



# Assam down town University

## Curriculum and Syllabus

### Master of Physiotherapy



OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**

July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022



*Chairperson  
Board of Studies*



*Member Secretary  
Academic Council*



## ***Vision***

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## ***Missions***

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community.

## Programme Details

### Programme Overview (not more than 100 words)

Bachelor of Physiotherapy (BPT) is a 4.5 year course including 6 months of internship. Students with a science background can pursue a career in physiotherapy. To practice as a physiotherapist or work professionally in a hospital or clinic, one must have a Bachelor's degree. The course provides students with a fundamental understanding of the human body based on medical sciences and training in therapy procedures and related skills. Course topics include anatomy, physiology, pathology, pharmacology, psychology, medical and surgical conditions, biomechanics, kinesiology, disability prevention, rehabilitation, and others. The course includes practical components, such as an internship where students work under professional supervision at various hospitals and institutions.

### Specific Features of the Curriculum

The Bachelor of Physiotherapy curriculum cultivates professional excellence by integrating expertise in musculoskeletal, neurological, cardiorespiratory, and paediatric physiotherapy. Students develop advanced clinical proficiency and empathetic patient care skills, ensuring superior healthcare outcomes. Practical research opportunities enable the development of innovative rehabilitation technologies, methodologies, and protocols, preparing graduates to lead advancements in physiotherapy practice. International competency is fostered through specialized certifications on global platforms, equipping students with interdisciplinary knowledge essential for navigating diverse healthcare environments. This comprehensive approach empowers graduates to excel as proficient, compassionate physiotherapy professionals capable of making significant contributions to global health and rehabilitation.

### Eligibility Criteria:

Minimum 50% in 10+2 with Physics, Biology & Chemistry. 5% relaxation for SC/ST, EWS, and Specially abled candidates.

### Program Educational Objectives (PEOs):

**PEO-1:** Any Physiotherapy Graduates will be well prepared for successful careers as physiotherapists in one or more of the sectors: hospitals, rehabilitation centres, academic institutions, sports clubs, NGOs, government schemes etc.

**PEO-2:** Physiotherapy graduates will be academically prepared to become licensed physiotherapy practitioners and will contribute effectively to the growth and development of the healthcare profession, and the society at large

**PEO-3:** The graduates will engage in professional practices to enhance their physiotherapeutic skill and stature, establish physiotherapy clinics or rehabilitation centres, and be successful in higher education if pursued.

## **I. Program Specific Outcomes (PSOs):**

**PSO1: Professional Excellence:** Exhibit expertise, advanced clinical proficiency, and empathetic patient care attitude across diverse subfields including musculoskeletal, neurological.

**PSO2: Practice in Research:** Able to develop new rehabilitation technology, methodology or protocol by doing research in physiotherapy. cardio respiratory, and pediatric domains for better healthcare outcomes.

**PSO3: International Competency:** Demonstrate global professional competencies by attaining interdisciplinary knowledge through specialized certifications offered on international learning platforms.

## **II. Program Outcome:**

**PO1: Physiotherapeutic Knowledge:** Apply comprehensive physiotherapeutic understanding and specialized knowledge for analyzing the functional aspects of the human body.

**PO2: Problem Analysis and Modern Approaches:** Assess, analyze and detect complex human dysfunction using suitable diagnostic techniques, and design respective physiotherapeutic solutions applying modern treatment approaches concerning healthcare policies and practices

**PO3: Circumstantial Rehabilitation:** Implement customized practices and management strategies in varying circumstantial conditions for solving physiotherapeutic problems and better rehabilitative outcomes of clinical practice in the

**PO4: Research-In-Practice:** Exhibit proficiency in utilizing high-quality evidence-based strategies that lead to excellence in professional practice.

**PO5: Communication:** Communicate effectively with patients/ diverse healthcare teams to comprehend health issues and be able to write effective reports.

**PO6: Professional Ethics:** Demonstrate commitment to ethical values adhering to the highest standard of integrity and accountability in the profession

**PO7: Teamwork and Leadership:** Function effectively as an individual or a member/ leader in diverse healthcare settings and teams.

**PO8: Lifelong Learning:** Ability to work independently and consistently acquire expertise in the continually developing domain of physiotherapeutic treatment methods and technology, while remaining adaptable to the dynamic changes in healthcare within society.

**Total Credits to be earned: 197**

**Career Prospects:**

Bachelor of Physiotherapy offers promising career prospects across various healthcare settings. Graduates can pursue roles as physiotherapists in hospitals, clinics, rehabilitation centers, and sports facilities, where they provide expert treatment for musculoskeletal, neurological, cardiorespiratory, and pediatric conditions. Opportunities exist in specialized areas such as sports medicine, orthopedics, geriatrics, and neurology, with options to work internationally or in interdisciplinary teams. Advancement into leadership positions, research, teaching, or consultancy roles is also feasible with experience and further education. With a growing demand for rehabilitation services globally, Bachelor of Physiotherapy graduates play a crucial role in improving patient outcomes and promoting wellness.

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 50% or as prescribed by the programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Sem Exam – I (ISE-I) (Written Examination)*	30
2.	In-Sem Exam – II (ISE-II) (Written Examination)*	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*are compulsory*

**Note:** Total Internal assessment should be out of 40

### INSTRUCTION

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.
2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.
3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

## **B. SEMESTER END EXAMINATION:**

Time table for end semester examination is published at least 25 days prior to the start of Examination.

### **I. Pre-Examination:**

#### **Eligibility Criteria for a student to appear in University Examinations:**

The student shall only be allowed to appear in a University Examination, if:

- i) He/ She is a registered student of the University;
- ii) He/ She is of good conduct and character;
- iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

### **II. Admit Card:**

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds.

### **III. Pattern of Question Papers:**

The question paper shall follow the principles of Bloom's Taxonomy.

Table

<b>S. N.</b>	<b>Level</b>	<b>Questions /verbs for test</b>
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify
4	Analyse	Classify, outline, categorize, analyze, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.
6	Create	Design, Formulate, Modify, Develop, integrate, etc.



**Note:** No course is to be evaluated on basis of **all 6 knowledge levels**.

The format of the question paper across all the program follow a unique pattern and the total marks is 60

**Table 1: Question paper pattern for End semester examination**

<b>Sl no</b>	<b>Question pattern</b>	<b>Total marks</b>
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

#### **V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

#### **VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Office-in-Charge of the center may take appropriate decisions as per the rules and procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

## **VII. Instruction to the Students:**

- (i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- (ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- (iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.
- (iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- (v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- (vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- (vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.
- (viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- (ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

## **VIII. Provision for an Amanuensis (writer):**

- (i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.
- (ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.

- (iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process.

### **C. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times CR$

#### **i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

#### **ii. Grade Point:**

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

#### **iii. Letter Grade:**

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

<b>Letter Grade</b>	<b>Grade Points</b>	<b>Description</b>
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

**iv. Grade Point Average:**

**a. SGPA (Semester Grade Point Average)**

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades ‘O’ to ‘F’ as given in Table 1.

$$SGPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  registered Course and  $C_i$  is the Credit (weight) of that Course.

## **b. CGPA (Cumulative Grade Point Average)**

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrollment in the Programme. In other words, taking into account all the Courses graded with 'O' to 'P' as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrollment.
- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i$ th completed Course and  $C_i$  is the Credit (weight) of that Course.

$$CGPA = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

- (iii) The CGPA shall be convertible into equivalent percentage of marks using Equation  
Conversion of CGPA to percentage marks: = CGPA\*10

## **D. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### **ii. Grievance Readdress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.
- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite proforma available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.
- (vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.
- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.
- (ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# INSTRUCTION TO TEACHERS AND STUDENTS

## (Teaching and Learning Methods)

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

### 1. Student- centric / Constructivist Approach:

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer and discuss in the successive class. This will

help in the preparation for various competitive examination and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student-centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

### **The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures	20%
Student-centric Approach, Students present and deliver lectures in the presence of teacher and supervised by teacher	60%
Students visit fields or perform experiments or teachers perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

### **The inquiry-based approach has to be followed in all the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned approaches and prepare a lesson plan for execution and maintain a file.



## Curriculum Framework

### Breakdown of Credits

Sl. No	Category	Total number of Credits
1	University Core(UC)	16
2	University Elective (UE)	19
3	Program Core(PC)	149
4	Program Elective (PE)	7
5	Faculty Elective (FE)	6
<b>Total number of credit</b>		<b>197</b>

### Breakdown by categories of courses

Sl no	Category	Credits	%
1	Physiotherapy and Rehabilitation	156	79.19
2	Paramedical Sciences	19	9.64
3	Sciences	6	3.04
4	Engineering	2	1.02
5	Commerce and Management	2	1.02
6	Humanities and Social Sciences	12	6.09
<b>Total</b>		<b>197</b>	<b>100</b>

## SEMESTER WISE COURSE DISTRIBUTION

Semester I														
S. N.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total
				L	T	P	S	R	O		IA*	SEE*	PE*	
1.	22BPTO111R	Biomechanics Of Human Motion	PC-	3	0	2	0	0	0	4	40	60	100	200
2	22BPTO112R	Human Anatomy	PC-	3	0	4	0	0	0	5	40	60	100	200
3	22BPTO113R	Human Physiology	PC-	3	0	4	0	0	0	5	40	60	100	200
4	22BPTO114R	Biochemistry	PC-	2	0	0	0	0	0	2	40	60	0	100
5	22BPTO115R	Psychology & Sociology	PC-	2	0	0	0	0	0	2	40	60	0	100
6	22UBPD112R	ELEMENTARY ENGLISH (Communicative English & Soft skills)	UE-AEC-SEC	0	0	4	0	0	0	2	0	0	100	100
7	22UBEC111	Extra-Curricular	UC-VAC-SEC	0	0	0	4	0	0	1	0	0	0	0
<b>Total</b>				<b>13</b>	<b>0</b>	<b>14</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>200</b>	<b>300</b>	<b>400</b>	<b>900</b>
Semester II														
S. No.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total
				L	T	P	S	R	O		IA*	SEE*	PE*	
1.	22BPTO121R	Biomechanics Of Human Motion	PC-	3	0	2	0	0	0	4	40	60	100	200
2	22BPTO122R	Human Anatomy	PC-	3	0	4	0	0	0	5	40	60	100	200
3	22BPTO123R	Human Physiology	PC-	3	0	4	0	0	0	5	40	60	100	200
4	22BPTO124R	Biochemistry	PC-	2	0	0	0	0	0	2	40	60	100	200
5	22BPTO125R	Psychology & Sociology	PC-	2	0	0	0	0	0	2	40	60	100	200
6	22UBPD122R	Implicit English(Communicative English & Soft Skills)	UE-AEC-SEC	0	0	4	0	0	0	2	0	0	100	100
7	22UBCC121	Co-Curricular	UC-VAC-SEC	0	0	0	4	0	0	1	0	0	0	0
8	22UBEC121	Extra-Curricular	UC-VAC-SEC	0	0	0	4	0	0	1	0	0	0	0
9	22BPTO126R	Basic Life Support (BlS)	PC-AEC-AECC	0	0	2	0	0	0	1	0	0	100	100
10	22MOCE101R/102R/103R	Mooc/Online	FE-	0	0	0	0	0	0	1	0	0	100	100

11	22UCDL102R	Digital Literacy (Digital Proficiency)	UC-AEC-SEC	0	0	2	0	0	0	1	0	0	100	100
<b>Total</b>				<b>13</b>	<b>0</b>	<b>18</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>200</b>	<b>300</b>	<b>900</b>	<b>1400</b>

**Semester III**

S. No.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total
				L	T	P	S	R	O		IA*	SEE*	PE*	
1.	22BPTO211R	Exercise Therapy	PC-	3	0	6	0	0	0	3+3=6	40	60	100	200
2	22BPTO212R	Electro Therapy	PC-	3	0	6	0	0	0	3+3=6	40	60	100	200
3	22BPTO213R	Pharmacology	PC-	2	0	0	0	0	0	2	40	60	0	100
4	22BPTO214R	Microbiology & Pathology	PC-	2	0	0	0	0	0	2	40	60	0	100
5	22BPTO215R	Biostatistics & Research Methodology	PC-	2	0	0	0	0	0	2	40	60	0	100
6	22BPTO217R	Environmental Sciences	UC-AEC-AECC	2	0	0	0	0	0	2	40	60	0	100
7	22UBPD212R	English Language For Excellence (Communicative English & Soft Skills)	UE-AEC-SEC	0	0	4	0	0	0	2	0	0	100	100
8	22UBCC211	Co-Curricular	UC-VAC-SEC	0	0	0	4	0	0	1	0	0	0	0
9	22BPTO216R	Quality Control And Patient Safety	PC-AEC-AECC	0	0	2	0	0	0	1	0	0	100	100
10	22UBEC211	Extra-Curricular	UC-VAC-SEC	0	0	0	4	0	0	1	0	0	0	0
11	22BPTOMC01/02/03	Mooc/Online	FE-	0	0	0	0	0	0	1	0	0	100	100
12	22UULS202R	Basic Life Saving Skills (Blss)	UC-AEC-SEC	3	0	0	0	0	0	3	0	0	100	100
13	22UUFL201R	Financial Literacy (Introduction To Financial Budgeting And Planning)	UC-AEC-SEC	0	0	2	0	0	0	1	0	0	100	100
<b>Total</b>				<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>240</b>	<b>360</b>	<b>700</b>	<b>1300</b>

**Semester IV**

S. N.	Course Code	Course Title	Course	Engagement	Maximum Marks for
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			Category	L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
1.	22BPTO221R	Exercise Therapy	PC-	3	0	6	0	0	0	3 + 3 = 6	40	60	100	200
2	22BPTO222R	Electrotherapy	PC-	3	0	6	0	0	0	3 + 3 = 6	40	60	100	200
3	22BPTO223R	Pharmacology	PC-	2	0	0	0	0	0	2	40	60	0	100
4	22BPTO224R	Microbiology & Pathology	PC-	2	0	0	0	0	0	2	40	60	0	100
5	22BPTO225R	Biostatistics & Research Methodology	PC-	2	0	0	0	0	0	2	40	60	0	100
6	22UBPD222R	English For Employability (Communicative English & Soft Skills)	UE-AEC-SEC	0	0	4	0	0	0	2	0	0	100	100
7	22UBCC221	Co-Curricular	UC-VAC-SEC	0	0	0	4	0	0	1	0	0	0	0
8	22UBEC221	Extra-Curricular	UC-VAC-SEC	0	0	0	4	0	0	1	0	0	0	0
9	22BPTO226R	Nutrition And Diet Therapy	PC-AEC-AECC	0	0	2	0	0	0	1	0	0	100	100
10	22UUHV105R	Universal Human Value (UHV) + Professional Ethics	UC-VAC-AECC	1	0	2	0	0	0	2	40	60	100	200
11	22BPTOMC04/05/06	Mooc/Online	FE-	0	0	0	0	0	0	1	0	0	100	100
	22UULS201R	Basic Acclimatization Skills (Bas)	UC-AEC-SEC	0	0	2	0	0	0	1	0	0	100	100
<b>Total</b>				<b>13</b>	<b>0</b>	<b>22</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>27</b>	<b>240</b>	<b>360</b>	<b>700</b>	<b>1300</b>

Semester V														
S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			Total
				L	T	P	S	R	O	C	IA*	SEE*	PE*	
1.	22BPTO311R	Clinical Orthopaedics And Traumatology	PC-	3	0	0	0	0	0	3	40	60	0	100
2	22BPTO312R	Clinical Neurology And Neurosurgery	PC-	3	0	0	0	0	0	3	40	60	0	100
3	22BPTO313R	General Medicine	PC	2	0	0	0	0	0	2	40	60	0	100

4	22BPTO314 R	General Surgery	PC-	2	0	0	0	0	0	2	40	60	0	100
5	22BPTO315 R	Community Medicine	PC	2	0	0	0	0	0	2	40	60	0	100
6	22BPTO316 R	Diagnostic Imaging For Physiotherapist	PC-	1	0	0	0	0	0	2	40	60	0	100
7	22BPTO317 R	Ergonomics In Sports And Physical Activity	PC- AEC- AECC	0	0	2	0	0	0	1	0	0	100	100
8	22BPTO301 R/22BPTO3 02R	Generic/Open/Univer sity Elective	UE-	0	0	0	0	0	0	2	0	0	100	100
9	22UBCC311	Co-Curricular	UC- VAC- SEC	0	0	0	4	0	0	1	0	0	100	100
10	22UBEC311	Extra-Curricular	UC- VAC- SEC	0	0	0	4	0	0	1	0	0	100	100
11	22BPTOMC 07/08/09	Mooc/Online	FE-	0	0	0	0	0	0	1	0	0	100	100
12	22BPTE311 R / 22BPTE312 R	Physical Activity And Public Health Practice / Physiotherapy In Palliative Care	PE-	1	0	0	0	0	0	1	0	0	100	100
13	22BPT318R	Clinical Posting Based Project	PC-	0	0	0	0	12	0	2	0	0	100	100
<b>Total</b>				<b>14</b>	<b>0</b>	<b>2</b>	<b>8</b>	<b>12</b>	<b>0</b>	<b>23</b>	<b>280</b>	<b>420</b>	<b>700</b>	<b>1100</b>

**Semester VI**

S. N.	Course Code	Course Title	Course Categor y	Engagement							Maximum Marks for			Total
				L	T	P	S	R	O	C	IA*	SEE*	PE*	
1.	22BPTO321 R	Clinical Orthopedics And Traumatology	PC-	3	0	0	0	0	0	3	40	60	0	100
2	22BPTO322 R	Clinical Neurology And Neurosurgery	PC-	3	0	0	0	0	0	3	40	60	0	100
3	22BPTO323 R	General Medicine	PC-	2	0	0	0	0	0	2	40	60	0	100
4	22BPTO324 R	General Surgery	PC-	2	0	0	0	0	0	2	40	60	0	100
5	22BPTO325 R	Community Medicine	PC-	2	0	0	0	0	0	2	40	60	0	100
6	22BPTO326 R	Diagnostic Imaging for Physiotherapist	PC-	2	0	2	0	0	0	2	40	60	0	100
7	22UBCC321	Co-Curricular	UC- VAC- SEC	0	0	0	4	0	0	1	0	0	100	100

## Semester VII

S. N.	Course Code	Course Title	Course Category	Engagement							C	Maximum Marks for			Total
				L	T	P	S	R	O	IA*		SEE*	PE*		

8	22UBEC321	Extra-Curricular	UC-VAC-SEC	0	0	0	4	0	0	1	0	0	100	100
9	22BPTO302R	Generic/Open/University Elective	UE-	0	0	0	0	0	0	2	0	0	100	100
10	22BPTO327R	Prosthetics And Orthotics	PC-AEC-AECC	0	0	2	0	0	0	1	0	0	100	100
11	22BPTOMC010/11/12	Mooc/Online	FE-	0	0	0	0	0	0	1	0	0	100	100
12	22BPTO328R	Physical And Functional Diagnosis	PC-AEC-AECC	0	0	0	4	0	0	1	0	0	100	100
13	22BPTO329R	Clinical Posting Based Project	PE-	0	0	0	0	12	0	2	0	0	100	100
<b>Total</b>				<b>14</b>	<b>0</b>	<b>8</b>	<b>12</b>	<b>12</b>	<b>0</b>	<b>23</b>	<b>280</b>	<b>420</b>	<b>700</b>	<b>1100</b>

1.	22BPTO411R	Pt In Orthopedics Conditions	PC-	2	0	4	0	0	0	2+2 = 4	40	60	100	200
2	22BPTO412R	Pt In Neurological Conditions	PC-	2	0	4	0	0	0	2+2 = 4	40	60	100	200
3	22BPTO413R	Pt In Cardiothoracic Conditions And General Condition	PC-	2	0	4	0	0	0	2+2 = 4	40	60	100	200
4	22BPTO414R	Pt In Obstetrics & Gynaecology And General Surgery	PC-	2	0	2	0	0	0	2+1 = 3	40	60	100	200
5	22BPTO415R	Community Based Rehabilitation	PC-	2	0	2	0	0	0	2+1 = 3	40	60	100	200
6	22BPTO416R	Allied Therapeutics And Sports Physiotherapy	PC-	2	0	0	0	0	0	2	40	60	0	100
7	22BPTO417R	Geriatric Rehabilitation	PC-AEC-AECC	0	0	2	0	0	0	1	0	0	100	100
8	22UBCC411	Co-Curricular	UC-VAC-SEC	0	0	0	4	0	0	1	0	0	100	100
9	22BPTOMC013/14/15	Mooc/Online	FE-	0	0	0	0	0	0	1	0	0	100	100
10	22BPTO418R	Clinical Posting Based Project	PE-	0	0	0	0	12	0	2	0	0	100	100
<b>Total</b>				<b>12</b>	<b>0</b>	<b>18</b>	<b>4</b>	<b>12</b>	<b>0</b>	<b>25</b>	<b>240</b>	<b>360</b>	<b>900</b>	<b>1500</b>

**Semester VIII**

S. N.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total
				L	T	P	S	R	O		IA*	SEE*	PE*	
1.	22BPTO421R	Pt In Orthopedics Conditions	PC-	2	0	4	0	0	0	2+2 = 4	40	60	100	200
2	22BPTO422R	Pt In Neurological Conditions	PC-	2	0	4	0	0	0	2+2 = 4	40	60	100	200
3	22BPTO423R	Pt In Cardiothoracic Conditions And General Condition	PC-	2	0	4	0	0	0	2+2 = 4	40	60	100	200
4	22BPTO424R	Pt In Obstetrics & Gynaecology And General Surgery	PC-	2	0	2	0	0	0	2+1 = 3	40	60	100	200
5	22BPTO425R	Community Based Rehabilitation	PC-	2	0	2	0	0	0	2+1 = 3	40	60	100	200
6	22BPTO426R	Allied Therapeutics And Sports Physiotherapy	PC-	2	0	0	0	0	0	2	40	60	100	200

7	22BPTO427R	Clinical Posting Based Project	PE-	0	0	0	0	12	0	2	0	0	100	100
<b>Total</b>				<b>12</b>	<b>0</b>	<b>16</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>22</b>	<b>240</b>	<b>360</b>	<b>600</b>	<b>1300</b>

**\*IA: Internal Assessment, SEE: Semester End Examination,  
PE: Practical Examination**

SEMESTER – I											
Course Title		BIOMECHANICS OF HUMAN MOTION									
Course code	22BPTO111 R	TOTAL CREDITS: 4			L	T	P	S	R	O/ F	C
		TOTAL HOURS: 45T+30P			3	0	2	0	0	0	4
PRE-REQUISITE	NIL	CO-REQUISITE	Human Anatomy and Human Physiology								
Programme	Bachelor in Physiotherapy										
Semester	1 <sup>st</sup>										
Course Objectives	1.To introduce the students to the concepts related to basic Joint Structure and Function, Muscle Structure and Function, Biomechanics of Shoulder Complex, Biomechanics of Elbow Complex, Biomechanics of the Wrist and Hand Complex, Biomechanics of Temporomandibular Joint. 2. To introduce the students to the mechanical aspects of the human body. 3. To make the students able to identify the normal movements of the body and recognize the abnormalities										
CO1	Apprehend the knowledge of kinetics and kinematics of the human body.										
CO2	Identify the movements of all the joints of the body and recognize the abnormalities present and thereby understand the patho-mechanics related to the joints.										
CO3	Identify the joints and muscle and demonstrate the various mechanisms causing the movement in different joints.										
CO4	Comprehend the concept of forces acting at various joints, muscle and the importance of joint work in activities of daily living.										
CO5	Explain the anatomical axis and planes and learn thoroughly about each movement occurring at all the joints of the human body.										
Unit-No.	Content				Contact Hour	Learning Outcome				KL	



<b>I</b>	<b>Basic Concepts of Biomechanics:</b> <ul style="list-style-type: none"> <li>• <b>Kinematics:</b> Description of Motion, Types of Motion, Location of Motion, Direction and Magnitude of Motion</li> <li>• <b>Kinetics:</b> Analysis of Forces, Definition, Force of Gravity, Reaction of Forces, Equilibrium, Objects in Motion, Force of Friction, Concurrent Force Systems, Parallel Force Systems, Work, Moment arm of Force, Force Components, Equilibrium of Levers</li> </ul>	8 Hrs	To have knowledge about the kinetics and kinematics of human body and to understand how physics are applied to the human body.	1,2
<b>II</b>	<b>Joint Structure and Function:</b> Joint Design, Specific connective tissue structures, General Properties of Connective Tissue, Human Joint Design, Kinematic Chains, Arthrokinematics and Osteokinematics.	8 Hrs	To learn about the various joint structures, connective tissues and kinematics.	1,2
<b>III</b>	<b>Muscle Structure and Function:</b> Mobility and Stability Functions of Muscles, Elements of Muscle Structure, Muscle Function, Effects of Immobilization, Injury and Aging on Muscle Tissues	8 Hrs	To gather information about the muscle structure, function and effects of injury and aging on muscle tissues.	1,2
<b>IV</b>	<ul style="list-style-type: none"> <li>• <b>Biomechanics of Shoulder Complex:</b> Components of shoulder complex, Integrated Function of Shoulder Complex, Mobility and Stability of Shoulder Complex, Structural and Functional Dysfunctions around Shoulder Complex</li> <li>• <b>Biomechanics of Elbow Complex:</b> Structure and function of the Elbow Complex, Structure and Function of the superior and inferior Radio-ulnar Joints, Mobility and Stability of Elbow Complex, Effect of Immobilization and Injury</li> </ul>	13 Hrs	To acquire knowledge about the shoulder complex and elbow complex and their mechanisms.	1,2
<b>V</b>	<ul style="list-style-type: none"> <li>• <b>Biomechanics of the Wrist and Hand Complex:</b> Structural components of the Wrist complex, function, structure and function of the Hand Complex, Finger Musculature, Functional Position of the Wrist and Hand</li> <li>• <b>Biomechanics of Temporomandibular Joint:</b> Structure and Function of Temporomandibular joint, Control of the disk, Muscular control of Temporomandibular joint, Relationship with the cervical spine, Dentition, Dysfunctions.</li> </ul>	8 Hrs	To learn about the wrist and hand complex, temporomandibular joint functions and dysfunctions.	1,2
<b>Practical</b>	1. Analysis of muscle work during ADL activities.	15Hrs	To analyse the activities and mention the muscle work	1,2,3,4

	2. Orientation to - Equilibrium board, Shoulder wheel, Shoulder ladder, Bicycle ergometer, Use of parallel Bars. CPM, stepper, treadmill wall Bars, Tilt Beds, springs, Pulleys, overhead pulley system, physio ball, exercise mat, theraband, suspension therapy.	10 Hrs	Identification and purpose of the equipments.	3,4
	3. Walking aids (10hrs).	5 Hrs	Identification of the aids and their uses.	2,3,4

### TEXT BOOKS:

1. Joint Structure and Function – A comprehensive Analysis By Pamela K Levangie, Cynthia C Norkin, JP Bros Medical Publishers, New Delhi.
2. Fundamentals of Biomechanics by Duane Knudson, 2nd ed. 2007 Publisher Springer

### REFERENCE BOOKS:

1. Clinical Kinesiology for Physical Therapist Assistants, JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997.
2. Brunnstrom, Clinical Kinesiology, JP Bros Medical Publishers, Bangalore, 5<sup>th</sup> Ed 1996, 1<sup>st</sup>Indian Ed1998

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apprehend the knowledge of kinetics and kinematics of the human body.	1,2,3,4,5,6,7,8
2	Identify the movements of all the joints of the body and recognize the abnormalities present and thereby understand the pathomechanics related to the joints.	1,2,3,4,5,8
3	Identify the joints and muscle and demonstrate the various mechanisms causing the movement in different joints.	1,2,3,4,5,6,8
4	Comprehend the concept of forces acting at various joints, muscle and the importance of joint work in activities of daily living.	1,2,3,4,5,7
5	Explain the anatomical axis and planes and learn thoroughly about each movement occurring at all the joints of the human body.	1,2,3,4,5,7,8

### MAPPING TABLE

	Course Name: BIOMECHANICS OF HUMAN MOTION	
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Course Code:22BPT0111 R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	3	2	3	2	1	1	1	2	1	0	0
	CO2	2	2	3	2	1	0	0	1	1	0	0
	CO3	2	2	3	2	1	1	0	1	2	0	0
	CO4	2	1	2	2	1	0	1	0	1	0	0
	CO5	3	2	3	2	1	0	2	1	1	1	0
	Average	2.4	1.8	2.8	2	1	0.4	0.8	1	1.2	0.2	0
	Count	12	10	14	9	6	4	5	5	6	1	0

SEMESTER – I										
Course Title	<b>HUMAN ANATOMY</b>									
Course code	22BPT0112R	TOTAL CREDITS: 5 TOTAL HOURS: 45T+60P	L	T	P	S	R	O/ F	C	
			3	0	4	0	0	0	5	
PRE-REQUISITE	NIL	CO-REQUISITE	Human Physiology and Biomechanics							
Programme	Bachelor in Physiotherapy									
Semester	1 <sup>st</sup>									
Course Objectives	<p>1. To introduce the students to the concepts related to Introduction to anatomical terms, Musculo skeletal anatomy, Head and neck, Regional anatomy, Digestive system, Endocrine glands, Tissue, Embryology.</p> <p>2. The objective of the course is that after lectures, demonstration, and practical the students shall be able to demonstrate knowledge in human anatomy as needed for the study and practice of physiotherapy.</p> <p>3. To make the students identify specific bones, muscles, joints and describe the features in details</p>									
CO1	Identify the joints, muscles and bone of the human body.									
CO2	Classify the different systems of the human body which comprises of the Central Nervous System, Cardio respiratory system, Reproductive system, etc.									
CO3	Mark the surface anatomy of the human body like the specific bones, muscles and organs of the body.									
CO4	Assess various surface landmarks of the human body.									
CO5	Identify and describe the source, course of major arterial, venous and lymphatic system, with special emphasis to upper extremities, thorax and spine.									
Unit-No.	Content					Contact Hour	Learning Outcome			KL

I	<p><b>INTRODUCTION TO ANATOMICAL TERMS.</b> (All the topics to be taught in detail)</p> <ul style="list-style-type: none"> <li>●Introduction- Anatomical positions of body, axes, planes, common anatomical terminologies (Groove,tuberosity,trochanters etc.)</li> <li>●Connective tissue- classification.</li> <li>●Bones- Composition &amp; functions, classification and types according to morphology and development.</li> <li>●Joints-definition-classification, structure of fibrous, cartilaginous joints, blood supply and nerve supply of joints.</li> </ul> <p>Muscles – origin, insertion, blood supply,nerve supply and actions</p>	10 hours	To understand and use the anatomical terms and explain the bones, joints, etc	2,3
II	<p><b>MUSCULOSKELETAL ANATOMY</b>(All the topics to be taught in detail)</p> <p><b>Upper Extremity</b></p> <ol style="list-style-type: none"> <li>a .Osteology, myology, nerve &amp; blood supply and lymphatic drainage of upper extremity</li> <li>b. Soft parts: Breast, pectoral region, axilla, cubital fossa</li> <li>c. Joints: Introduction to all joints of Upper Extremity.</li> <li>d. Arches of hand, skin of the palm and dorsum of hand.</li> </ol> <p><b>Head and Neck:</b></p> <p><b>Osteology:</b> Mandible and bones of the skull.</p> <p><b>Soft parts:</b> Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck.</p>	8 hours	To be able to demonstrate the features and side determination of the bones of human body.	1,2
III	<p><b>REGIONAL ANATOMY</b> (All the topics to be taught in detail)</p> <p>Thorax:</p> <p><b>a) Cardio – Vascular System:</b></p> <p>Mediastinum: Divisions and contents Pericardium: Thoracic Wall, Heart: Position, shape and parts of the heart, Conducting System, Big vessels, Circulation of the heart</p> <p><b>b)Respiratory system:</b> Outline of respiratory passages Pleura and lungs: position, parts, relations, blood supply and nerve supply; Lungs – emphasize on Broncho pulmonary segments. Diaphragm, Intercostal muscles and Accessory muscles of respiration.</p>	10 hours	To understand and explain the cardio vascular and respiratory systems.	1,3

<p><b>IV</b></p>	<p><b>1.DIGESTIVE SYSTEM</b>  a) Peritoneum: Parietal peritoneum, visceral peritoneum, folds of peritoneum, functions of peritoneum.  b) Large blood vessels of the gut.  c) Location, size, shape, features, blood supply, nerve supply and functions of the following:  Stomach, liver, spleen, pancreas, intestines, gall bladder.</p> <p><b>2.ENDOCRINE GLANDS:</b>  Position, shape, size, function, blood supply and nerve supply of the following glands:  Hypothalamus and pituitary gland, thyroid glands, parathyroid glands, Adrenal glands, pancreatic islets, ovaries and testes, pineal glands, thymus</p>	<p><b>12 hours</b></p>	<p><b>To understand and explain the digestive and endocrine glands.</b></p>	<p>3,4</p>
<p><b>V</b></p>	<p><b>1.TISSUE</b> General Histology, study of the basic tissues of the body ;Microscope, Cell, Epithelium, Connective Tissue, Cartilage, Bone, Muscular tissue, Nerve Tissue – TS &amp; LS, Circulatory system – large sized artery, medium sized artery, large sized Vein, lymphoid tissue, Skin and its appendages.  <b>2.EMBRYOLOGY</b>  a)Ovum, Spermatozoa, fertilization and formation of the Germ layers and their derivations.  b)Development of skin, Fascia, blood vessels, lymphatic.  c)Development of bones, axial and appendicular skeleton and muscles  d)Neural tube, brain vessels and spinal cord  e)Development of brain and brain stem structures</p>	<p><b>5 hours</b></p>	<p><b>To understand the basic of general tissues of the body and the embryology.</b></p>	<p>1,2</p>

<p><b>Practical</b></p>	<p>a. Upper extremity including surface Anatomy.  b. Histology-Elementary tissue including surface Anatomy.  c. Embryology-models, charts &amp; X-rays.</p> <p>-Demonstration of the muscles of the whole body and organs in thorax and abdomen in a cadaver  -Demonstration of movements in important joints.  -Surface making of the lung, pleura, fissures and lobes of lungs, heart, liver, spleen,  -Kidney, cranial nerves, spinal nerves and important blood vessels.  -Identification of body prominences on inspection and by palpation especially of extremities.  -Points of palpation of nerves and arteries.</p>	<p><b>60 Hrs</b></p>	<p><b>To demonstrate the surface anatomy, identify histology slides, organs and palpation.</b></p>	<p>1,2,3,4</p>
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### TEXT BOOKS:

- 1.DATTA [A.K], Essentials of human Anatomy: Thorax and Abdomen Ed 2. Vol. I Current Book International, Culcutta 1994,p433,DATTA[A.K], Essentials of human Anatomy: Head and Neck Ed2. Vol. II, Current Book International, Culcutta 1995, p363,
- 2.SINGH [Inderbir], Text book of Anatomy with colour atlas: Introduction, Osteology, Upper Extremity, Lower Extremity. Vol I. P Brothers, New Delhi 1996,
- 3.SINGH [Inderbir], Text book of Anatomy with colour Atlas: Thorax and Abdomen. Vol II. JP

### REFERENCE BOOKS:

1. SNELL [Richard S], Clinical Anatomy for Medical students: Ed. 5. Little Brown and Company Boston. 1995,p898,
2. B.D Chaurasia's Human Anatomy – Regional and Applied; Volume I, Volume II and Volume III.
3. MOORIE [Kieth L], Clinically Oriented Anatomy. Ed.3. Williams and Wilkins, Baltimore, 1992,p917,
4. ROMANES [ G J], Cunningham manual of practical anatomy: upper and lower limb ed 15 Vol I Oxford Medical Publication, Oxford 1996, P263,
5. ROMANES [G J], Cunningham manual of practical anatomy: Thorax and abdomen ed 15 Vol II Oxford Medical Publication, Oxford 1996, P298,
6. ROMANES [G J], Cunningham manual of practical anatomy: Head and Neck and Brain ed 15 Vol II Oxford Medical Publication, Oxford 1996, P346

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping												
SN	Course Outcome (CO)	Mapped Program Outcome										
1	Identify the joints, muscles and bone of the human body.	3,8										
2	Classify the different systems of the human body which comprises of the Central Nervous System, Cardio respiratory system, Reproductive system, etc.	1,8										
3	Mark the surface anatomy of the human body like the specific bones, muscles and organs of the body.	1,8										
4	Assess various surface landmarks of the human body.	1,6,8										
5	Identify and describe the source, course of major arterial, venous and lymphatic system, with special emphasis to upper extremities, thorax and spine.	1,3,8										
<b>Course Name: HUMAN ANATOMY</b>												
Course	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
Code:22BPTO112R	CO1	3	0	0	0	0	0	0	2	1	0	0
	CO2	3	0	0	0	0	0	0	2	1	0	0
	CO3	3	0	0	0	0	0	0	2	2	0	0
	CO4	3	0	0	0	0	1	0	2	1	0	0
	CO5	3	0	1	0	0	0	0	2	1	1	0
	Average	3	0	0.2	0	0	0.2	0	2	1.2	0.2	0
	Count	15	0	1	0	0	1	0	10	6	1	0

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SEMESTER – I										
Course Title	HUMAN PHYSIOLOGY									
Course code	22BPTO113R	TOTAL CREDITS: 5 TOTAL HOURS: 45T+60P	L	T	P	S	R	O/ F	C	
			3	0	4	0	0	0	5	
PRE-REQUISITE	NIL	CO-REQUISITE	Human Anatomy							
Programme	Bachelor in Physiotherapy									
Semester	1st									
Course Objectives	1.To introduce the students to the concepts related to General physiology, Blood, Nerve muscle physiology, Cardiovascular system, Respiratory system, Digestive system. 2. The objective of this course is that after lectures, demonstration, and lab practical the students will be able to demonstrate and understanding of Human Physiology as needed for the study and practice of physiotherapy									
CO1	Impart an in- depth knowledge of fundamental reactions of living organisms, particularly in the human body.									

<b>CO2</b>	Acquainted with practical classes including hematology experiments, clinical examinations, amphibian chart, and recommended demonstrations.			
<b>CO3</b>	Outline the subject in terms of its function for various system of human body.			
<b>CO4</b>	Analyze physiological responses & adaptation to environmental stresses- with special emphasis on physical activity & temperature.			
<b>CO5</b>	Acquire the skill of basic clinical examination, with special emphasis to Cardiovascular and Respiratory system, & Exercise tolerance/Ergography.			
<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<p><b>GENERAL PHYSIOLOGY</b> Cell: Morphology. Organelles: their structure and functions</p> <ul style="list-style-type: none"> <li>• Transport Mechanisms across the cell membrane</li> <li>• Body fluids: Distribution, composition. Tissue fluid –formation.</li> </ul> <p><b>BLOOD</b></p> <ul style="list-style-type: none"> <li>• Introduction: Composition and functions of blood.</li> <li>• Plasma: Composition, formation, functions. Plasma proteins.</li> <li>• RBC: count and its variations. Erythropoiesis. Haemoglobin - Blood indices, PCV, ESR.</li> <li>• WBC: Classification. Morphology, functions, count, its variation of each. Immunity</li> <li>• Platelets: Morphology, functions, count, its variations</li> </ul> <p>Hemostatic mechanisms: Blood coagulation– factors, mechanisms, their disorders. Anticoagulants.</p> <p>Blood Groups: Landsteiner’s law. Types, significance, determination, Erythroblastosis foetalis. Blood Transfusion: Cross matching. Indications and complications. Lymph: Composition, formation, circulation and functions.</p>	<b>10 hours</b>	<b>Learn about human cell, blood physiology.</b>	1,2



<p><b>II</b></p>	<p><b>1. NERVE MUSCLE PHYSIOLOGY</b></p> <p><b>Introduction:</b> Resting membrane potential. Action potential – ionic basis and properties.</p> <p><b>Nerve:</b> Structure and functions of neurons. Classification, Properties and impulse transmission of nerve fibres.</p> <p><b>Nerve injury</b> – degeneration and regeneration.</p> <p><b>Neuroglia:</b> Types and functions.</p> <p><b>Muscle:</b> Classification. Skeletal muscle: Structure. Neuromuscular junction: Structure. Neuromuscular transmission, myasthenia gravis. <b>Excitation-</b> Contraction coupling. Rigormortis. Motor unit. Properties of skeletal muscles,</p> <p><b>Strength-</b> Duration curve, fatigue. Smooth muscle: Structure, types, mechanism of contraction. Plasticity</p>	<p><b>10 hours</b></p>	<p><b>Learn about nerve physiology, muscle physiology, neuromuscular junction.</b></p>	<p>1,2</p>
<p><b>III</b></p>	<p><b>CARDIOVASCULAR SYSTEM</b></p> <ul style="list-style-type: none"> <li>• Introduction: Organisation of CVS. Cardiac muscles: Structure. Ionic basis of action potential and pacemaker potential.</li> <li>• Conducting system: Components. Impulse conduction Cardiac Cycle. Heart sounds. ECG: waves &amp; common abnormalities of ECG.</li> <li>• Cardiac Output. Stroke volume and its regulation. Heart rate and its regulation. Their variations</li> <li>• Arterial Blood Pressure: Definition. Normal values and its variations. Determinants. Peripheral resistance. Regulation of BP.</li> <li>• Arterial pulse.</li> <li>• Shock – Definition. Classification – causes and features</li> <li>• Regional Circulation: Coronary, Cerebral and Cutaneous circulation.</li> </ul>	<p><b>10 hours</b></p>	<p><b>Learn about physiology of cardiovascular system, ECG, Blood pressure, shock.</b></p>	<p>1,2</p>

IV	<p><b>1. RESPIRATORY SYSTEM</b></p> <ul style="list-style-type: none"> <li>• Introduction: Organisation &amp; Functions of respiratory system. Respiratory muscles.</li> <li>• Mechanics of breathing: Intrapleural and Intrapulmonary pressure changes during respiration. Chest expansion. Lung compliance, Surfactant</li> <li>• Spirometry: Lung volumes and capacities. Timed vital capacity and its clinical significance. Maximum ventilation volume. Respiratory minute volume.</li> <li>• Dead Space: Types and their definition.</li> <li>• Pulmonary Circulation. Ventilation-perfusion ratio and its importance.</li> <li>• Transport of respiratory gases: Diffusion across the respiratory membrane. Oxygen transport – Different forms, oxygen-haemoglobin dissociation curve. Factors affecting it. P50, Haldane and Bohr effect. Carbon dioxide transport: Different forms, chlorideshift.</li> <li>• Regulation of Respiration: Neural Regulation. Hering-breuer's reflex. Voluntary control. Chemical Regulation</li> <li>• Hypoxia: Effects of hypoxia. Types of hypoxia. Acclimatization Hypercapnoea. Asphyxia. Dysbarism</li> <li>• Disorders of Respiration</li> <li>• Artificial respiration</li> <li>• Respiratory changes during exercise.</li> </ul>	10 hours	Learn about physiology of respiratory system, spirometry, transport mechanism, regulation.	1,3
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V	<b>DIGESTIVE SYSTEM</b> <ul style="list-style-type: none"> <li>• Salivary Secretion: Saliva: Composition. Functions. Regulation. Mastication (in brief)</li> <li>• Swallowing: Definition. Different stages. Functions.</li> <li>• Stomach: Functions. Gastric juice: Gland, composition, function, regulation. Gastrin: Production, function and regulation. Peptic ulcer. Gastric motility. Gastric emptying. Vomiting.</li> <li>• Pancreatic Secretion: Composition, production, function. Regulation.</li> <li>• Liver: Functions of liver. Bile secretion: Composition, functions and regulation. Gall bladder: Functions.</li> <li>• Intestine: Succus entericus: Composition, function and regulation of secretion. Intestinal motility and its function and regulation. Mechanism of Defaecation.</li> </ul>	5 hours	<b>Learn about physiology of digestive system</b>	1,2
Practical	<b>PRACTICAL</b> <b>I. Haematology</b> To be done by the students 1. Study of Microscope and its uses 2. Determination of RBC count 3. Determination of WBC count 4. Differential leukocyte count 5. Estimation of haemoglobin 6. Calculation of blood indices 7. Determination of blood groups 8. Determination of bleeding time 9. Determination of clotting time  <b>II Demonstrations only</b> 1. Determination of ESR 2. Determination of PCV	60 hours	<b>Learn how to demonstrate various haematological tests.</b>	1,2,3,4,5

**TEXT BOOKS:**

1. Text book of medical physiology – Guyton Arthur
2. Concise medical physiology – Chaudhuri Sujit K.
3. Human Physiology – Chatterjee C.C
4. Text book of practical Physiology –Ranade.
5. Text of Physiology – A.K.Jain.

**REFERENCE BOOKS:**

1. Basics of Medical physiology- Venkatesh D &Sudhakar HH
2. Manipal Manual of Physiology – Prof. C N Chandrashekar  
Reference:
3. Review of Medical Physiology – Ganong William F.
4. Physiological basis of Medical practice – Best &Taylor

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping			MAPPING TABLE
SN	Course Outcome (CO)	Mapped Program Outcome	
1	Impart an in- depth knowledge of fundamental reactions of living organisms, particularly in the human body.	1,8	
2	Acquainted with practical classes including haematology experiments, clinical examinations, amphibian chart, and recommended demonstrations.	3,8	
3	Outline the subject in terms of its function for various system of human body.	1,2	
4	Analyze physiological responses & adaptation to environmental stresses- with special emphasis on physical activity & temperature.	1,2,8	
5	Acquire the skill of basic clinical examination, with special emphasis to Cardiovascular and Respiratory system, & Exercise tolerance/Ergography.	1,2,8	

Course Name:HUMAN PHYSIOLOGY												
Course Code: 22BPTO113R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	3	0	0	0	0	0	0	2	1	0	0
	CO2	0	0	2	0	0	0	0	2	2	0	1
	CO3	3	0	0	0	0	0	0	2	1	0	0
	CO4	2	1	0	0	0	0	0	2	1	0	0
	CO5	2	1	0	0	0	0	0	2	0	0	0
	Average	2	0.2	0.2	0	0	0	0	2	1	0	0.2
	Count	10	2	2	0	0	0	0	10	5	0	1

SEMESTER – I													
Course Title	BIOCHEMISTRY												
Course code:	22BPTO114R	TOTAL CREDITS: 2					L	T	P	S	R	O/F	C
		TOTAL HOURS: 30T					2	0	0	0	0		2
PRE-REQUISITE	NIL	CO-REQUISITE			Anatomy and Physiology								
Programme	Bachelor in Physiotherapy												
Semester	1st												

<b>Course Objectives</b>	1.To introduce the concepts of biomolecules, enzymes, metabolism, nutrition, digestion and absorption. 2. To describe the structures of biomolecules and their role in physiological function. 3. To develop link between nutrition, digestion and biomolecules.			
<b>CO1</b>	Apprehend the knowledge of structure and function of biomolecules (carbohydrates, lipids, protein and nucleic acids).			
<b>CO2</b>	Understand the normal function of different components of food, and the basics of Enzymology.			
<b>CO3</b>	Comprehend the concept of basics of food nutrition.			
<b>CO4</b>	Explain about BMR and SDA values.			
<b>CO5</b>	Comprehend the knowledge of Nutrition and Biomolecules.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<p><b>Nutrition:</b> Introduction, Importance of nutrition Calorific values, Respiratory quotient – Definition, and its significance Energy requirement of a person - Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food.</p> <p><b>Physical activities</b> - Energy expenditure for various activities. Calculation of energy requirement of a person</p> <p><b>Balanced diet</b> Recommended dietary allowances</p> <p><b>Role of carbohydrates in diet:</b> Digestible carbohydrates and dietary fibers Role of lipids in diet</p> <p><b>Role of proteins in diet:</b> Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and non- essential amino acids. Nitrogen balance, Nutritional disorders.</p> <p><b>Carbohydrate Chemistry</b> Definition, general classification with examples, Glycosidic bond Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. Glycosaminoglycans (mucopolysaccharides).</p> <p><b>Lipid Chemistry</b> Definition, general classification Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol, Essential fatty acids and their importance, Lipoproteins: Definition, classification, properties, Sources and function Ketone bodies.</p>	<b>10 hrs</b>	<p><b>Students will learn about</b></p> <ul style="list-style-type: none"> <li>● <b>BMR, Balanced diet,</b></li> <li>● <b>Carbohydrate structures, their functions</b></li> </ul>	<b>1,2</b>

II	<p><b>Amino-acid Chemistry</b></p> <p>Amino acid chemistry: Definition, Classification, Peptide bonds, Peptides: Definition, Biologically important peptides, Protein chemistry: Definition, Classification, Functions of proteins. Special focus on structural organization and associated disorders of Collagen, Elastin and Glycoproteins.</p> <p><b>Nucleotide and Nucleic acid Chemistry</b></p> <p>Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body. Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of tRNA, rRNA, mRNA.</p>	7 hrs	<p>Students will gain knowledge about</p> <ul style="list-style-type: none"> <li>• Amino acids, proteins and their structure. Also will learn about their functions.</li> <li>• Structure of Nucleic acids, nucleotides and their biochemical roles.</li> </ul>	1,2
III	<p><b>Enzymes</b></p> <p>Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic enzymology (clinical significance of enzymes)</p> <p><b>Digestion and Absorption</b></p> <p>General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance.</p>	7 hrs	<ul style="list-style-type: none"> <li>• They will learn about enzymes, their role in biochemical reactions.</li> <li>• Learn about digestion, what the importance of enzymes in this process is and how the biomolecules are absorption for utilization by the cell.</li> </ul>	1,2
IV	<p><b>1. Vitamins:</b></p> <p>Definition, classification according to solubility, Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity.</p>	3 hrs	<ul style="list-style-type: none"> <li>• Students will build knowledge about structure and function of Vitamins. Also, understand their role as coenzyme many reactions.</li> </ul>	1,3
V	<p><b>2. Mineral Metabolism:</b></p> <p>Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail.</p>	3hrs	<ul style="list-style-type: none"> <li>• Students will know the importance of minerals in the body.</li> <li>• They would learn how the minerals are absorbed and transport in the body</li> </ul>	1,2

### TEXT BOOKS:

1. "Lehninger Principles of Biochemistry" by David L Nelson and Michael M Cox
2. "Biochemistry" by U Satyanaryana and U Chakrapani

### REFERENCE BOOKS:

1. "Haper's Illustrated Biochemistry" by Robert Murray, Daryl K Granner et al.
2. "Biochemistry" by Lubert Stryer, Jeremy M Berg, et al.
3. "Biochemistry" by David E Metzler.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Apprehend the knowledge of structure and function of biomolecules (carbohydrates, lipids, protein and nucleic acids).	<b>7</b>
<b>2</b>	Understand the normal function of different components of food, and the basics of Enzymology.	<b>7</b>
<b>3</b>	Comprehend the concept of basics of food nutrition.	<b>7</b>
<b>4</b>	Explain about BMR and SDA values.	<b>7</b>
<b>5</b>	Comprehend the knowledge of Nutrition and Biomolecules.	<b>7</b>

### MAPPING TABLE

<b>Course Name: BIOCHEMISTRY</b>													
<b>Course Code: 22BPTO114R</b>	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	
	<b>C01</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
	<b>C02</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
	<b>C03</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
	<b>C04</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
	<b>C05</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
	<b>Average</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
	<b>Count</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>5</b>

<b>SEMESTER – I</b>										
<b>Course Title</b>	<b>PSYCHOLOGY &amp; SOCIOLOGY</b>									
<b>Course code:</b>	<b>22BPTO115R</b>	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>	

		<b>TOTAL HOURS: 30T</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>1st</b>								
<b>Course Objectives</b>	<p>1.To understand the fundamental processes underlying human behaviour.</p> <p>2.To gain a better understanding of the field of psychology both historic and current.</p> <p>3.To develop an understanding of processes involved in learning and cognition.</p> <p>4.This course will introduce the students to basic ideas about sociology and various other concepts related to society.</p> <p>5.This course will also familiarize the students with social factors in health and disease situations, socialization, social groups, and various other institutions in society.</p> <p>6. This paper shall also look at social changes and how society has developed from the past till present.</p>								
<b>CO1</b>	Understand the meaning, nature, and scope of psychology and also the students will be able to the relationship of sociology with other disciplines. The methods of sociological investigations as well as the significance of societal factors for healthcare professionals								
<b>CO2</b>	Analyze the role of heredity and environment in growth & development and also the students will look at the importance of societal factors in case of health and illness								
<b>CO3</b>	Analyse the fundamental concepts related to sensation, attention, and perception and the students will look at the processes of socialization and the other agencies of socialization								
<b>CO4</b>	Understand the meaning and nature of motivation, comprehend its significance in driving behaviour and achieving goals & the students shall understand the impact of social groups in society as well as in sickness and health								
<b>CO5</b>	Analyze sources & impact of frustration and conflict in personal, professional, and social contexts & Students will here learn the social changes that has taken place from the past and how social change is related to other factors of significance in society								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<p>Introduction to Psychology</p> <p>Meaning, Nature and Scope of Psychology</p> <p>a.Methods: Introspection, observation, inventory, and experimental method.</p> <p>b.Branches : Pure psychology and applied psychology</p> <p>c.Psychology and Physiotherapy.</p>	<b>2</b>	Students will learn about the different methods of Psychology, its branches and how it is related to physiotherapy.				1,2		
	<p>Introduction to Sociology: Meaning- Definition and scope of Sociology, Relation to anthropology, psychology, social psychology, Methods of sociological investigation- case study, interview, opinion poll method, social survey and opinion poll methods, Importance of sociology with special reference to health-care professionals</p>	<b>3</b>	Students will learn the different ways of conducting research in society and the importance of sociological concepts in relation to healthcare sector				1,2		



<b>II</b>	Growth and Development <ul style="list-style-type: none"> <li>. Life span : different stages of development ( Infancy, childhood, adolescence, adulthood, middle age, old age)</li> <li>a. Heredity and environment : role of heredity and environment in physical and psychological development, “Nature v/s Nature controversy”</li> </ul>	3	The students will understand the role of growth and development in adolescence, adulthood, middle age and old age. they will also be acquainted with the role of nature and nurture on development.	1,2
	Social factors in Health and disease situations: Meaning of social factors, Role of social factors in health and illness	3	The students will understand the role of societal factors in health and illness as well as look at different social factors in society	1,2
<b>III</b>	Sensation, Attention and perception <ul style="list-style-type: none"> <li>. Sensation: Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation, movement, equilibrium and visceral sense.</li> <li>a. Attention: Type so of attention, determinants of attention</li> <li>b. Perception: Gestalt principles of organization of perception, factors influencing perception</li> <li>c. Illusion and Hallucination: Different types.</li> </ul>	4	The students shall learn the essence of sensation, attention and perception on human behaviour. they will also learn about various forms of hallucination and illusion.	1,3
	Socialization: Meaning and nature of socialization, Primary, Secondary and Anticipatory socialization, Agencies of socialization	3	The students shall learn the essence of socialization as well as the different agencies and types of socialising	1,3
<b>IV</b>	Motivation: <ul style="list-style-type: none"> <li>. Meaning and Nature of Motivation</li> <li>a. Motivation cycle</li> <li>b. Classification of motives</li> </ul>	3	Students will understand the impact of motivation and its classification.	1,3
	Social Groups: Concepts of social groups influence on formal and informal groups on health and sickness, The role of primary and secondary groups in the hospital and rehabilitation setup	3	Students will understand the impact of sickness on the society and the role of societal groups in other medical units	1,3
<b>V</b>	Frustration and Conflict: <ul style="list-style-type: none"> <li>. Meaning and Nature of Frustration and Conflict</li> <li>a. Frustration: Sources of Frustration</li> <li>b. Conflicts: Types of Conflict</li> </ul>	3	Students will learn about the various sources of frustration and conflict along with its types.	1,2
	Social Change: Meaning of social changes, Factors of social changes, Human adaptation and social change, Social change and stress, Social change and deviance, Social change and health programme, The role of social planning in the improvement of Health and rehabilitation	3	Students will learn about the various social institutions and impact of social change on the same	1,2

**TEXT BOOKS:**

1. Morgan, C. T., & King, R. A. (1975). Study guide for Morgan and King Introduction to psychology: Fifth edition. New York: McGraw-Hill
2. Class 11 and 12 NCERT Psychology Textbooks.
3. Franklin, Henry, 1990, The Principles of Sociology, Jaipur: Print Well publishers.
4. Social Change and Development in India Textbook in Sociology, NCERT
5. Giddens, Anthony, 2010, Sociology, 6th edition, Polity Press.
6. Pandit, Niraj, 2012, Sociology for Health Professionals, 2<sup>nd</sup> edition, Wolters Kluwer Press

**References:**

1. Baron, R. & Misra, G. (2013). Psychology. New Delhi: Pearson.
2. Ciccarelli, S. K., & Meyer, G. E. (2010). Psychology: South Asian Edition. New Delhi: Pearson Education
3. Chadha, N.K. & Seth, S. (2014). The Psychological Realm: An Introduction. New Delhi: Pinnacle Learning.
4. Shankar Rao, C.N., 2012, Principles of Sociology with an Introduction to Social Thought, S.Chand publication
5. Haralambos, 2007, Sociology: Themes and Perspectives, Bombay: OUP.
6. Ogburn and Nimkoff, 1966, A Handbook of Sociology, New Delhi: Eurasia Publication House (pvt) Ltd.
7. Giddens, Anthony, 2010, Sociology, 6th edition, Polity Press.
8. Rawat, H K, 2010, Sociology: Basic concepts, Jaipur: Rawat Publications.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>												
SN	Course Outcome (CO)	Mapped Program Outcome										
1	Understand the meaning, nature, and scope of psychology and also the students will be able to the relationship of sociology with other disciplines. The methods of sociological investigations as well as the significance of societal factors for healthcare professionals	1,2,3,4,5,6,7,8										
2	Analyze the role of heredity and environment in growth & development and also the students will look at the importance of societal factors in case of health and illness	1,2,3,4,5,6,7,8										
3	Analyse the fundamental concepts related to sensation, attention, and perception and the students will look at the processes of socialization and the other agencies of socialization	1,2,3,4,5,6,7,8										
4	Understand the meaning and nature of motivation, comprehend its significance in driving behaviour and achieving goals & the students shall understand the impact of social groups in society as well as in sickness and health	1,2,3,4,5,6,7,8										
5	Analyze sources & impact of frustration and conflict in personal, professional, and social contexts & Students will here learn the social changes that has taken place from the past and how social change is related to other factors of significance in society	1,2,3,4,5,6,7,8										

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<b>Course Name: PSYCHOLOGY &amp; SOCIOLOGY</b>												
<b>Course Code:22BPTO115 R</b>	<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
	<b>CO1</b>	3	2	2	1	2	3	2	2	3	2	1
	<b>CO2</b>	1	3	1	1	1	1	2	2	1	3	2
	<b>CO3</b>	1	1	3	1	1	1	2	2	2	1	3
	<b>CO4</b>	1	1	1	3	1	1	1	2	1	1	1
	<b>CO5</b>	1	1	1	1	3	1	1	2	1	1	1
	<b>Average</b>	1.4	1.6	1.6	1.4	2	3	2	2	3	2	1
	<b>Count</b>	7	8	8	7	8	7	8	10	8	8	8

<b>SEMESTER – I</b>	
<b>Course Title</b>	<b>ELEMENTARY ENGLISH(Communicative English &amp; Soft Skills)</b>

<b>Course code:</b>	<b>22UBPD112R</b>	<b>TOTAL CREDITS: 2</b> <b>TOTAL HOURS: 60P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b> <b>/</b> <b>F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>1st</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To enable the students to learn, comprehend and apply the basics of English grammar in the language use.</li> <li>2. To develop the skills of listening and speaking through various exercises.</li> <li>3. To learn and understand the basics of Phonetics and importance of correct pronunciation in a language.</li> </ol>								
<b>CO1</b>	Grammar exercises will enable the students to develop their speaking and writing skills.								
<b>CO2</b>	Communication skills will help them express themselves informal and informal situations.								
<b>CO3</b>	Students will be able to generate simple sentences containing learned vocabulary and using appropriate grammatical structures.								

<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Grammar <ul style="list-style-type: none"> <li>• Parts of Speech</li> <li>• Articles</li> <li>• Affirmative and Negative Sentences</li> </ul>	6 hrs	Describe, illustrate about how to write speech, articles etc.	1,2, 3,4, 5
<b>II</b>	Grammar <ul style="list-style-type: none"> <li>• Determiners</li> <li>• Sentence Construction from jumbled words</li> <li>• Types of Sentences (Assertive, Imperative etc.)</li> </ul>	6hrs	Describe, illustrate about how to write the sentence	1,2, 3,4, 5
<b>III</b>	Building Vocabulary Synonyms Antonyms	8 hrs.	Describe, illustrate about how to change the word.	1,2, 3,4, 5
<b>IV</b>	Speaking Skills <ul style="list-style-type: none"> <li>• Introduction and greetings</li> <li>• Pronunciation</li> <li>• Asking and offering in formation</li> </ul>	6 hrs.	Describe, illustrate about how to speaking.	1,2, 3,4, 5

	<ul style="list-style-type: none"> <li>• Video Recording for self-analysis</li> </ul>			
<b>V</b>	<b>Communication Skills</b> <ul style="list-style-type: none"> <li>• Introduction to Communication,</li> <li>• Importance of Communication Skills,</li> <li>• Purpose of Communication,</li> <li>• Types of Communication,</li> <li>• Barriers to Communication,</li> </ul>	8 hrs.	Describe, illustrate about how to communicate	1,2, 3,4, 5

**Text Books**

- English Vocabulary in Use (Advanced), Michael Mc Carthy and Felicity, CUP.
- English Grammar in Use, Raymond Murphy 4th edition, CUP.
- Effective Communication and Soft Skills, Nitin Bhatnagar, Pearsons.

**Reference Books:**

- Elementary English Grammar and Practice, Collins Corpus.
- Wren, P.C and Martin, H. 1995. High School English Grammar and Composition, S Chand Publishing.
- Suggested Reading.
- Elementary English Grammar, Shri Sai Printographers, 2019

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The application of grammatical rules will enable the students to improve the speaking and writing skills.	<b>5,7,8</b>
<b>2</b>	It enables the learners to use the language effectively.	<b>5,7,8</b>
<b>3</b>	It will strength both listening and speaking skills.	<b>5,7,8</b>
<b>4</b>	It will strengthen their vocabulary and use of words.	<b>5,7,8</b>
<b>5</b>	It will give an introduction on the concept of communication, its importance and barriers.	<b>5,7,8</b>

<b>COURSE TITLE</b>	<b>EXTRACURRICULAR ACTIVITIES</b>								
<b>COURSE CODE</b>	<b>22UBEC111</b>	<b>TOTALCREDITS:1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		<b>TOTALHOURS:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	Nil								
<b>ANTI-REQUISITE</b>	Nil								
<b>PROGRAMMES</b>	All UG Programmes								
<b>SEMESTER</b>	First Year,Fall Semester								

<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners
<b>CO</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to learn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.
<b>Content</b>	
AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.	

**SEMESTER – II**

Course Title	BIOMECHANICS OF HUMAN MOTION								
Course code	22BPT0121R	TOTAL CREDITS: 4	L	T	P	S	R	O/F	C
		TOTAL HOURS: 45T+30P	3	0	2	0	0	0	4
PRE-REQUISITE	NIL	CO-REQUISITE	Human Anatomy and Human Physiology						
Programme	Bachelor in Physiotherapy								
Semester	2 <sup>nd</sup>								
Course Objectives	1. To introduce the students to the concepts related to Basic Concepts of Biomechanics Joint Structure and Function, Biomechanics of hip joint, Biomechanics of knee joint, Biomechanics of ankle joint, Gait and Posture. 2. To introduce the students to the mechanical aspects of the human body. 3. To make the students able to identify the normal movements of the body and recognize the abnormalities.								
CO1	Apprehend the knowledge of the kinetics and kinematics of the human body.								
CO2	Identify the movements of the joints and recognize the abnormalities of lower limbs.								
CO3	Identify the joints and muscles and enhance the mechanisms of hip, knee, ankle joints, Posture and gait.								
CO4	Acquire and apply the knowledge of forces acting at various joints of the human body.								
CO5	Apply the concept of axis and planes for the movement of lower limb.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Biomechanics of Vertebral Column:</b> General structure and Function ( Region wise), Mobility and Stability of Vertebral Column, Muscles of the Vertebral Column, Biomechanics pelvic girdle, General effects of Aging and Injury <b>Biomechanics of Breathing :</b> Biomechanics of Breathing - mechanism of inspiration and expiration, movements of thorax.		8 Hrs	To learn about the Biomechanics of Vertebral column and mechanism of breathing.				1,2	
II	<b>Biomechanics of the Hip Complex:</b> Structure and Function of the Hip Joint, Arthrokinematics and Osteokinematics, Hip Joint Musculature, Stability, Muscle Function in Bilateral and Single leg Stance, Trabecular System, Biomechanical alteration in various Hip joint Pathology.		8 Hrs	To learn about the Biomechanics of Hip joint and the pathologies.				1,2	
III	<b>Biomechanics of the Knee Complex:</b> Structure and Function of the Tibiofemoral Joint, Static and Dynamic stability of Tibiofemoral Joint, Structure and Function of the Patellofemoral Joint, Stability of Patella, Biomechanics changes in the Knee complex with Pathology <b>Biomechanics of the Ankle Complex:</b> Kinematics and Kinetics of the Tibiotalar Joint, Stability of the Ankle Joint, Arch of foot, Effect of weight bearing on foot.		8 Hrs	To learn about the Biomechanics of Knee joint, Ankle joint and the pathologies.				1,2	

<b>IV</b>	<b>Biomechanics of Gait:</b> Kinematics of Gait, Phases, Spatiotemporal Parameters of Gait, Determinants of Gait, Energy requirements, Kinetics of Gait, External and Internal Forces, Kinetics and Kinematics of the Trunk and Upper Extremities, Stair climbing gait, Effect of age, Gender, Assistive Devices, Disease States, Muscle pathology, Mal alignments, Injuries and limb length discrepancies on Human Gait. Disease States, Muscle pathology, Malalignments, Injuries and limb length discrepancies on Human Gait. Abnormal gait, Impairments.	13 Hrs	To learn about the Biomechanics of gait, phases of gait, gait pathologies.	1,2
<b>V</b>	<b>Posture:</b> Static and Dynamic Posture, Major Goals and basic elements of Postural control, Kinetics and Kinematics of Posture, Inertial and Gravitational Forces, Ground Reaction Forces, Optimal or Ideal Posture, Biomechanics analysis of Posture in all planes, Effect of Age, Pregnancy, and Pathology on Posture.	8 HRS	To learn about the elements of Postural control, kinetics and kinematics of gait.	1,2
<b>Practical</b>	1. Pathological gaits.	6 Hrs	To analyse the different types of gait.	1,2,3,4
	2. Limb length and limb girth.	16 Hrs	Identification and assessment of limb lengths and limb girth.	2,3,4
	3. Goniometry.	8 Hrs	To identify the instrument and assess the parts and measure the joint ROM.	1,2,3

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BPTO111R	BIOMECHANICS OF HUMAN MOTION	3	1	3	0	1	2	1	2
22BPTO112R	HUMAN ANATOMY	3	1	2	1	0	1	2	2
22BPTO113R	HUMAN PHYSIOLOGY	3	1	2	1	0	1	2	2
22BPTO114R	BIOCHEMISTRY	3	1	2	1	0	1	2	2
22BPTO115R	PSYCHOLOGY & SOCIOLOGY	0	0	0	2	0	0	1	1
22UBPD112R	ELEMENTARY ENGLISH	0	0	0	3	0	0	0	0
22UBEC111R	EXTRA-CURRICULAR	0	0	0	0	0	0	0	1



## TEXT BOOKS:

1. Joint Structure and Function – A comprehensive Analysis By Pamela K Levangie, Cynthia C Norkin, JP Bros Medical Publishers, New Delhi.
2. Fundamentals of Biomechanics by Duane Knudson, 2nd ed. 2007 Publisher Springer

## REFERENCE BOOKS:

1. Clinical Kinesiology for Physical Therapist Assistants, JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997.
2. Brunnstrom, Clinical Kinesiology, JP Bros Medical Publishers, Bangalore, 5<sup>th</sup> Ed 1996, 1<sup>st</sup> Indian Ed1998

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apprehend the knowledge of the kinetics and kinematics of the human body.	1,2,3,4,5,6,7,8
2	Identify the movements of the joints and recognize the abnormalities of lower limbs.	1,2,3,4,5,8
3	Identify the joints and muscles and enhance the mechanisms of hip, knee, ankle joints, Posture and gait.	1,2,3,4,5,6,8
4	Acquire and apply the knowledge of forces acting at various joints of the human body.	1,2,3,4,5,7
5	Apply the concept of axis and planes for the movement of lower limb.	1,2,3,4,5,6,7,8

## MAPPING TABLE

Course Code: 22BPTO121R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	3	2	3	2	1	1	1	2	1	0	0
	CO2	2	3	3	2	2	0	0	1	1	0	0
	CO3	2	2	3	1	1	1	0	1	2	0	0
	CO4	2	1	2	2	1	0	2	0	1	0	0
	CO5	3	2	3	2	1	2	2	1	1	1	0
	Average	2.4	2	2.8	1.8	1.2	0.8	1	1	1.2	0.2	0
	Count	12	10	14	9	6	4	5	5	6	1	0

SEMESTER – II									
Course Title	<b>HUMAN ANATOMY</b>								
Course code	22BPTO122R	TOTAL CREDITS: 5	L	T	P	S	R	O/ F	C
		TOTAL HOURS: 45T+60P	3	0	4	0	0	0	5
PRE-REQUISITE	NIL	CO-REQUISITE	Human Physiology and Biomechanics						
Programme	Bachelor in Physiotherapy								
Semester	2nd								
Course Objectives	<p>1. To introduce the students to the concepts related to Introduction to anatomical terms, musculoskeletal anatomy, Lower limb and trunk, Neuroanatomy, Regional anatomy, Digestive system, Endocrine glands, Tissue, Urinary system, special senses.</p> <p>2. The objective of the course is that after lectures, demonstration, and practical the students shall be able to demonstrate knowledge in human anatomy as needed for the study and practice of physiotherapy.</p> <p>3. To make the students identify specific bones, muscles, joints and describe the features in details</p>								
CO1	Identify the lower limb joints, muscles and bone of the human body.								
CO2	Explain the different systems of the human body which comprises of the Central Nervous System, Cardio respiratory system, Reproductive system, Special senses etc								
CO3	Identify the specific bones, muscles and organs of the lower limb of the body.								
CO4	Apprehend and apply the knowledge of anatomical terms and terminologies.								
CO5	Acquire the knowledge of anatomical basis of various clinical conditions e.g. trauma, deformities, pertaining to lower limbs & pelvis.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<p><b>1. MUSCULOSKELETAL ANATOMY:</b></p> <p><b>Lower Extremity</b></p> <p>a. Osteology , years old onology, nerve &amp; blood supply and lymphatic drainage of lower extremity</p> <p>b. Soft parts: Gluteal region, thigh (Femoral triangle, femoral canal inguinal canal, Adductor canal, popliteal fossa), sole of the foot, arches of foot, skin of foot.</p> <p>c. Lymphatic drainage, venous drainage &amp; arterial supply of lower limbs &amp; Joints.</p> <p><b>Trunk &amp; Pelvis:</b></p> <p>a) Osteology , years old oncology, nerve &amp; blood supply and lymphatic drainage of trunk and pelvis.</p> <p>● Soft tissue: Inter-vertebral disc.</p>	10 hours	<b>To understand and use the anatomical terms and explain the bones, joints, etc and to be able to demonstrate the features and side determination of the bones of human body.</b>				2,3		
II	<p><b>2. URINARY SYSTEM (5 hours)</b></p> <p>Location, size, shape, features, blood supply, nerve supply and functions of the following: kidney, urinary bladder.</p>	10 hours	<b>To understand and explain the Urinary systems.</b>				1,2		

<b>III</b>	<b>3. REPRODUCTIVE SYSTEM</b> Position, shape, size, features, blood supply and nerve supply of the male and female reproductive system.	<b>10 hours</b>	<b>To understand and explain the Reproductive systems.</b>	1,3
<b>IV</b>	<b>4. NEURO ANATOMY</b> Central Nervous System: Brain Stem, Cerebellum , Thalamus, Hypothalamus Corpus striatum, Cerebral hemisphere, Lateral ventricles, Spinal segments and areas a. Cranial nerves b. Peripheral nervous system c. Neuromuscular junction d. Blood supply to brain, Basal Ganglia, Pons, medulla The pyramidal & extra pyramidal systems	<b>10 hours</b>	<b>To understand and explain the Central Nervous system.</b>	3,4
<b>V</b>	<b>SPECIAL SENSES (4 hours)</b> Gross anatomy of eye ball, nose, ears and tongue.	<b>5 hours</b>	<b>To understand the basic of gross anatomy of eye ball, nose, ears and tongue.</b>	1,2
<b>Practical</b>	1. Lower extremity including surface Anatomy 2. Head & Spinal cord and Neck and Brain including surface Anatomy 3. Thorax including surface anatomy, abdominal muscles joints  • Demonstration of the muscles of the whole body and organs in thorax and abdomen in a cadaver • Demonstration of movements in important joints. • Surface making of the lung, pleura, fissures and lobes of lungs, heart, liver, spleen, • Kidney, cranial nerves, spinal nerves and important blood vessels. • Identification of body prominences on inspection and by palpation especially of extremities. • Points of palpation of nerves and arteries.	<b>60 Hrs</b>	<b>To demonstrate the surface anatomy, identify histology slides,organs and palpation.</b>	1,2,3,4

**TEXT BOOKS:**

1.DATTA [A.K], Essentials of human Anatomy: Thorax and Abdomen Ed 2. Vol. I Current Book International, Culcutta 1994,p433,DATTA[A.K], Essentials of human Anatomy: Head and Neck Ed2. Vol. II, Current Book International, Culcutta 1995, p363,

2.SINGH [Inderbir], Text book of Anatomy with colour atlas: Introduction, Osteology, Upper Extremity, Lower Extremity. Vol I. P Brothers, New Delhi 1996,

3.SINGH [Inderbir], Text book of Anatomy with colour Atlas: Thorax and Abdomen. Vol II. JP

**REFERENCE BOOKS:**

1. SNELL [Richard S], Clinical Anatomy for Medical students: Ed. 5. Little Brown and Company Boston. 1995,p898,

2. B.D Chaurasia’s Human Anatomy – Regional and Applied; Volume I, Volume II and Volume III.

3. MOORIE [Kieth L], Clinically Oriented Anatomy. Ed.3. Williams and Wilkins, Baltimore, 1992,p917,

4. ROMANES [ G J], Cunningham manual of practical anatomy: upper and lower limb ed 15 Vol 1 Oxford Medical Publication, Oxford 1996, P263,

5. ROMANES [G J], Cunningham manual of practical anatomy: Thorax and abdomen ed 15 Vol II Oxford Medical Publication, Oxford 1996, P298,

6. ROMANES [G J], Cunningham manual of practical anatomy: Head and Neck and Brain ed 15 Vol II Oxford Medical Publication, Oxford 1996, P346

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify the lower limb joints, muscles and bone of the human body.	1,8
2	Explain the different systems of the human body which comprises of the Central Nervous System, Cardio respiratory system, Reproductive system, Special senses etc	1,8
3	Identify the specific bones, muscles and organs of the lower limb of the body.	1,8
4	Apprehend and apply the knowledge of anatomical terms and terminologies.	1,5,8
5	Acquire the knowledge of anatomical basis of various clinical conditions e.g. trauma, deformities, pertaining to lower limbs & pelvis.	1,3,8

**MAPPING TABLE**

	Course Name: HUMAN ANATOMY												
Course Code:22BPTO11 2R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	
	CO1	3	0	0	0	0	0	0	0	2	1	0	0
	CO2	3	0	0	0	0	0	0	0	2	1	0	0
	CO3	3	0	0	0	0	0	0	2	2	0	0	
	CO4	3	0	0	0	0	1	0	2	1	0	0	
	CO5	3	0	1	0	0	0	0	2	1	1	0	
	Average	3	0	0.2	0	0	0.2	0	2	1.2	0.2	0	
	Count	15	0	1	0	0	1	0	10	6	1	0	

EMESTER – II									
Course Title	<b>HUMAN PHYSIOLOGY</b>								
Course code	<b>22BPTO123R</b>	TOTAL CREDITS: 5	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		TOTAL HOURS: 45T+60P	<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
PRE-REQUISITE	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>Human Anatomy</b>						
Programme	<b>Bachelor in Physiotherapy</b>								
Semester	<b>2nd</b>								
Course Objectives	<p>1.To introduce the students to the concepts related to endocrine system, reproductive system, renal system, nervous system and special senses.</p> <p>2. The objective of this course is that after lectures, demonstration, and lab practical the students will be able to demonstrate and understanding of Human Physiology as needed for the study and practice of physiotherapy</p>								
CO1	Acquainted with the knowledge of fundamental systems of the human body.								
CO2	Understand the systemic circulation; sensory receptors; special senses; motor unit; spinal cord; control of movement; hypothalamic functions; endocrine system etc.								
CO3	Demonstrate practicals which includes sensory examination, motor examination, reflexes and cranial nerve examination recommended demonstrations.								
CO4	Understand and demonstrate the subject in terms of its function for various system of human body.								
CO5	Acquire the knowledge of the relative contribution of each organ system in maintenance of the homeostasis.								
Unit-No.	<b>Content</b>		<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>	

<p><b>I</b></p>	<p><b>ENDOCRINE SYSTEM</b>  <b>Introduction:</b> Major endocrine glands. Hormone: classification, mechanism of action. Functions of hormones Secretory cells, action on target cells, synthesis, storage, action , regulation of secretion of each hormone &amp; Disorders of Pituitary Gland, Thyroid Gland, Parathyroid Gland, Adrenal Gland, Endocrine Pancreas, Hypothalamic Relationship. Glucose metabolism and its regulation, Calcitriol, Thymus and Pineal gland (very brief). Local Hormones.(Briefly).</p>	<p><b>10 hours</b></p>	<p>The students should be able to learn about endocrine system</p>	<p>1,2</p>
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<b>II</b>	<p><b>REPRODUCTIVE SYSTEM</b></p> <p><b>Introduction:</b> Sex determination. Sex differentiation.</p> <p><b>Male Reproductive System:</b> Functions of testes. Pubertal changes in males. Spermatogenesis. Testosterone: action. Regulation of secretion. Semen.</p> <p><b>Female Reproductive System:</b> Functions of ovaries and uterus. Pubertal changes in females.</p> <p><b>Oogenesis.</b> Hormones: oestrogen and progesterone-action. Regulation of secretion. Menstrual Cycle: Phases. Ovarian cycle. Uterine cycle. Hormonal basis. <b>Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy.</b> Functions of placenta.</p> <p><b>Lactation.</b> Contraception methods</p>	<b>6 hours</b>	The students should be able to learn about the reproductive system	1,2
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<p><b>III</b></p>	<p><b>RENAL SYSTEM</b></p> <ul style="list-style-type: none"> <li>•<b>Nephrons</b>, Renal blood flow and its regulation. Functions of kidneys.</li> <li>•<b>Mechanism of Urine Formation.</b> Renal clearance. Insulin clearance.</li> <li>•<b>Creatinine clearance.</b> Glucose clearance</li> <li>•<b>Tubular Reabsorption &amp; Tubular Secretion</b></li> <li>•<b>Mechanism of concentrating and diluting the Urine:</b> Counter-current mechanism. Regulation of water excretion. Diuresis. Diuretics.</li> <li>•<b>Micturition.</b></li> <li>•<b>Acid-Base balance</b> (very brief)</li> <li>•<b>Artificial Kidney:</b> Principle of haemodialysis.</li> <li>•Skin and temperature regulation.</li> </ul>	<p><b>6 hours</b></p>	<p>The students should be able to learn about the renal system.</p>	<p>1,2</p>
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<p><b>IV</b></p>	<p><b>SPECIAL SENSES</b></p> <ul style="list-style-type: none"> <li>•<b>Vision:Introduction:</b> Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Photopic vision. Scotopic vision.</li> <li>•<b>Visual Pathway and the effects of lesions.</b></li> <li>•<b>Refractive Errors</b></li> <li>•<b>Visual Reflexes:</b> Accommodation, Pupillary and Light. Visual acuity and Visual field. Light adaptation. Dark adaptation.<b>Color vision</b> – color blindness. Nyctalopia.</li> <li>•<b>Audition:</b> Functions of external ear, middle ear and inner ear. Structure of Cochlea and organ of corti. Auditory pathway. Types of Deafness. Tests for hearing. Audiometry.</li> <li>•<b>Taste:</b> Taste buds. Primary tastes. Gustatory pathway.</li> <li>•<b>Smell:</b> Olfactory membrane. Olfactory pathway.</li> <li>•<b>Vestibular Apparatus:</b> Crista ampullaris and macula. Funcions. Disorders</li> </ul>	<p><b>8 hours</b></p>	<p>The students should be able to learn about the special senses</p>	<p>1,3</p>
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V	<p><b>NERVOUS SYSTEM</b></p> <ul style="list-style-type: none"> <li>• <b>Introduction:</b> Organisation of CNS – central and peripheral nervous system. Functions of nervous system. Synapse: classification, Synaptic transmission. Properties.</li> <li>• <b>Sensory Mechanism:</b> Sensory receptors: function, classification and properties. Sensory pathway. The trigeminal pathway. Sensory cortex. Somatic sensations. Pain sensation: mechanism of pain. Cutaneous pain – slow and fast pain, hyperalgesia. Deep pain. Visceral pain – referred pain. Gate control theory of pain.</li> <li>• <b>Motor Mechanism:</b> Motor Cortex. Motor pathway. Upper motor neuron and lower motor neuron.</li> <li>• <b>Reflex Action:</b> components, Bell-Magendie law, classification and Properties. Monosynaptic and polysynaptic reflexes, superficial reflexes, deep reflexes. Stretch reflex. Muscle tone</li> <li>• <b>Spinal cord Lesions:</b> Complete transection and Hemi section of the spinal cord.</li> <li>• <b>Cerebellum:</b> Functions. Cerebellar ataxia.</li> <li>• <b>Posture and Equilibrium:</b> Postural reflexes – spinal, medullary, midbrain and cerebral reflexes.</li> <li>• <b>Thalamus and Hypothalamus:</b> Nuclei. Functions. Thalamic syndrome</li> <li>• <b>Reticular Formation and Limbic System:</b> Components and Functions.</li> <li>• <b>Basal Ganglia:</b> Structures included and functions. Parkinson’s disease.</li> <li>• <b>Cerebral Cortex:</b> Lobes. Brodmann’s areas and their functions. Higher functions of cerebral cortex – learning, memory and speech.</li> <li>• <b>EEG:</b> Waves and features. Sleep: REM and NREM sleep.</li> <li>• <b>CSF:</b> Formation, composition, circulation and functions. Lumbar puncture and its significance. Blood brain barrier. Hydrocephalus.</li> <li>• <b>ANS:</b> Features and actions of parasympathetic and sympathetic nervous system.</li> </ul>	15 hrs	The students should be able to learn about the Nervous system.	1,2
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<b>Practical</b>	<b>Clinical examination :</b> <ol style="list-style-type: none"> <li>1. Examination of Sensory system.</li> <li>2. Recording of Motor system</li> <li>3. Examination of reflexes.</li> <li>4. Examination of cranial nerves .</li> </ol>	<b>60 hours</b>	The students should be able to demonstrate the examination of sensory, motor, reflexes and cranial nerves	1,2,3
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### **TEXT BOOKS:**

1. Text book of medical physiology – Guyton Arthur
2. Concise medical physiology – Chaudhuri Sujit K.
3. Human Physiology – Chatterjee C.C
4. Text book of practical Physiology –Ranade.
5. Text of Physiology – A.K.Jain.

### **REFERENCE BOOKS:**

1. Basics of Medical physiology- Venkatesh D &Sudhakar HH
2. Manipal Manual of Physiology – Prof CN Chandrashekar
3. Review of Medical Physiology – Ganong WilliamF
4. Physiological basis of Medical practice – Best &Taylor

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	1.To introduce the students to the concepts related to endocrine system, reproductive system, renal system, nervous system and special senses. 2. The objective of this course is that after lectures, demonstration, and lab practical the students will be able to demonstrate and understanding of Human Physiology as needed for the study and practice of physiotherapy	1,2
2	Acquainted with the knowledge of fundamental systems of the human body.	3,2
3	Understand the systemic circulation; sensory receptors; special senses; motor unit; spinal cord; control of movement; hypothalamic functions; endocrine system etc.	1,2,8
4	Demonstrate practicals which includes sensory examination, motor examination, reflexes and cranial nerve examination recommended demonstrations.	1,2,8
5	Understand and demonstrate the subject in terms of its function for various system of human body.	1,2,8

### MAPPING TABLE

		Course Name: HUMAN PHYSIOLOGY											
Course Code:22BPTO12 3R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	
	CO1	3	0	0	0	0	0	0	2	1	0	0	
	CO2	3	0	0	0	0	0	0	0	2	2	0	0
	CO3	1	2	0	0	0	0	0	0	2	2	0	0
	CO4	2	1	0	0	0	0	0	0	2	1	0	0
	CO5	2	1	0	0	0	0	0	0	2	0	0	0
	Average	2.2	0.8	0	0	0	0	0	0	2	1.2	0	0
	Count	11	4	0	0	0	0	0	0	10	6	0	0

SEMESTER – II									
Course Title	<b>BIOCHEMISTRY</b>								
Course code:	<b>22BPT0124R</b>	TOTAL CREDITS: 2	L	T	P	S	R	O/ F	C
		TOTAL HOURS: 30T	2	0	0	0	0		2
PRE-REQUISITE	NIL	CO-REQUISITE	Anatomy and Physiology						
Programme	Bachelor in Physiotherapy								
Semester	2nd								
Course Objectives	1. To develop the concept of metabolism. 2. To describe the metabolic pathways of different biomolecules. 3. To illustrate clinical correlation and diagnosis of biochemical disorder.								
CO1	Acquaint with the basic principle and importance of metabolism in daily activities of life.								
CO2	Develop the concept of metabolism of various chemical substances of the body.								
CO3	Determine the synthesis and breakdown of carbohydrates, lipids, nucleic acids, proteins and their regulation.								
CO4	Comprehend the concept of human biochemistry.								
CO5	Understand the basis of clinical correlation and diagnosis of biochemical disorder.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<p><b>Introduction to metabolism and its type.</b></p> <p><b>Carbohydrate Metabolism</b></p> <p>Introduction, Glycolysis – Aerobic, Anaerobic Citric acid cycle, Substrate level phosphorylation. Glycogen metabolism – Glycogenesis, Glycogenolysis, Metabolic disorders glycogen, Gluconeogenesis, Cori cycle, Hormonal regulation of glucose, Glycosuria, Diabetes mellitus</p>	7 hrs	<ul style="list-style-type: none"> <li>They would build knowledge about metabolism and how carbohydrates are used by the body via different metabolic process like glycolysis, gluconeogenesis, glycogenolysis.</li> </ul>					1,2	
II	<p><b>Lipid Metabolism</b></p> <p>Introduction to lipid metabolism, Lipolysis, Oxidation of fatty acids -oxidation of fatty acids, Lipogenesis - Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues, Ketone body metabolism: Ketone body formation (ketogenesis), utilization (ketolysis), ketosis, Rothera's test.</p> <p>Cholesterol metabolism: synthesis, degradation, cholesterol transport Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases) Hypocholesterolemic agents, Common hyper lipoproteinemia, Fatty liver.</p>	6 hrs	<ul style="list-style-type: none"> <li>Knowledge on lipid metabolism will be gained by the students.</li> <li>They would understand the need of lipolysis, triacylglycerol synthesis, ketone bodies etc.</li> <li>They would also learn about some biochemical disease associated with lipid metabolism.</li> </ul>					1,2	
III	<p><b>Amino acid and Protein Metabolism:</b></p> <p>Catabolism of amino acids - Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle, specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.</p>	5 hrs	<ul style="list-style-type: none"> <li>They would also build concept on amino acids and protein metabolism where they will learn about urea cycle, transamination and deamination.</li> </ul>					1,3	

IV	<p><b>Acid-Base balance:</b></p> <p>Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system Role of lungs and kidneys in acid base balance, Acid base imbalance.</p> <p><b>Water balance:</b></p> <p>Water distribution in the body, Body water, water turnover, Regulation of water balance: role of ADH and thirst centre.</p> <p><b>Electrolyte balance:</b></p> <p>Osmolarity. Distribution of electrolytes. Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF.</p>	6 hrs	<ul style="list-style-type: none"> <li>• They will develop concept of acid – base.</li> <li>• They would develop the knowledge of buffering capacity of blood and understand the role of lungs and kidneys in acid- base balance.</li> </ul>	1,3
V	<p><b>Nucleic acids and porphyrin metabolism:</b> Biosynthesis of purine and pyrimidine and its breakdown; biosynthesis and degradation of heme.</p> <p><b>Clinical Biochemistry:</b></p> <p>Normal levels of blood and urine constituents, Relevance of Glucose levels in blood and urine, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate. Liver function tests, Renal function tests.</p>	6hrs	<ul style="list-style-type: none"> <li>• They will learn metabolism of nucleic acid and heme.</li> <li>• They will also gain knowledge about normal levels of metabolites in blood.</li> </ul>	1,2

**TEXT BOOKS:**

1. “Lehninger Principles of Biochemistry” by David L Nelson and Michael M Cox
2. “Biochemistry” by U Satyanaryana and U Chakrapani

**REFERENCE BOOKS:**

1. “HAPER’S ILLUSTRATED BIOCHEMISTRY” BY ROBERT MURRAY, DARYL K GRANNER ET AL.
2. “BIOCHEMISTRY” BY LUBERT STRYER, JEREMY M BERG, ET AL.
3. “BIOCHEMISTRY” BY DAVID E METZLER.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquaint with the basic principle and importance of metabolism in daily activities of life.	7
2	Develop the concept of metabolism of various chemical substances of the body.	7
3	Determine the synthesis and breakdown of carbohydrates, lipids, nucleic acids, proteins and their regulation.	7
4	Comprehend the concept of human biochemistry.	7
5	Understand the basis of clinical correlation and diagnosis of biochemical disorder.	7

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		Course Name: <b>BIOCHEMISTRY</b>											
Course Code: <b>22BPTO124R</b>	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	
	CO1	0	0	0	0	0	0	1	0	1	0	1	
	CO2	0	0	0	0	0	0	1	0	1	0	1	
	CO3	0	0	0	0	0	0	1	0	1	0	1	
	CO4	0	0	0	0	0	0	1	0	1	0	1	
	CO5	0	0	0	0	0	0	1	0	1	0	1	
	Average	0	0	0	0	0	0	1	0	1	0	1	
	Count	0	0	0	0	0	0	5	0	5	0	5	

SEMESTER – II										
Course Title	PSYCHOLOGY & SOCIOLOGY									
Course code:	22BP TO1 25R	TOTAL CREDITS: 2  TOTAL HOURS: 30T	L	T	P	S	R	O/F	C	
			2	0	0	0	0		2	



PRE-REQUISITE	NIL	CO-REQUISITE	NIL	
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>			
<b>Semester</b>	<b>2nd</b>			
<b>Course Objectives</b>	<p>1. This course will introduce the students to basic ideas about the existing social institutions in society</p> <p>2. This course will also familiarize the students with some major social problems faced by the people and what help the health workers will be of in the same</p> <p>3. This paper shall also look at the role of health care professionals or medical social workers and how health and culture is related.</p> <p>4.To introduce the students to the concepts related to Emotions and Intelligence.</p> <p>5.To gain a better understanding of the basics and various concepts of Learning.</p> <p>6.To develop an understanding of processes involved in Personality and Thinking.</p>			
<b>CO1</b>	Identify And Describe The Three Levels Of Emotions Along With The Major Theories along with an insight to the concept of family and the influences.			
<b>CO2</b>	Analyse the concept of intelligence and its significance in human cognition and behaviour. Grasp the multidimensional nature of intelligence and its relevance in various domains of life and an understanding about Social security			
<b>CO3</b>	Identify the problems of the disabled and social workers and Enhance of reasoning& problem-solving strategies.			
<b>CO4</b>	Identify the various factors & major theories that influences the process of learning and an insight to culture and health			
<b>CO5</b>	Identify & describe personality and its components, along with some common defence mechanism and gain an understanding of the medical social workers.			
Unit-No.	Content	Contact Hour	Learning Outcome	KL
<b>I</b>	<b>Introduction to Psychology</b> a. Meaning, Nature and Scope of Psychology b. Methods: Introspection, observation, inventory, and experimental method. c. Branches : Pure psychology and applied psychology d. Psychology and Physiotherapy.	2	Students will learn about the different methods of Psychology, its branches and how it is related to physiotherapy.	1,2
	<b>Family</b> <b>a.</b> The family, meaning and definitions, Functions of types of family, Changing Family patterns, Influence of Family on the individual's health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy	3	Students will learn about family as a social institution and its importance in relation to health and well-being	1,2

<b>II</b>	<b>Growth and Development</b> <b>a.</b> Life span : different stages of development ( Infancy, childhood, adolescence, adulthood, middle age, old age) <b>b.</b> Heredity and environment : role of heredity and environment in physical and psychological development, “Nature v/s Nature controversy”	3	The students will understand the role of growth and development in adolescence, adulthood, middle age and old age. they will also be acquainted with the role of nature and nurture on development.	1,2
	<b>Social Security:</b> Social Security and social legislation in relation to the disabled	<b>3</b>	The students will understand the society and the kind of life led by the disabled as well as what is their role in the same	1,2
<b>III</b>	<b>Sensation, Attention and perception</b> <b>a.</b> Sensation: Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation, movement, equilibrium and visceral sense. <b>b.</b> Attention: Type so of attention, determinants of attention <b>c.</b> Perception: Gestalt principles of organization of perception, factors influencing perception <b>d.</b> Illusion and Hallucination: Different types.	4	The students shall learn the essence of sensation, attention and perception on human behaviour. they will also learn about various forms of hallucination and illusion.	1,3
	<b>Social Problems of disabled, Social Worker:</b> Consequences of the following social problems in relation to sickness and disability remedies prevent problems.  1. Population explosion, 2. Poverty and unemployment, 3. Beggary , 4. Juvenile delinquency, 5. Prostitution, 6. Alcoholism, 7. Problems of women in employment.	<b>3</b>	The students shall learn about the various social issues faced by the disabled and social workers as well as learn about other social problems existent in society	1,3
<b>IV</b>	<b>Motivation:</b> a. Meaning and Nature of Motivation b. Motivation cycle c. Classification of motives	3	Students will understand the impact of motivation and its classification.	1,3

	<b>Culture and Health:</b> Concept of Health, Concept of Culture, Culture and Health, Culture and Health Disorders	<b>3</b>	Students will understand the inter-relationship between culture, health and health disorders	1,3
V	<b>Frustration and Conflict:</b> a. Meaning and Nature of Frustration and Conflict b. Frustration: Sources of Frustration c. Conflicts: Types of Conflict	3	Students will learn about the various sources of frustration and conflict along with its types.	1,2
	<b>Social Worker:</b> Meaning of Social Works, The role of a medical social worker	<b>3</b>	Students will learn about their responsibility as future social or health-care workers	1,2

### TEXT BOOKS:

1. Giddens, Anthony, 2010, Sociology, 6th edition, Polity Press.
2. Pandit, Niraj, 2012, Sociology for Health Professionals, 2<sup>nd</sup> edition, Wolters Kluwer Press
3. Indrani, T K, Text Books of Sociology for Graduates Nurses and Physiotherapy Students, JP Brothers, New Delhi, 10
4. Feldman, R.H (1996). Understanding Psychology. New Delhi: Tata McGrawhill. Morgan et al (2003). Introduction to Psychology. New Delhi: Tata McGrawhill

### REFERENCE BOOKS:

1. Shankar Rao, C.N., 2012, Principles of Sociology with an Introduction to Social Thought, S, Chand publication
2. Haralambos, 2007, Sociology: Themes and Perspectives, Bombay: OUP.
3. Ogburn and Nimkoff, 1966, A Handbook of Sociology, New Delhi: Eurasia Publication House (pvt) Ltd.
4. Mangal, S.K (2002). Advanced Educational Psychology. New Delhi: prentice hall.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify And Describe The Three Levels Of Emotions Along With The Major Theories along with an insight to the cocept of family and the influences.	1,2,3,4,5,6,7,8
2	Analyze the concept of intelligence and its significance in human cognition and behaviour. Grasp the multidimensional nature of intelligence and its relevance in various domains of life and an understanding about Social security	1,2,3,4,5,6,7,8
3	Identigy the problems of the disabled and social workers and Enhance of reasoning& problem-solving strategies.	1,2,3,4,5,6,7,8
4	Identify the various factors & major theories that influences the process of learning and an insight to culture and health	1,2,3,4,5,6,7,8
5	Identify & describe personality and its components, along with some common defence mechanism and gain an understanding of the medical social workers.	1,2,3,4,5,6,7,8

### MAPPING TABLE

Course Name: PSYCHOLOGY & SOCIOLOGY													
Course Code:22BPTO115R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	
	CO1	3	2	2	1	2	3	2	2	2	3	2	1
	CO2	1	3	1	1	1	1	2	2	2	1	3	2
	CO3	1	1	3	1	1	1	2	2	2	2	1	3
	CO4	1	1	1	3	1	1	1	1	2	1	1	1
	CO5	1	1	1	1	3	1	1	1	2	1	1	1
	<b>Average</b>	1.4	1.6	1.6	1.4	2	3	2	2	2	3	2	1
	<b>Count</b>	7	8	8	7	8	7	8	10	8	8	8	8

SEMESTER – II									
<b>Course Title</b>	<b>IMPLICIT ENGLISH</b> (Communicative English & Soft Skills)								
<b>Course code:</b>	<b>22UBPD122R</b>	<b>TOTAL CREDITS: 2</b> <b>TOTAL HOURS: 60P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Program me</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>2nd</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To enable students to learn, understand different types of sentences structures.</li> <li>2. To strengthen the vocabulary of the students which will help in their writing and speaking.</li> <li>3. To introduce the importance of dress code in various organisations.</li> <li>4. To familiarize with the 3P's(Planning, prioritizing&amp; performing) of Time Management.</li> </ol>								
<b>CO1</b>	Students will be able to analyse and transform the different type of sentences.								
<b>CO2</b>	Learners will be able to use language effectively.								
<b>CO3</b>	Importance of dress code and behavioural ethics will boost their confidence.								
<b>CO4</b>	Learners will learn to utilize the time Effectively & Efficiently.								

<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Grammar I. Interchange of Interrogative and  Assertive Sentences, Exclamatory and Assertive Sentences  II. Types of Tenses  Common Errors	6	Describe, illustrate the types of tenses, sentences.	1,2, 3

<b>II</b>	Vocabulary Homonyms Homophones	6	Describe, illustrate about vocabulary	1,2,3
<b>III</b>	Reading Skills  i. Techniques of Effective Reading Gathering ideas and information from a text	8	Describe, illustrate about reading skills	1,2,3
<b>IV</b>	Conflict Management	6	Describe, illustrate the type of conflict management	1,2,3
<b>V</b>	Time-Management Skills i. Introduction To Time Management, ii. Importance of Time Management, Basic Tips to Maintain Time.	8	Describe, illustrate the importance of time management.	1,2,3

**Activity:** Problem solving activity: A situation will be given to the students and they will have to show to handle the situation or solve the problem

**Text Books:**

- Effective Communication, John Adair, Macmillan Ltd. 1997
- Language in Use, Adrian Doff and Chris Jones, Cambridge Press, 2006
- A Textbook of English Grammar and Composition, Adhir Debnath, Bina Library

**References:**

- Communication Skills Training: A Practical Guide to Improving Your Social Intelligence, Presentation and Social Speaking, Ian Tuhovsky, 2019
- A Textbook for AECC English Communication : Interface, Dr. Kironmoy Chetia and Pranami Bania Breez Mohan Hazarika, January 2019.

**Suggested Reading:**

- English Communication: Theory and Practice (2020 Edition 1 January 2018), Dr. Manoj Kr. Garg

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	The learner will be able to analyze and use the techniques in language use.	5,7,8
2	Communication and be have oral skills will boost their self-reliance.	5,7,8
3	Students will learn the effective and efficient utilization of the time.	5,7,8
4	It will strengthen their vocabulary and use of words.	5,7,8
5	It will give an introduction on the concept of communication, its importance and barriers.	5,7,8

COURSE TITLE	EXTRACURRICULAR ACTIVITIES								
COURSE CODE	22UBEC121	TOTALCREDITS:1	L	T	P	S	R	O/ F	C
		TOTALHOURS:	0	0	0	4	0	0	1
PRE-REQUISITE	Nil								
ANTI-REQUISITE	Nil								
PROGRAMMES	All UG Programmes								
SEMESTER	First Year,Fall Semester								

<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners
<b>CO</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to earn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.

### Content

AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.

SEMESTER – II									
Course Title	<b>BASIC LIFE SUPPORT (BLS)</b>								
Course code:	<b>22BPTO126R</b>	<b>TOTAL CREDITS: 1</b>	L	T	P	S	R	O/ F	C
		<b>TOTAL HOURS: 30</b>	0	0	2	0	0	0	1
PRE-REQUISITE	<b>Human Anatomy and Human Physiology</b>	CO-REQUISITE	<b>Human Anatomy and Human Physiology</b>						
Programme	<b>Bachelor in Physiotherapy</b>								
Semester	<b>2nd</b>								
Course Objectives	1. The goal of the BLS course is to teach and guide on the techniques used during the initial resuscitation of a cardiac arrest victim. 2. BLS includes airway, breathing and circulatory support without the use of equipment and Automated external defibrillator (AED). 3. BLS includes the management of airways.								
CO1	Understand relevant anatomy and physiology of cardiopulmonary and respiratory system.								
CO2	Acquainted with the process of BLS so that in emergency cases they are able to utilize the knowledge of BLS and help in successful resuscitation.								
CO3	Demonstrate and apply the method of adult and paediatric Basic Life Support, its technique and airway management.								
CO4	Able to carry out the proper management of airways.								
CO5	Able to act immediately in any emergency situation								
Unit-No.	Content	Contact Hour	Learning Outcome						KL
I	Introduction to BLS The chain of survival: Early recognition and call for help, Early bystander CPR, Early defibrillation, Early advanced life support and post-resuscitation care	2 Hrs	Students will be able to understand the meaning of BLS						1,2



<b>II</b>	Anatomy & Physiology Components of the heart, Importance of adequate chest recoil, Anatomy & Physiology of the Respiratory System, Cardiac Arrest, Myocardial Infarction	8 Hrs	Students shall be able to demonstrate and understand the medical terms.	1,2
<b>III</b>	Adult Basic Life Support Sequence, Technical description, Defibrillation, Rescuer duties	10 Hrs	Students will be able to Demonstrate the sequence of resuscitation for adults	1,3
<b>IV</b>	Paediatrics Basic Life Support Sequence, Technical description, Defibrillation, Rescuer duties ,Dangers and safety of HCP and infant	10 Hrs	Students will be able to Demonstrate the sequence of resuscitation for children	2,3
<b>V</b>	Airway Management Mouth-to-Barrier Device Breathing, Bag-Mask Device, E-C clamp technique and 2 hands technique, Laryngeal Mask Airway ( LMA )	2 Hrs	Students will learn various airway management processes.	3,4

#### **TEXT BOOKS:**

1. BLS for Healthcare Providers Student Manual by Jane John-Nwankwo RN,MSN.

#### **REFERENCE BOOKS:**

1. BASIC LIFE SUPPORT TRAINING MANUAL by The BLS Subcommittee, National Committee on Resuscitation Training, Ministry of Health Malaysia.
2. HIGHLIGHTS of the 2015 American Heart Association Guidelines Update for CPR and ECC, American Heart Association.

#### **RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand relevant anatomy and physiology of cardiopulmonary and respiratory system.	<b>2,5,6</b>
<b>2</b>	Acquainted with the process of BLS so that in emergency cases they are able to utilize the knowledge of BLS and help in successful resuscitation.	<b>5,6</b>
<b>3</b>	Demonstrate and apply the method of adult and paediatric Basic Life Support, its technique and airway management.	<b>1,2,7,8</b>
<b>4</b>	Able to carry out the proper management of airways.	<b>2,7,8</b>
<b>5</b>	Able to act immediately in any emergency situation	<b>1,5,6</b>

SEMESTER – II									
<b>Course Title</b>	<b>DIGITAL PROFICIENCY</b>								
<b>Course code:</b>	<b>22UUDL102R</b>	<b>TOTAL CREDITS: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		<b>TOTAL HOURS: 30</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	Basic Digital Literacy	<b>CO-REQUISITE</b>	Nil						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>2<sup>nd</sup></b>								
<b>Course Objectives</b>	<p>1.Students will be able to understand the fundamentals of computer systems and Internet search.</p> <p>2.Students will be able to use MS Office suite for various purposes ,including data management and visualization.</p> <p>3.Students will be able to use social media and e-commerce portals</p>								
<b>CO1</b>	Students will have basic understanding of Computer Systems and the Internet search.								
<b>CO2</b>	Students will be able to solve basic information management issues using MS-Office Products.								
<b>CO3</b>	Students will be able to efficiently and ethically use Social Media.								
<b>CO4</b>	Students will be able to use computing technically ethically, safely, securely and legally for day-to-day use including secure financial transactions.								

Unit- No.	Content	Contact Hour	Learning Outcome	KL
I	<ul style="list-style-type: none"> <li>Fundamentals of Computer Systems</li> </ul> Components of a Computer and their functions. Different Types of Computers and their Applications.	12	Learn the ability to communicate effectively.	1,2
II	Introduction to MS-Office <ul style="list-style-type: none"> <li>Components of the MS-Office suite.</li> <li>Creating documents with MS-Word.</li> <li>Creating Presentations with MS-PowerPoint.</li> </ul> Creating Spreadsheets with MS-Excel.	12	Demonstrate and explain the history taking.	1,2
III	Introduction to Internet & Cyber World: <ul style="list-style-type: none"> <li>Introduction to Computer Networks and Internet.</li> <li>World Wide Web, Websites and Web portals, Web browsing.</li> <li>Web Searching, Search engines, Introduction to Google Search Engine; How to search using Keywords, topics of Interest, etc.</li> <li>Creation and use of Email Accounts.</li> </ul> Cyber Crimes.	12	Describe, illustrate the visual acuity.	1,2
IV	Introduction to Social Media: The Power of Social Media, Relevance of Social Media in present scenario. <ul style="list-style-type: none"> <li>Creating accounts and using some popular Social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, LinkedIn.</li> </ul> Social Media Etiquettes.	10	Describe, illustrate the type of eye examination.	1,2
V	Digital Payments <ul style="list-style-type: none"> <li>Introduction to Digital Payment Systems.</li> </ul> Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Netbanking, UPI	2	Describe, illustrate the and demonstrate the ophthalmic instruments.	1,2

**TEXT BOOKS:**

T1: Sinha Pradeep K. and Priti Sinha. Computer Fundamentals: Concepts Systems & Applications. 3rd ed. New Delhi: BPB Publications.

T2: Goel, A, 2010. Computer Fundamentals, Pearson India

REFERENCE BOOKS:

R1: Balaguruswamy, E. 2009 Fundamentals of Computers, Tata McGraw-Hill

R2: Balaguruswamy, 2014. E. Fund Of Comp & Programming (Updated Ed Sem. I, Au) Tata McGraw-Hill Education.

R3: Lawson, C. 2022. Introduction to Social Media, Oklahoma State University.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding of Computer Hardware, Software and Computer handling.	<b>5,7,8</b>
<b>2</b>	Learn to solve basic information management issues using MS-Office Products.	<b>5,7,8</b>
<b>3</b>	Learn to efficiently search the Internet for required information	<b>5,7,8</b>
<b>4</b>	Learn to use computing technically ethically, safely, securely and legally for day-to-day use	<b>5,7,8</b>
<b>5</b>	Create accounts and effectively use various digital payment systems such as credit cards, debit cards, net banking, and UPI, demonstrating an understanding of the underlying processes and security measures Involved	<b>5,7,8</b>

<b>Course Code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
22BPTO121R	BIOMECHANICS OF HUMAN MOTION	3	1	3	0	1	2	1	2
22BPTO122R	HUMAN ANATOMY	3	1	2	1	0	1	2	2
22BPTO123R	HUMAN PHYSIOLOGY	3	1	2	1	0	1	2	2
22BPTO124R	BIOCHEMISTRY	3	1	2	1	0	1	2	2

22BPTO125R	PSYCHOLOGY & SOCIOLOGY	0	0	0	2	0	0	1	1
22UBPD122R	IMPLICIT ENGLISH	0	0	0	3	0	0	0	0
22UBCC121R	CO-CURRICULAR	0	0	0	0	0	0	0	1
22BPTO126R	BASIC LIFE SUPPORT	0	0	0	0	0	0	0	2
22UUDL102R	DIGITAL PROFICIENCY	0	0	0	0	0	0	0	1

SEMESTER – III										
<b>Course Title</b>	<b>EXERCISE THERAPY</b>									
<b>Course code</b>	<b>22BPTO211R</b>	<b>TOTAL CREDITS: 6</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	
		<b>TOTAL HOURS: 45T+90P</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>
<b>PRE-REQUISITE</b>	<b>HUMAN ANATOMY, BIOMECHANICS OF HUMAN MOTION</b>	<b>CO-REQUISITE</b>	<b>NIL</b>							
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>									
<b>Semester</b>	<b>3<sup>rd</sup></b>									
<b>Course Objectives</b>	1.To introduce the students to the concepts related to introduction to exercise therapy and various methods of testing for assessment. 2.To impart the students to the concepts related to Active movement, Passive movements, Suspension therapy, Stretching, Balance, Co-ordination exercises, Individual and group Exercises									
<b>CO1</b>	Equipped with the principles and effects of exercise as a therapeutic modality.									
<b>CO2</b>	Perform the techniques in the restoration of physical function.									
<b>CO3</b>	Acquired with the knowledge about the principles and techniques of exercise therapy in the clinical practice.									
<b>CO4</b>	Choose the effective exercise therapeutic skills with strong theoretical knowledge on patients									
<b>CO5</b>	Comprehend manual muscle testing techniques, stretching techniques as well as the importance of aerobic exercise and their application in clinical use.									
<b>Unit-No.</b>	<b>Content</b>				<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>

<p><b>I</b></p>	<p><b>INTRODUCTION TO EXERCISE THERAPY:</b>  The aims of exercise therapy, the techniques of exercise therapy, Approach to patient's problems, Assessment of patient's condition- Measurement of vital parameters, Starting positions-Fundamental and derived positions, Planning of treatment.</p> <p><b>AEROBIC EXERCISE:</b>  Definition and key terms, Physiologic response to aerobic exercise, Examination and evaluation of aerobic capacity, The exercise program.</p>	<p><b>10 hours</b></p>	<p>Understanding the major aims for learning exercise therapy and how to apply on the patients. Demonstrate an understanding of health related fitness components, endurance, flexibility and body composition.</p>	<p>1,2</p>
<p><b>II</b></p>	<p><b>METHODS OF TESTING:</b></p> <p>a) Goniometer- parts, types, principles, uses, Limitations of goniometry, Techniques for measurements of ROM for all peripheral joints.</p> <p>b) Measurement of joint range: ROM definition, Normal ROM for all peripheral joints and spine.</p> <p>c) Tests for neuromuscular efficiency</p> <p>d) Manual Muscle Testing: Introduction to MMT, Principles and aims, Indications and limitations, Techniques of MMT for group and individual muscles: Techniques of MMT for upper limbs/Techniques of MMT for lower limbs/Techniques of MMT for spine</p> <p>e)Anthropometric measurements: Muscle girth- Biceps, Triceps, Forearm, Quadriceps, Calf  Static power test, Dynamic power test, Endurance test, Speed test  Pulmonary function test  Test for sensation  Measurement of limb length: true limb length, apparent limb length, segmental limb length.</p>	<p><b>10 hours</b></p>	<p>Understanding and applying the goniometry measurement for measuring the range of motion. Learning the various grades of MMT and the technique and applying it on the patients to examine the muscle power. Anthropometric measurement can be used to estimate total body fat, regional fat and fat distribution. Confirming a diagnosis of primary or secondary lung diseases with the use of PFT. Understanding the limb length and applying it to asses the limb length discrepancy(LLD)</p>	<p>1,2</p>

<p><b>III</b></p>	<p><b>ACTIVE MOVEMENT</b>  Types of active movements:  Free exercise: Classification, Principles, Techniques, Indications, Contraindications, Effects and uses.  Active assisted exercise: Principles, Techniques, Indications, Contraindications, Effects and uses.  Resisted exercise: Definition, Principles, Indications and contraindications, precautions and techniques, effects and uses, Types of resisted exercises: Manual and mechanical resistance exercise, Equipment for resistance training.  Isometric exercise, Dynamic exercise: Concentric and eccentric, Constant versus variable resistance, Isokinetic exercise, Open chain and closed exercise.  Specific exercises:  Isotonic: Delorme, Oxford, Mac Queen, Circuit  Weight training Isometric:</p>	<p><b>10 hours</b></p>	<p>Students will learn the various free exercises, resisted, active assisted as well as isometric exercises and applying it to the clinical use for the patients to train their muscles.</p>	<p>1,2</p>
<p><b>IV</b></p>	<p><b>PASSIVE MOVEMENTS:</b> Causes of immobility, Classification of Passive movements, Principles of giving Passive movements, Indications, contraindications, Effects and uses, Techniques  <b>SUSPENSION THERAPY:</b>  Definition, Principles, Equipment and accessories, Indications and contraindications, Benefits of suspension therapy  Types of suspension therapy: Axial, Vertical, Pendular  Techniques of suspension therapy for upper limb and lower limb  <b>STRETCHING:</b>  Definition and terms related to stretching, Tissue response towards immobilization and elongation, Determinants of stretching exercise, Effects, Inhibition and relaxation procedures, Precautions and contraindication, Techniques of stretching.</p>	<p><b>10 hours</b></p>	<p>By the use of passive movements, suspension therapy and stretching the students will learn the techniques of the application of it on the patients.</p>	<p>2,3</p>



<p><b>V</b></p>	<p><b>BALANCE:</b>  Definition, Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output.</p> <p>Components of balance (sensory, musculoskeletal, biomechanical)</p> <p>Impaired balance: Causes, Examination and evaluation, Activities for treating impaired balance: mode, posture, movement. Precautions .</p> <p><b>CO-ORDINATION EXERCISES:</b></p> <p>Anatomy and physiology of cerebellum with its pathways  Definition: Co-ordination, Inco-ordination  Causes for inco-ordination, Test for co-ordination: equilibrium test, non-equilibrium test</p> <p>Principles of co-ordination test  Frenkel’s exercise: uses of Frenkel’s exercise, home exercise.</p> <p><b>INDIVIDUAL AND GROUP EXERCISES:</b>  Advantages and disadvantages, Organization and group exercises, Recreational activities and sports.</p>	<p><b>5 hours</b></p>	<p>By understanding the balance training and coordination exercises the students will be able to train the patients suffering from balance and coordination impairments and disability</p>	<p>3,4</p>
<p><b>Practical</b></p>	<ol style="list-style-type: none"> <li>1. Demonstrate the technique of measuring ROM using goniometry. (12 hrs)</li> <li>2. Demonstrate the techniques of strengthening muscles using resisted exercises. (14hrs)</li> <li>3. Demonstrate the techniques for measuring limb length and body circumference. (16hrs)</li> <li>4. Demonstrate the techniques for muscle stretching. (10hrs)</li> <li>5. Demonstrate exercises for training co-ordination-Frenkel’s exercise. (10hrs)</li> <li>6. Demonstrate to use the technique of suspension therapy. (10hrs)</li> <li>7. Demonstrate various techniques of active and passive movements. (10 hrs)</li> <li>8. Demonstrate muscle strength using the principles and technique of MMT (8 hrs)</li> </ol>	<p><b>90 hours</b></p>	<p>Students will be able to assess various discrepancies in the skeletal and muscular system and learn various exercise therapy techniques.</p>	<p>1,2,3,4,5</p>

**TEXT BOOKS:**

1. Therapeutic exercise by Barbara Bandy
2. Therapeutic exercise by Carolyn Kisner
3. Principles of exercise therapy by M. Dena Gardiner
4. Practical Exercise therapy by Hollis Margaret
5. Therapeutic exercise by Sydney Litch

**REFERENCE BOOKS:**

1. Therapeutic exercise by Hall & Brody
2. Therapeutic exercise by Basmajian
3. Physical Rehabilitation by Sullivan.
4. Therapeutic massage by Sinha.
5. Principles of muscle testing by Hislop.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping													MA PPI NG TAB LE
SN	Course Outcome (CO)	Mapped Program Outcome											
1	Equipped with the principles and effects of exercise as a therapeutic modality.	1,2,3,4,5,6,7,8											
2	Perform the techniques in the restoration of physical function.	1,2,3,4,6,7,8											
3	Acquired with the knowledge about the principles and techniques of exercise therapy in the clinical practice.	1,2,4,5,6,7											
4	Choose the effective exercise therapeutic skills with strong theoretical knowledge on patients	1,2,3,4,6,7,8											
5	Comprehend manual muscle testing techniques, stretching techniques as well as the importance of aerobic exercise and their application in clinical use.	1,2,3,4,5,6,8											

Course Name: EXERCISE THERAPY												
Course Code: 22BPTO211R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	3	2	1	1	1	2	1	2	1	0	0
	CO2	2	1	2	1	0	2	1	1	2	0	1
	CO3	3	1	1	0	2	1	1	0	2	0	0
	CO4	3	3	2	1	0	1	2	1	1	0	0
	CO5	3	2	1	2	1	1	0	1	1	0	0
	Average	2.8	1.8	1.4	1	0.8	1.4	1	1	1.4	0	0.2
	Count	14	9	7	5	4	7	5	5	7	0	1

SEMESTER – III									
Course Title	ELECTRO THERAPY								
Course code	22BPTO212R	TOTAL CREDITS: 6	L	T	P	S	R	O	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	6
PRE-REQUISITE	HUMAN ANATOMY, BIOMECHANICS OF HUMAN MOTION	CO-REQUISITE	NIL						
Program me	Bachelor in Physiotherapy								
Semester	3 <sup>rd</sup>								
Course Objectives	1. To introduce the students to the concepts related to :Medical electronics, Electric current, Therapeutic current, Nerve Muscle Physiology, Galvanic current, Faradic current, Sinusoidal Current & Biodynamic Current, Micro current & macro current, Cathodal / Anodal galvanism, HVPGS-Parameters and its uses, 2.To impart the students to the concepts related to :Types of electrical stimulators, Principles of application, TENS, Pain: Define pain, Pain Gate control theory in detail, Electro Magnetic Spectrum.								
CO1	Analyse principles, techniques, effects, indications, contraindications, and the dosage parameter for various indications of electrotherapeutic modalities in the restoration of physical functions								
CO2	Identify the indications, contraindications, dosage of electro therapy modalities, demonstrates the different techniques and describe their effects on various conditions.								
CO3	Categorise different types of currents and laws which will help the students to apply and learn in using the electro therapy modalities in a proper manner. And they will also learn about the physiology of nerve and muscle. They will be able to recall physics principles and laws of electricity, electro-magnetic spectrum and ultrasound.								
CO4	Apply the common electrical components such as transistors, valves, capacitors, transformers and will be able to identify such components.								
CO5	Describe the effects of environmental and man- made electro- magnetic field at the cellular level and risk factors on prolonged exposure.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		

<p><b>I</b></p>	<p><b>Medical electronics:</b>  Introduction  Types of electricity  Electronic theory of electrical charge  Potential  Electromotive force  Capacitance  Ohm’s law  Resistance  Capacitor  Rheostat  Joule’s law  Thermoelectricity and See back effect  Thomson effect  Primary cell, secondary cell  Magnetic effect of current  Galvanometer  Electricity  Magnetism  Electromagnetism  Electromagnetic induction, v. Eddy current Transformer  AC and DC motors  Voltmeter and ammeter  Thermo ionic valves and semiconductor devices  <b>ELECTRIC CURRENT</b>  Introduction ,type of electric current ,physiologic response ,pulsed current- pulse parameters ,pulse shape, pulse intensity, method(mode), polarity, electrodes ,electrical pulse generators  <b>THERAPEUTIC CURRENT</b>  Classification of therapeutic currents:  •AC ,DC, Interrupted DC  •LFC,MFC,HFC  •High voltage, low voltage  •Low amperage ,High amperage  •Currents causing ionic changes, currents causing thermal changes  <b>Nerve Muscle Physiology:</b>  Action potential, Propagation of action potential, Resting membrane potential, motor unit, Synapse, Accommodation, Stimulation of healthy muscle, Stimulation of denervated muscle, Stimulation for tissue repair.</p>	<p><b>10</b></p> <p><b>2</b></p> <p><b>7</b></p>	<p>In this unit the students will understand the different types of currents and laws which will help the students to apply and learn in using the electro therapy modalities in a proper manner. And they will also learn about the physiology of nerve and muscle.</p>	<p>1,2</p>
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II	<p><b>Galvanic current:</b> Definition, Modifications, Physiological &amp; Therapeutic effects of galvanic current, Indications&amp; Contraindication, Dangers, Effects of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles.</p> <p><b>Faradic current:</b> Definition, Modifications, Techniques of application of individual, Muscle and group muscle stimulation, Physiological &amp; therapeutic effects of faradic current, Precautions, Indications &amp; contraindications, Dangers. Sinusoidal Current &amp; Biodynamic Current. Micro current &amp; macro current.</p>	8	Here the students will understand the different therapeutic currents and how to use it in patients.	1,2
III	<p><b>Cathodal / Anodal galvanism.</b>  <b>HVPGS</b>-Parameters and its uses.  Types of electrical stimulators:  -<b>NMES</b>-construction component  -Neuromuscular diagnostic stimulator  -Components and working principles.  Principles of application: Tissue impedance, Types of electrodes,Electrode tissue interference, Size and placement of electrodes,Electrode coupling, Current flow in tissues, lowering of skin resistance.</p>	7	Knowledge about anodal and cathodal galvanism and its principles which will help the students to apply it on the patients.	1,2
IV	<p><b>TENS:</b> Definition, Types, Conventional TENS, Acupuncture TENS, Burst TENS, Brief and intense TENS, Modulated TENS, Types of electrodes and placement, Dosage parameters, Physiological &amp; Therapeutic effects, Indications and contraindications.  <b>Pain:</b> Define pain, Pain Gate control theory in detail.</p>	5	They will have an understanding about the pain control theory in human body as well as different parameters of TENS which will help them to apply it on the patients	2,3

V	<p><b>Electro Magnetic Spectrum:</b></p> <p><b>Ultrasound:</b></p> <p><b>Definition:</b> Frequency, Piezo electric effect, Production of US, Treatment dosage parameters, Continuous and pulsed ,intensity, US fields: Near field, Far field, Half Value distance, Attenuation, Coupling media, Thermal effects, Non thermal effects, Principles and Application of US: Direct contact, Water bag, Water bath, Solid sterile gel pack method for wound, Uses, Indication and contraindication, Dangers of ultrasound, Phonophoresis.</p>	6	Students will know the use of ultrasound therapy and learn how to apply it therapeutically over a patient and also have a knowledge on the electromagnetic spectrum	3,4
Practical	<ol style="list-style-type: none"> <li>1.Demonstrate the techniques for patient evaluation- receiving and positioning the patient for treatment using electrotherapy, collection of materials and testing of apparatus for treatment.( 12hrs)</li> <li>2.Winding up procedure after any electrotherapy treatment method.( 14hrs)</li> <li>3. Electrical stimulation for the muscles supplied by the peripheral nerves. ( 16Hrs)</li> <li>4. Plotting of SD curve with chronaxie and rheobase. (10hrs)</li> <li>5.Demonstrate FG test. (10hrs)</li> <li>6.Demonstrate treatment techniques using TENS for various regions. (14hrs)</li> <li>7.Application of US for different regions-various methods of application.( 14hrs)</li> </ol>	90	Students will be acquainted with the various electrotherapeutic modalities and their usages in various conditions along with the required dosage. Identify the indications and contraindications of the various modalities	1,2,3,4,5,6

**TEXT BOOKS:**

1. Claytons Electrotherapy by Forster & Palastanga
2. Electrotherapy Explained by Low & Reed
3. Clinical Electrotherapy by Nelson

**REFERENCE BOOKS:**

1. Electrotherapy Evidence based practice by Sheila Kitchen
2. Physical agents by Michele Cameroon
3. Principles of Electrotherapy by Michele Cameroon

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping												
SN	Course Outcome (CO)	Mapped Program Outcome										
1	Analyse principles, techniques, effects, indications, contraindications, and the dosage parameter for various indications of electrotherapeutic modalities in the restoration of physical functions	1,2,3,5,8										
2	Identify the indications, contraindications, dosage of electro therapy modalities, demonstrates the different techniques and describe their effects on various conditions.	1,2,3,4,5,6,8										
3	Categorise different types of currents and laws which will help the students to apply and learn in using the electro therapy modalities in a proper manner. And they will also learn about the physiology of nerve and muscle. They will be able to recall physics principles and laws of electricity, electro-magnetic spectrum and ultrasound.	3,5,6,7,8										
4	Apply the common electrical components such as transistors, valves, capacitors, transformers and will be able to identify such components.	1,2,3,4,5,6,7,,8										
5	Describe the effects of environmental and man- made electro-magnetic field at the cellular level and risk factors on prolonged exposure.	1,2,3,4,5,6,7,8										
		Course Name: ELECTRO THERAPY										
Course	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3

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Code:22BPTO212R	CO1	2	1	1	0	1	0	0	1	1	0	0
	CO2	1	1	1	1	1	2	0	1	0	0	0
	CO3	0	0	1	0	1	1	1	1	2	1	0
	CO4	1	2	2	1	1	2	1	1	0	0	0
	CO5	2	2	2	1	1	2	1	1	1	0	0
	Average	1.2	1.2	1.4	0.6	1	1.4	0.6	1	0.8	0.2	0
	Count	6	6	7	3	5	7	3	5	4	1	0

SEMESTER – III												
Course Title	PHARMACOLOGY											
Course code	22BPTO213R	TOTAL CREDITS: 2	L	T	P	S	R	O	C			
			2	0	0	0	0	0	2			
PRE-REQUISITE	NIL	CO-REQUISITE	NIL									
Programme	Bachelor in Physiotherapy											
Semester	3 <sup>rd</sup>											
Course Objectives	1. To introduce the students to the concepts related to General Pharmacology. 2.To introduce the students to Autonomic Nervous system, Neuropharmacology, Cardiovascular Pharmacology, Cardiovascular Pharmacology, Digestion and Metabolism..											
CO1	Determine the fundamental pharmacology of commonly used drugs, their significance in overall treatment, and their role in physiotherapy											
CO2	Understand the general principles of drug action and the handling of drugs by the body.											
CO3	Recognizes how the outcome of treatment is influenced by both drug and physiotherapy factors.											
CO4	Comprehend the effects and implications of sedatives on the body											
CO5	Summarise how drugs can contribute to cardiovascular diseases and metabolism											
Unit-No.	Content					Contact Hour	Learning Outcome					KL
I	<b>General Pharmacology:</b> Introduction, Definition, Classification of drugs, Sources of drugs, Routes of drug administration, Distribution of drugs, Metabolism and Excretion of drugs Pharmacokinetics, Pharmacodynamics, Factors modifying drug response, Adverse effects.					5	By the end of this unit the students should know how about the basic drug administration, metabolism and drug reactions					1,2
II	<b>Autonomic Nervous system:</b> General considerations – The Sympathetic and Parasympathetic Systems, Receptors, Somatic Nervous System. Cholinergic and Anti-Cholinergic drugs, Adrenergic and Adrenergic blocking drugs, Peripheral muscle relaxants.					6	By the end of this unit the students should be able to discuss about the sympathetic and parasympathetic nervous systems, drug actions an relaxants					1,2



<b>III</b>	Neuropharmacology: Sedative – Hypnotic Drugs: Barbiturates, Benzodiazepines Antianxiety Drugs: Benzodiazepines, Other Anxiolytics Drugs used in the treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic Antidepressants Atypical Antidepressants, Lithium, Antipsychotic drugs	<b>8</b>	By the end of this unit the students should know how about the sedatives group of drugs their actions and reactions	1,2
<b>IV</b>	Cardiovascular Pharmacology: Drugs used in the treatment of Heart Failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors, Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators. Antiarrhythmic Drugs	<b>8</b>	By the end of this unit the students should know about the drugs applicable for the cardiovascular systems also about their actions and reactions	2,3
<b>V</b>	Digestion and Metabolism: Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea Drugs used in the treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemic	<b>3</b>	By the end of this unit the students should be able to discuss about the drugs used in gastrointestinal system with their actions and reactions	3,4

#### TEXTBOOKS:

1. Lippincott's Pharmacology.
2. Essential of Medical Pharmacology by Tripathi
3. Text book of Medical Pharmacology by Padmajaudaykumar

#### REFERENCE BOOKS:

1. Pharmacology by N.Murugesh
2. Pharmacology & Pharmacotherapeutics by Sadoskar

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Determine the fundamental pharmacology of commonly used drugs, their significance in overall treatment, and their role in physiotherapy	<b>1,2,3,4,5,6,7,8</b>
<b>2</b>	Understand the general principles of drug action and the handling of drugs by the body.	<b>1,3,4,5,6,7,8</b>
<b>3</b>	Recognizes how the outcome of treatment is influenced by both drug and physiotherapy factors.	<b>1,3,4,5,6,7,8</b>
<b>4</b>	Comprehend the effects and implications of sedatives on the body	<b>1,2,3,4,5,6,7,8</b>

<b>5</b>	Summarise how drugs can contribute to cardiovascular diseases and metabolism	<b>1,2,3,4,5,6,7,8</b>
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### MAPPING TABLE

		Course Name: PHARMACOLOGY										
Course Code:22BPTO213R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	2	1	3	3	3	2	2	3	1	0	0
	CO2	1	0	2	3	3	1	1	2	1	0	0
	CO3	2	0	3	3	3	1	2	1	1	0	0
	CO4	2	2	3	3	3	1	2	2	0	0	0
	CO5	2	1	2	3	3	1	2	2	0	1	0
	Average	1.8	0.8	2.6	3	3	1.2	1.8	2	0.6	0.2	0
	Count	9	4	13	15	15	6	9	10	3	1	0

**SEMESTER – III**

<b>Course Title</b>	<b>MICROBIOLOGY &amp; PATHOLOGY</b>								
<b>Course code</b>	<b>22BPTO214R</b>	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		<b>TOTAL HOURS: 30</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>3<sup>rd</sup></b>								
<b>Course Objectives</b>	<p>1.To introduce the students to the concepts related to the microorganisms , immune system and some important disease caused by microorganisms</p> <p>2.The objective of this course is that after lectures, demonstration, the students will be able to understand the importance of microbiology in health science.</p> <p>3. The students will have taught about the cell injury, inflammation and repair, hemodynamic disorders and introduction of haematology.</p>								
<b>CO1</b>	Designed to have a depth knowledge of importance of medical microbiology in human life.								
<b>CO2</b>	Understand the different terminology commonly used in medical microbiology area.								
<b>CO3</b>	Understand the knowledge of antibiotics and aseptic techniques.								
<b>CO4</b>	Denote the concept of immune system and its mechanism								
<b>CO5</b>	Ability to get the concept of bacteria and bacterial infection.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<p>Definitions: Infection, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate.</p> <p>Routes of infection and spread; Endogenous and Exogenous infections; source at reservoir of infections.</p> <p>Bacterial cell, Morphology limited to recognizing bacteria in clinical samples. Shape, motility and arrangement, Structures, which are virulence</p>	<b>3hours</b>	Students will have a idea about the different terminology used in microbiology and concept of bacteria				1,2		

	<p><b>Introduction and scope of Pathology;</b> Subdivisions of Pathology, techniques for studying Pathology.</p> <p><b>Cell Injuries</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Important Aspects of Normal Cell Structure</li> <li><input type="checkbox"/> Reversible Cell Injury</li> <li><input type="checkbox"/> Irreversible Cell Injury</li> <li><input type="checkbox"/> Pigments.</li> </ul>	<b>2</b>	Students will have a basic concept on pathology	
<b>II</b>	Basic principles of immunity & immune-biology: lymphoid organs and tissues, Immunity and its types, Antigen, Antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis.	<b>4hrs</b>	Students will have a better knowledge regarding immune system	1,2
	<p><b>Inflammation and Repair</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Inflammation: Definition and signs of inflammation.</li> <li><input type="checkbox"/> Types– Acute and chronic inflammation.</li> <li><input type="checkbox"/> Acute inflammation–Causes, morphological patterns and outcome.</li> <li><input type="checkbox"/> Chronic inflammation–Causes, morphology and examples.</li> <li><input type="checkbox"/> Regeneration and repair–Mechanism of cutaneous wound healing.</li> </ul> <p>-Factors affecting wound healing.</p>	<b>3</b>	Students will have a basic idea of inflammation and healing after injured	
<b>III</b>	Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports Staphylococci, Streptococci & Pneumococci Mycobacteria: Tuberculosis, M. leprae, Enterobacteriaceae	<b>4hours</b>	Students will have a better understanding regarding common skin and Respiratory tract causing infection	1,2
	<p><b>Hemodynamic Disorder, Thromboembolic Disease Shock</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hyperemia/Ischemia and Hemorrhage</li> <li><input type="checkbox"/> Edema-</li> <li><input type="checkbox"/> Thrombosis and Embolism</li> <li><input type="checkbox"/> Infraction.</li> <li><input type="checkbox"/> Shock</li> </ul>	<b>5</b>	Students will have a concept of understanding regarding different types of Hemodynamic disorder	
<b>IV</b>	V. cholera and other medically important vibrios, Campylobacters and Helicobacters, Pseudomonas, Bacillus anthracis,	<b>3 hours</b>	Students will have a better understanding regarding some common important bacteria responsible for food poisoning	2,3
	<p><b>Adaptation of Growth Disturbances &amp; Differentiation</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Atrophy</li> <li><input type="checkbox"/> Hypertrophy</li> <li><input type="checkbox"/> Hyperplasia</li> <li><input type="checkbox"/> Metaplasia</li> </ul> <p><b>Neoplasia</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Nomenclature</li> <li><input type="checkbox"/> Carcinogenic Agents</li> <li><input type="checkbox"/> Tumors</li> </ul>	<b>3</b>	Students will have a basic of pathology regarding to growth disturbance & differentiation	

<b>V</b>	Sterilization, disinfection and universal precautions in relation to patient care and disease prevention, Definition of asepsis, sterilization, disinfection Antimicrobials: Mode of action, , resistance spectrum of activity.	<b>2 hours</b>	Students will have a better understanding regarding safety measures of health care organization and laboratory	3,4
	<b>Introduction of Hematology</b>  <input type="checkbox"/> Blood–formation, composition <input type="checkbox"/> Hematopoiesis, stem cells, formed elements and their functions <input type="checkbox"/> Anticoagulants Instrumentations in pathology laboratory	<b>2</b>	Students will have understood about the haematology, under this collection of blood, Anticoagulants	

**Text Book:**

1. Text book of Microbiology by Anantha Narayanan
2. Microbiology by Baveja

**Reference book:**

1. Text book of microbiology by Chakraborty
2. Essential of Medical Microbiology by Apurba Kumar Sastry and Sandhya Bhat K
3. Immunology by Kuby
4. Pathology–Harsh Mohan
5. Pathologic Basis of Disease-Robbin and Cotran
6. Textbook of Medical Laboratory Technology Praful B. Godkar, Darshan P Godkar

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Designed to have a depth knowledge of importance of medical microbiology in human life.	<b>1,2,3,4,5,6,7,8</b>
<b>2</b>	Understand the different terminology commonly used in medical microbiology area.	<b>1,3,4,5,6,7,8</b>
<b>3</b>	Understand the knowledge of antibiotics and aseptic techniques.	<b>1,3,4,5,6,7,8</b>
<b>4</b>	Denote the concept of immune system and its mechanism	<b>1,2,3,4,5,6,7,8</b>
<b>5</b>	Ability to get the concept of bacteria and bacterial infection.	<b>1,2,3,4,5,6,7,8</b>

**MAPPING TABLE**

Course Name: MICROBIOLOGY & PATHOLOGY												
Course Code:22BPTO 214R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PS O1	PS O2	PS O3
	CO1	3	2	2	1	2	1	1	1	1	0	0
	CO2	1	2	1	3	1	1	1	1	0	1	0
	CO3	1	2	2	3	2	1	1	1	1	1	1
	CO4	2	3	3	2	3	1	2	2	1	0	0
	CO5	1	2	1	1	1	1	1	1	1	0	0
	Average	1.6	2.2	1.8	2	1.8	1	1.2	1.2	0.8	0.4	0.2
	Count	8	11	9	10	9	5	6	6	4	2	1

**SEMESTER – III**

<b>Course Title</b>	<b>BIostatistics AND RESEARCH METHODOLOGY</b>
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Course code	22BPTO215R	TOTAL CREDITS: 2	L	T	P	S	R	O	C
		TOTAL HOURS: 30	2	0	0	0	0	0	2
PRE-REQUISITE	NIL	CO-REQUISITE	NIL						
Programme	Bachelor in Physiotherapy								
Semester	3 <sup>rd</sup>								
Course Objectives	<p>1. To introduce the students to the concepts related to -Introduction to Research methodology, Research problem, Research design, Sampling Design, Measurement &amp; scaling techniques.</p> <p>2.To impart the students to the concepts related to - advanced statistical science and its applications to problems of human health and diseases.</p>								
CO1	Describe the basic research methodology, statistical concepts								
CO2	Apply the methods from basic statistics and research methods for different study types.								
CO3	Develop the ability to apply methods while working on a research project work.								
CO4	Gain knowledge of the basic concepts of biostatistics and its need for professional practice and research.								
CO5	Describe and over view the design and methodology of an experiment or survey, demography and sampling and interpretation of data, tabulation and the graphical representation.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
<b>PART I (RESEARCH METHODOLOGY)</b>	<b>Introduction to Research methodology:</b> Meaning of research, objectives of research, Motivation in research, Types of research & research approaches, Research methods vs methodology, Criteria for good research, Problems encountered by researchers in India.	<b>8</b>	Have an overall idea about the research methods, how to use it in medical research and about the research problem.				1,2		
<b>I</b>	<b>Research problem:</b> Statement of research problem. Statement of purpose and objectives of research problem, Necessity of defining the problem.								
<b>II</b>	<b>Research design:</b> Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design  <b>Methods of data collection:</b>  <ul style="list-style-type: none"> <li>● Collection of primary data</li> <li>● Collection of data through questionnaire &amp; schedule</li> </ul> Difference between questionnaire & schedule	<b>6</b>	Understanding the purpose and objectives of research design and how to collect the data for research.				1,2,3		
<b>III</b>	Measurement & scaling techniques: Measurement in research- Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, it's Classification. Important scaling techniques.	<b>3</b>	Students will know about the Different measurement scales and its uses for the research studies				2,3,4,5		

<b>PART II (BIOSTATISTICS )</b>  <b>IV</b>	Introduction: Meaning, definition, characteristics of statistics., Importance of the study of statistics, Branches of statistics, Statistics and health science including physiotherapy, Parameters and Estimates, Descriptive and inferential statistics, Variables and their types, Measurement scales.	<b>6</b>	Have an understanding about the importance of statistics in the research studies and in physiotherapy its variables and measurement scales	1,2,3,4
<b>V</b>	Tabulation of Data: Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.	<b>7</b>	Have an idea on the graphical representation and use it while doing the research studies	3,4,5

**TEXT BOOKS:**

1. Elements of Health Statistics: Rao.N.S.N
2. An introduction of Biostatistics: SunderRao.P.S.S.
3. Methods in Bio-Statistics 6<sup>th</sup> Edn. 1997: B.K.Mahajan
4. Biostatistics: A manual of Statistics Methods: K. VisweswaraRao
5. Elementary Statistics 1stEdn, 1990. In Medical Workers: InderbirSingh

**REFERENCE BOOKS:**

1. Statistics in Psychology and education: Great and Henry.
2. An Introduction to Gupta C.B. Statistical Methods, 1972: Ram Prasad & Sons.
3. Basic Statistics, 3rdEdn.: Simpsory G. Kaftha.P.
4. Research; Principles and Methods: L Denise F.Poli & Hungler.
5. Fundamentals of Research, 4<sup>th</sup> Edn.: David J.fox.



## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe the basic research methodology, statistical concepts	<b>1,2,3</b>
<b>2</b>	Apply the methods from basic statistics and research methods for different study types.	<b>1,2,3</b>
<b>3</b>	Develop the ability to apply methods while working on a research project work.	<b>1,2,3</b>
<b>4</b>	Gain knowledge of the basic concepts of biostatistics and its need for professional practice and research.	<b>1,2,3</b>
<b>5</b>	Describe and over view the design and methodology of an experiment or survey, demography and sampling and interpretation of data, tabulation and the graphical representation.	<b>1,2,3</b>

### MAPPING TABLE

<b>Course Name: BIOSTATICS &amp; RESEARCH METHODOLOGY</b>												
<b>Course Code:22BPTO215 R</b>	<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
	<b>CO1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>1</b>
	<b>CO2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>
	<b>CO3</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>1</b>
	<b>CO4</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
	<b>CO5</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>2</b>
	<b>Average</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1.4</b>	<b>0.8</b>	<b>1.4</b>
	<b>Count</b>	<b>10</b>	<b>15</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>4</b>	<b>6</b>

**SEMESTER – III**

SEMESTER – III									
Course Title	Environmental Studies								
Course code	22BPTO217R	TOTAL CREDITS:2	L	T	P	S	R	O / F	C
		TOTAL HOURS:30	2	0	0	0	0	0	2
PRE-REQUISITE	NIL	CO-REQUISITE	NIL						
Programme	Bachelor in Physiotherapy								
Semester	3 <sup>rd</sup>								
Course Objectives	1.To prepare students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective. 2.To develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, Skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and prevention of new ones.								
CO1	Appreciate the ethical,cross-cultural,and historical context of environmental issues and the links between human and natural systems.								
CO2	Acquire knowledge natural resource, its importance and environmental impacts of Human activities on natural resource								
CO3	Gain insight about environment and ecosystem								
CO4	Comprehend the concept of biodiversity and respect them.								
CO5	Understands about the conservation of biodiversity and its importance. Aware students about problems of environmental pollution, its impact on human and ecosystem and control measures.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Multidisciplinary nature of environmental studies:</b> Definition, scope and importance Need for public awareness.	2	Evaluate the different environmental problems and Importance of awareness				1,2		
II	<b>Natural Resources:</b> <b>Renewable and non-renewable resources:</b> Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts overwater, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	2	Describe about different resources and its impact on depletion.				1,2		

<b>III</b>	<b>Ecosystems</b> Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the Following ecosystem:-Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds,streams,lakes,rivers,oceans,estuaries)	<b>2</b>	Describe, illustrate and explain the importance of ecosystem and steps for conservation.	1,2
<b>IV</b>	<b>Biodiversity and its conservation</b> Introduction– Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega-diversity nation• Hot-spots of biodiversity.Threats to biodiversity: habitat loss, poaching of wildlife,man-wild lifeconflicts.Endangered and endemic species of India.Conservation of biodiversity:In-situ and Ex-situ conservationof biodiversity	<b>5</b>	To understand biodiversity and the biogeographical classification in India. Also to emphasise the importance of biodiversity with regard to productive, social, ethical, aesthetic and options.	2,3
<b>V</b>	<b>Environmental Pollution</b> Definition Cause, effects and control measures of:-Air pollution, Water pollution, Soil pollution,Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.	<b>4</b>	Understand the factor contributing to environmental pollution, it's effects and the importance of taking control measures	3,4
<b>VI</b>	<b>Social Issues and the Environment</b> From Unsustainable to Sustainable development.Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problemsand concerns. Case Studies. Environmental ethics: Issues and possible solutions. Climate change, globalwarming, acidrain,ozonelayer depletion, nuclear accidents and holocaust.Case Studies. Waste land reclamation. Consumerism and waste products. Environment Protection Act.Air (Prevention and Control of Pollution)Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act.Issues involvedin enforcement of environmental legislation.Public awareness.	<b>6</b>	Evaluate the different environmental problems and Importance of awareness	4,5
<b>VII</b>	<b>Human Population and the Environment</b> Population growth, variation among nations. Population explosion–Family Welfare Programme. Environment and human health.HumanRights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Case Studies.	<b>6</b>	Understand the various environmental issues which Are arising issues which are arising increased Human populations.	4,5
<b>VIII</b>	<b>Field work</b> Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain.Visit to a local polluted site-Urban/Rural/ Industrial/ Agricultural.Study of commonplants, insects, birds. Study of simple ecosystems-pond,river, hillslopes,etc.	<b>3</b>	Field visit to a local area for documentation and assessment of environmental assets.	5,6

**Text Books:**

- Harucha E.B, Textbook of Environmental Studies, Orient Blackswan Publishing.
- Tiwari V.K.A Textbook of Environmental Studies, Himalaya Publishing House
- Chatwal G.R.& Sharma H. Environmental Studies, Himalaya Publishing House

**Reference Books:**

- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Volland II, Enviro Media (R)
- Trivedi R.K. and P.K. Goel, Introduction to Air Pollution, Techno-Science Publication (TB)
- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad-380013, India, Email: mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the fundamentals and advances of cytology including structure and functions of cell and cell organelles.	1,3 & 4
2	Able to explain the cell cycle and cell division.	1,2
3	Learn and develop skills for operating microscope, preparing slides by various staining techniques	7,9,10
4	Apply knowledge of cellular processes to explain how cells operate and interact within living organisms.	5,7
5	Demonstrate a comprehensive understanding of cell structure and function.	5,8

**MAPPING TABLE:**

Course Code: 22BPT0217R	Course Name: ENVIRONMENTAL SCIENCES										
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	0	1	0	1	0	0	1	1	0	0
CO2	1	0	1	0	1	0	0	1	1	0	1

	CO3	1	0	1	0	1	0	0	1	0	0	1
	CO4	1	0	1	0	1	0	0	1	1	0	0
	CO5	1	0	1	0	1	0	0	1	0	0	1
	Average	1	0	1	0	1	0	0	1	0.6	0	0.6
	Count	5	0	0		5	0	0	5	3	0	3

SEMESTER – III										
<b>Course Title</b>	<b>ENGLISH LANGUAGE FOR EXCELLENCE (Communicative English &amp; Soft Skills)</b>									
<b>Course code</b>	<b>22UBPD212R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>F</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	0	0	4	0	0	0	0	2
<b>PRE-REQUISITE</b>	22UBPD122R Implicit English	<b>CO-REQUISITE</b>	NIL							
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>									
<b>Semester</b>	<b>3<sup>rd</sup></b>									

<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To enable students to learn, understand and practice transformation of sentences,uses of correct preposition.</li> <li>2. To augment the writingskills in different areas including CV and cover letter writing.</li> <li>3. To boost productivity and performance at work,which assists in the achievement of professional goals.</li> <li>4. To evaluate the required attributes in a candidate.</li> </ol>
<b>CO1</b>	Practice of grammar will strengthen their speaking and writing skills.
<b>CO2</b>	Learners will be able to use the skills in their professional communication.
<b>CO3</b>	It will enable to deal with thoughts, and emotions in a productive way.
<b>CO4</b>	The different attributes will develop the students' ability to cope up in professional environment
<b>CO5</b>	Assess behaviors, thoughts, and emotions in a conscious and productive way

<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Grammar a. Use of Prepositions b. Tag questions	6	Explain use of prepositions.	1,2, 3
<b>II</b>	Grammar I. Active and Passive Voice ii. Direct and Indirect Speech	8	Describe active, passive voice and direct & indirect speech.	1,2, 3
<b>III</b>	Writing Skills  i. The Basics of Writing; avoid ambiguity and vagueness ii. Paragraph Writing iii. Resume, CV and Cover Letter	8	Describe writing skills.	1,2, 3
<b>IV</b>	Self-Management Skills  i. SWOT Analysis ii. Goal Setting iii. Personal Hygiene	8	Describe, and explain self-management skills.	1,2, 3
<b>V</b>	Non-Verbal Communication-Sciences of Body Language  i. What is Non-Verbal Communication & Body Language, ii. Types of Body Language, iii. Importance and Impact of Body Language, iv. Types of Communication through Body Language, Body Language Do's and Don'ts, Doubt Clearing Session Basic Tipsto Maintain Time.	10	Describe, and explain Non-Verbal Communication-Sciences of Body Language.	1,2, 3

#### TEXT BOOKS:

T1: Lata, P.,,S.(2015).Communication Skills, Second Edition. India: Oxford University Press.

T2: Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.

T2: Mc Dowell, Gayle Laakmann. 2008. Cracking the Coding Interview (Indian Edition).

#### REFERENCE BOOKS:

R1: Zinsser, William. (2006)On Writing Well: The Classic Guide to Writing Non-fiction, Harper Perennial

R2: Lacinai, Antonio. (2016)Understanding Body Language:51 gestures and what they signal, Books on Demand.

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome</b>	<b>Mapped Program Outcome</b>
1.	Understand prepositions and tag questions to analyze and correct grammatical structures in sentences.	5,7,8
2.	Analyse active and passive voice, and transform direct into indirect speech.	5,7,8
3.	Comprehend the writing skills through various techniques of language use.	5,7,8
4.	Apply SWOT analysis and goal-setting techniques to evaluate personal and professional development strategies	5,7,8
5.	Assess behaviours, thoughts, and emotions in a conscious and productive way.	5,7,8



SEMESTER – III									
Course Title	QUALITY CONTROL AND PATIENT SAFETY								
Course code	22BPT0216R	TOTAL CREDITS: 01	L	T	P	S	R	O/ F	C
		TOTAL HOURS: 30	0	0	2	0	0	0	1
PRE-REQUISITE	NIL	CO-REQUISITE	NIL						
Programme	Bachelor in Physiotherapy								
Semester	3 <sup>rd</sup>								
Course Objectives	1. This course will help the students to understand the basic concepts of quality in health Care. 2. This course will also help the students to develop skills to implement sustainable quality assurance program in the health system.								
CO1	Comprehend the knowledge about teaching the NABH guidelines.								
CO2	Exposure about the management of biomedical waste, infection control & prevention, antibiotic resistance								
CO3	Apprehend about disaster management.								
CO4	Illustrate about the various emergencies code of conduct								
CO5	Summarize about the facilities emphasizing on patient care								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<p><b>Quality assurance and management:</b> The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.</p> <p>a. Concepts of Quality of Care b. Quality Improvement Approaches c. Standards and Norms d. Quality Improvement Tools e. Introduction to NABH guidelines</p>	6	At the end of the unit the student will learn about the quality in health care and management					1,2,3	
II	<p><b>Bio medical waste management and environment safety:</b> The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the course are as follows:</p> <p>a. Definition of Biomedical Waste b. Waste minimization c. BMW – Segregation, collection, transportation, treatment and disposal (including colour coding) d. Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste e. BMW Management &amp; methods of disinfection f. Modern technology for handling BMW g. Use of Personal protective equipment (PPE) h. Monitoring &amp; controlling of cross infection (Protective devices)</p>	6	At the end of the unit the student will learn about the biomedical waste management and environment safety					1,2,4	

<p><b>III</b></p>	<p><b>Infection prevention and control:</b>  The objective of this section will be to provide a broad understanding of the core course areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –</p> <ul style="list-style-type: none"> <li>a. Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],</li> <li>b. Prevention &amp; control of common healthcare associated infections,</li> <li>c. Components of an effective infection control program, and</li> <li>d. Guidelines (NABH and JCI) for Hospital Infection Control</li> </ul>	<p><b>6</b></p>	<p>At the end of the unit the student will learn about the importance of infection prevention and control</p>	<p>1,2</p>
<p><b>IV</b></p>	<p><b>Antibiotic Resistance:</b></p> <ul style="list-style-type: none"> <li>a. History of Antibiotics</li> <li>b. How Resistance Happens and Spreads</li> <li>c. Types of resistance- Intrinsic, Acquired, Passive</li> <li>d. Trends in Drug Resistance</li> <li>e. Actions to Fight Resistance</li> <li>f. Bacterial persistence</li> <li>g. Antibiotic sensitivity</li> <li>h. Consequences of antibiotic resistance</li> <li>i. Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals</li> </ul>	<p><b>6</b></p>	<p>At the end of the unit the student will learn about the importance of antibiotic resistance</p>	<p>2,3,5</p>
<p><b>V</b></p>	<p><b>Disaster preparedness and management:</b>  The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include</p> <ul style="list-style-type: none"> <li>a. Fundamentals of emergency management,</li> <li>b. Psychological impact management,</li> <li>c. Resource management,</li> <li>d. Preparedness and risk reduction,</li> <li>e. Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.</li> </ul>	<p><b>6</b></p>	<p>At the end of the unit the student will learn about the disaster preparedness and management</p>	<p>3,4,5,6</p>

**TEXT BOOKS:**

1. Textbook of medical laboratory technology by Praful B Godkar.

**REFERENCE BOOKS:**

1. Handbook of Healthcare quality & patient safety by Girdhar J Gyani

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Comprehend the knowledge about teaching the NABH guidelines.	5
2	Exposure about the management of biomedical waste, infection control & prevention, antibiotic resistance	0
3	Apprehend about disaster management.	4
4	Illustrate about the various emergencies code of conduct	2,7
5	Summarize about the facilities emphasizing on patient care	1,6

**MAPPING:**

		Course Name: QUALITY CONTROL AND PATIENT SAFETY											
Course Code:22BPTO216R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	
	CO1	0	0	0	0	1	0	0	0	0	0	0	1
	CO2	0	0	0	0	0	0	0	0	0	0	0	0
	CO3	0	0	0	1	0	0	0	0	0	0	0	0
	CO4	0	1	0	0	0	0	1	0	0	0	0	0
	CO5	1	0	0	0	0	1	0	0	0	1	0	0
	Average	0.2	0.2	0	0.2	0.2	0.2	0.2	0	0	0	0.2	0.2
	Count	1	1	0	1	1	1	1	0	0	1	1	1

**SEMESTER – III**

Course Title	BASIC LIFE SAVING SKILLS (BLSS)
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<b>Course code</b>	<b>22UULS202R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
			<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
		<b>TOTAL HOURS:</b>						<b>/</b>	
								<b>F</b>	
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>3<sup>rd</sup></b>								
<b>Course Objectives</b>	The aim of the course is to provide the learners with basic knowledge and practical skills needed in an emergency fire situation, and to provide appropriate basic management and treatment for injuries.								
<b>CO1</b>	The students will be able to recognize respiratory arrest/cardiac arrest, and provide oxygen to the patients to sustain tissue viability.								
<b>CO2</b>	The students will be able to perform the importance of early CPR on Adult, child and infants victims.								
<b>CO3</b>	The students will be able to perform the basic steps to relive choking for responsive and unresponsive victims								
<b>CO4</b>	The students will be able to prevent injury from getting worse, aiding recovery, relieving pain and protecting the victims from deterioration.								
<b>CO5</b>	The students will be able to learn about the fire equipment requirements, methods of operation and getting out alive.								
<b>Unit-No.</b>	<b>Content</b>				<b>Contact Hour</b>	<b>Learning Outcome</b>			<b>KL</b>
<b>I</b>	<b>Basic Life Support (BIS)</b> <ul style="list-style-type: none"> <li>● Introduction of BLS</li> <li>● Chain of survival</li> <li>● ABCs Assessment</li> <li>● CPR and Ventilation Technique</li> <li>● AED</li> </ul> Choking for adult and children				<b>4</b>	Describe and understand about the Basic Life Support and the techniques that can be used during emergency			1,2,3
<b>II</b>	<b>First Aid</b> <ul style="list-style-type: none"> <li>● Golden rules of First aid</li> </ul> First aid Kits				<b>2</b>	To familiarize the rules and utility of First Aid kits.			1,2,4
<b>III</b>	<b>Trauma emergencies</b> <ul style="list-style-type: none"> <li>● Introduction</li> <li>● Priorities of Initial approach in pre-hospital care               <ol style="list-style-type: none"> <li>a) Scene safety</li> <li>b) Primary assessment</li> <li>c) Bleeding control</li> <li>d) Extrication of victims and Safe transfer</li> <li>e) Cervical spine stabilization and C-collar application</li> </ol> </li> </ul> Splinting of broken Limbs				<b>4</b>	To understand the trauma emergencies and the correct approach that should be taken during the pre-hospital care such as primary assessment, bleeding control, Extrication of victims ,Safe transfer and other approach that can be taken during emergencies			1,2

IV	<b>Triage system</b> <ul style="list-style-type: none"> <li>● Introduction</li> <li>● Flow chart approach of Triage</li> </ul> Triage of Single and Multiple Casualties in Pre-Hospital setting	2	To understand triage system and its utility in pre hospital settings	2,3,5
V	<b>Medical emergencies</b> <ul style="list-style-type: none"> <li>● Introduction</li> <li>● Victim centered approach and Management of:- <ul style="list-style-type: none"> <li>a) Seizures</li> <li>b) Heart attack</li> <li>c) asthma</li> <li>d) diabetic emergencies</li> <li>e) emergency child birth</li> </ul> </li> </ul> Respiratory distress and failure	4	To understand medical emergencies and learn the handling and management of conditions like seizures, heart attack, asthma etc.	3,4,5,6
VI	<b>Environmental Emergency</b> <ul style="list-style-type: none"> <li>● Recognizing and caring for heat related illness such as: Heat stroke, heat cramps, heat exhaustion, dehydration.</li> <li>● Recognizing and caring for cold related illness such as frost bite, hypothermia. Poisoning, Snakebite</li> </ul>	2	To understand environmental induced medical emergencies like Heat stroke, heat cramps, heat exhaustion, dehydration and handling of cold related illness such as frost bite, hypothermia. Poisoning, Snakebite	4,5,6
VII	<b>Safety of people in the event of fire</b> <ul style="list-style-type: none"> <li>● Recognition of possible fire sources and emergency procedures, construction techniques for eliminating fire.</li> <li>● Types of detecting devices and extinguishing agents and systems</li> <li>● Devising procedures in the event of fire and react to fire danger.</li> </ul> Safety goals and objectives, Identifying hazards and risks	2	To understand the safety of the people in case of a fire breakout and utility of the extinguishing agents and systems in the event of fire and react to fire danger, construction techniques for eliminating fire. Safety goals and objectives, Identifying hazards and risks	5,6

**Book reference:**

1. Nancy Caroline's Emergency Care in the streets eight edition by Jones and Bartlett
2. First Aid book by LC Gupta; Publisher Jaypee Brothers, 7<sup>th</sup> Edition.
3. Advance Cardiovascular life support and Basic life support provider manual @ American Heart Association (AHA)

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The students will be able to recognize respiratory arrest/cardiac arrest, and provide oxygen to the patients to sustain tissue viability.	<b>1,2,7,8</b>
<b>2</b>	The students will be able to perform the importance of early CPR on Adult, child and infants victims.	<b>1,2,4,5</b>
<b>3</b>	The students will be able to perform the basic steps to relive choking for responsive and unresponsive victims	<b>1,7,8</b>
<b>4</b>	The students will be able to prevent injury from getting worse, aiding recovery, relieving pain and protecting the victims from deterioration.	<b>1,2,6,7</b>
<b>5</b>	The students will be able to learn about the fire equipment requirements, methods of operation and getting out alive.	<b>2,5,6,8</b>

<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>EXTRACURRICULAR ACTIVITIES</b>								
<b>Course code</b>	<b>22UBEC211</b>	<b>TOTAL CREDITS:1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>3<sup>rd</sup></b>								
<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners								
<b>CO</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to earn from invited experts in their respective fields. The students will get an exposure of 360degree learning methodology considering the overall growth along with the academics.								
<b>Content</b>									
AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.									

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BPTO211R	EXERCISE THERAPY	3	1	3	0	1	2	1	2
22BPTO212R	ELECTRO THERAPY	3	1	2	1	0	1	2	2
22BPTO213R	PHARMACOLOGY	3	1	2	1	0	1	2	2
22BPTO214R	MICROBIOLOGY & PATHOLOGY	3	1	2	1	0	1	2	2
22BPTO215R	BIOSTATISTICS & RESEARCH METHODOLOGY	0	0	0	2	0	0	1	1
22BPTO217R	ENVIRONMENTAL SCIENCES	0	0	0	3	0	0	0	0
22UBPD212R	ENGLISH LANGUAGE FOR EXCELLENCE	0	0	0	0	0	0	0	1
22UBCC211R	CO-CURRICULAR	0	0	0	0	0	0	0	2
22BPTO216R	QUALITY CONTROL AND PATIENT SAFETY	0	0	0	0	0	0	0	1
22UBEC211R	EXTRA-CURRICULAR	0	0	0	0	0	0	0	1

SEMESTER – IV									
Course Title	EXERCISE THERAPY								
Course code	22BPTO221R	TOTAL CREDITS: 6	L	T	P	S	R	O	C
			3	0	6	0	0	0	6
		TOTAL HOURS: 45T+90P							
PRE-REQUISITE	HUMAN ANATOMY, BIOMECHANICS OF HUMAN MOTION	CO-REQUISITE	NIL						
Programme	Bachelor in Physiotherapy								
Semester	4 <sup>th</sup>								

<b>Course Objectives</b>	<p>1. This course offers students a lifespan approach to physical fitness, performance and health to prepare them for a career in the physical therapy field.</p> <p>2. The exercise science majorly prepares students for a variety of possible careers in athletic training, physical therapy, fitness and sports, education, sport science and coaching such occupation include aerobics instructor, cardiopulmonary rehabilitation specialists, exercise physiologist, occupational physiologist, personal trainer and conditioning specialist and more.</p>			
<b>CO1</b>	Equipped with the principles and effects of proprioceptive neuromuscular facilitation and relaxation technique.			
<b>CO2</b>	Apply the techniques of massage and functional re-education and manual therapy including peripheral joint mobilization.			
<b>CO3</b>	Acquire the knowledge about the techniques of breathing exercises and hydrotherapy, posture and gait.			
<b>CO4</b>	Acquire the skill of assessment of isolated and group muscle strength and the techniques of MMT and mobilization.			
<b>CO5</b>	Describe the pattern of normal and abnormal movements of various joint activities.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<p><b>PROPRIOCEPTIVENEUROMUSCULAR FACILITATION:</b></p> <p>Definitions and goals</p> <p><b>Basic neurophysiologic principles of PNF:</b> Muscular activity, Diagnostic patterns of movement: upper limb and lower limb</p> <p><b>Procedure:</b> Components of PNF Techniques of facilitation: <b>Mobility:</b> Contract relax, Hold relax, Rhythmic initiation</p> <p><b>Strengthening:</b> Slow reversal, Repeated contractions, Timing for emphasis, Rhythmic stabilization <b>Stability:</b> Alternating isometric, Rhythmic stabilization Skill: Timing for emphasis, resisted progression Endurance: Slow reversal, Agonist reversal</p> <p><b>RELAXATION:</b> Definitions: Muscle tone, Postural tone, Voluntary Movement, Pathological tension in muscle, Stress mechanics, Types of stress, Effect of stress on body, Indications of relaxation, Methods and techniques of relaxation, Principle and uses: General, local, Jacobson's, Mitchel's, additional methods.</p>	<b>10</b>	<p>Students will learn the basic PNF techniques and learn how to use it on the patients with the PNF patterns and methods</p> <p>Have a knowledge and understanding about the relaxation methods and the muscles acting during stress and how to overcome stress with the use of relaxation techniques.</p>	1,2



II	<p><b>MASSAGE:</b> Introduction, history and origin, definition, therapeutic effects, contraindications, classification</p> <p><b>FUNCTIONAL RE-EDUCATION:</b> Mat exercises, Lying to sitting: Activities on the mat/bed, Movement and stability at floor level Sitting activities and gait Lower limb and upper limb activities</p>	5	Understanding of the therapeutic massage techniques and the re-education methods for the patients	1,2,3
III	<p><b>MANUAL THERAPY AND PERIPHERAL JOINT MOBILISATION:</b></p> <p>Principles, Grades, Indications and Contraindications, Effects and uses-Maitland, McKenzie, Mulligan</p> <p>Biomechanical basis for mobilization, Techniques of mobilization for upper limb, lower limb, spine, Precautions.</p>	10	Learning the grades of mobilisation postulated by different people and applying them on the patients therapeutically.	1,2
IV	<p><b>POSTURE:</b> Definition, Active and Inactive postures, Postural mechanism, Patterns of posture, Principles of re-education: Corrective methods and techniques, Patient education.</p> <p><b>LOCOMOTION:</b> Gait, normal gait analysis, pathological gaits, gaits training Staircase climbing Training with supportive aids Walking aids – principles – selection – training – crutch walking – cane walking - Pre-crutch training</p>	10	They will learn the different postural mechanisms and the muscles acting on it. They will also have an idea about the gait patterns and walking aids and apply them to mobilise the patients.	2,3
V	<p><b>HYDROTHERAPY:</b> Definitions, Goals and Indications, Precautions and contraindications, Properties of water, Uses of Special equipment, techniques, Effects and uses, merits and demerits</p> <p><b>BREATHING EXERCISES, POSTURAL DRAINAGE, THORACIC MOBILITY EXERCISE, COUGHING AND ADDITIONAL TECHNIQUES TO FACILITATE COUGH AND AIRWAY CLEARANCE</b> Principle techniques, effect – merits /demerits</p>	10	Basics of hydro therapy its goals and use it therapeutically for treatment purpose. Also different breathing patterns and airway clearance techniques which will help the students to apply practically	3,4

<p><b>Practical</b></p>	<p>The students of exercise therapy are to be trained in Practical Laboratory work for all the topics discussed in theory. The student must be able to evaluate and apply judiciously the different methods of exercise therapy techniques on the patients. They must be able to:</p> <ol style="list-style-type: none"> <li>1. Breathing exercises and postural drainage various positions. (10hrs)</li> <li>2. Demonstrate the techniques of massage manipulations. (10hrs)</li> <li>3. Demonstrate the techniques for functional re-education. (14hrs)</li> <li>4. Assess and evaluate posture and gait. (12hrs)</li> <li>5. Demonstrate the PNF techniques. (14hrs)</li> <li>6. Demonstrate mobilization of individual joint regions. (15hrs)</li> <li>7. Assess and train gait using walking aids. (15hrs)</li> </ol> <p>)</p>	<p><b>90 hours</b></p>	<p>Students will be able to demonstrate various exercise therapy techniques in various conditions.</p>	<p>1,2,3,4,5,6</p>
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**TEXT BOOKS:**

1. Therapeutic exercise by Barbara Bandy
2. Therapeutic exercise by Carolyn Kisner
3. Principles of exercise therapy by M. Dena Gardiner
4. Practical Exercise therapy by Hollis Margaret
5. Therapeutic exercise by Sydney Litch

**REFERENCE BOOKS:**

1. Therapeutic exercise by Hall & Brody
2. Therapeutic exercise by Basmajian
3. Physical Rehabilitation by Sullivan.
4. Therapeutic massage by Sinha.
5. Principles of muscle testing by Hislop.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Equipped with the principles and effects of proprioceptive neuromuscular facilitation and relaxation technique.	1,2,3,5,6,7,8
2	Apply the techniques of massage and functional re education and manual therapy including peripheral joint mobilization.	1,2,3,4,6,8
3	Acquire the knowledge about the techniques of breathing exercises and hydrotherapy, posture and gait.	7,9,10
4	Aquire the skill of assessment of isolated and group muscle strength and the techniques of MMT and mobilization.	1,2,3,5,6,8
5	Describe the pattern of normal and abnormal movements of various joint activities.	1,2,4,5,8

### MAPPING TABLE

	<b>Course Name: EXERCISE THERAPY</b>											
<b>Course Code:22BPTO221R</b>	<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
	<b>CO1</b>	3	2	1	0	1	2	1	2	1	0	0
	<b>CO2</b>	2	1	2	1	0	2	0	1	2	0	0
	<b>CO3</b>	3	1	1	0	1	1	0	2	2	0	0
	<b>CO4</b>	3	3	2	1	2	0	2	0	1	0	0
	<b>C05</b>	3	2	0	1	1	0	0	1	1	0	0
	<b>Average</b>	2.8	1.8	1.2	0.6	1	1	0.6	1.2	1.4	0	0
	<b>Count</b>	14	9	6	3	5	5	3	6	7	0	0

SEMESTER – IV									
Course Title	ELECTRO THERAPY								
Course code	22BPTO222R	TOTAL CREDITS: 6  TOTAL HOURS: 45T+90P	L	T	P	S	R	O	C
			3	0	6	0	0	0	6
PRE-REQUISITE	HUMAN ANATOMY, BIOMECHANICS OF HUMAN MOTION	CO-REQUISITE	NIL						
Program me	Bachelor in Physiotherapy								
Semester	4 <sup>th</sup>								
Course Objectives	1. To introduce the students to the concepts related to Ionization/Iontophoresis, Electro-diagnosis, SD curve, Pulsed electro-magnetic energy. 2. To impart students to the concepts related to Interferential therapy, SWD, Micro wave diathermy, IRR, UVR, Laser, Superficial Heating Modalities, Cryotherapy, Traction..								
CO1	Learn the principles, techniques, effects, indications, contraindications, and the dosage parameter for various indications of electrotherapeutic modalities in the restoration of physical functions.								
CO2	List out the indications, contraindications, dosage of electro therapy modalities, demonstrates the different techniques and describe their effects on various conditions.								
CO3	Identify the key physiological effect of the modalities, key contraindications, dangers and precautions and appropriate clinical doses.								
CO4	Describe the physiological effects and therapeutic effects and uses of various therapeutic ions and topical pharmaco- therapeutic agents to be used for the application of Iontophoresis.								
CO5	Acquire the skill of application of the electrotherapy modes like UVR, LASER, Superficial heating modalities on models, for the purpose of assessment and treatment.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		

<b>I</b>	<p><b>Ionization/Iontophoresis:</b> Techniques of application of iontophoresis, Indications, Selection of current, Commonly used ions (drugs) for pain, hyperhydrosis, wound healing.</p> <p><b>Electro-diagnosis:</b> FG Test SD curve-Methods of Plotting SD curve, Apparatus selection, Characters of normally innervated muscle, Characters of partially denervated muscle, Characters of completely denervated muscle, Chronaxie&amp;Rheobase EMG:Construction of EMG equipment Nerve conduction Velocity Bio-feed back.</p> <p><b>Pulsed electro-magnetic energy:</b> Principles, Production and parameters, uses:</p>	<b>10</b>	Understanding the conditions and application of all the electrotherapeutic modalities in a correct manner.	1,2
<b>II</b>	<p><b>Interferential therapy:</b> Definition, Principle of production, Static interference system, Dynamic interference system, Dosage parameters, Electrode placement, Physiological and therapeutic effects, Indications and contraindications.</p> <p><b>Russian current</b> Rebox typecurrent</p>	<b>7</b>	Know the use of IFT in reducing the pain and application of it in different conditions as well as the Russian current and its uses in various conditions	1,2
<b>III</b>	<p><b>SWD:</b> Definition, Frequency and wavelength of SWD, Circuit diagram and production of SWM methods of heat production by SWD, Types of electrodes used, Placement and spacing of electrodes, Tunings and testing of the apparatus, Physiological and therapeutic effects, Indications and contraindications, Dangers and dosages.</p> <p><b>Micro wave diathermy:</b> Definition, wave length and frequency, production of MWD, Applicators, Dosage parameters, Physiological and therapeutic effects, Indications and contraindications, Dangers. D, Principle of production,</p>	<b>6</b>	Understanding the use of SWD and microwave diathermy therapeutically in different conditions.	1,2
<b>IV</b>	<p><b>IRR:</b> Definition, wavelength and parameters, Types of IR generators, Production, Physiological and therapeutic effects, Duration and frequency of treatment, Indication and contraindication.</p> <p><b>UVR:</b> Define, Types, UVR generators: High pressure mercury vapour lamp, water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, PUVA apparatus, Physiological and therapeutic effects, Sensitizers and filters, Dosage, Calculations of E1,E2,E3,E4 dosages, Indication and contraindications ,Dangers, Distance in UVR lamp.</p> <p><b>LASER:</b> Definition, Principles of production, Production of LASER, Methods of application of LASER, Dosage of LASER, Physiological and Therapeutic effects of LASER, Safety precautions, Classifications of LASER, Energy density and power density.</p>	<b>10</b>	Understanding IRR,UVR and LASER devices and its utility and parameter and ranges of the devices	2,3

<p><b>V</b></p>	<p><b>Superficial Heating Modalities</b></p> <ul style="list-style-type: none"> <li>•<b>Wax therapy:</b> Principles, Composition of wax bath therapy unit, Methods of application of wax, Physiological and Therapeutic effects, Indication and contraindications, Dangers.</li> <li>•<b>Contrast bath:</b> Methods of application, Therapeutic uses, Indication and contraindications.</li> <li>•<b>Moist Heat Therapy:</b> Hydro collator packs, Methods of applications, Therapeutic uses, Indication and contraindications.</li> <li>•<b>Whirl Pool bath:</b> Methods of application, Therapeutic uses, Indication and contraindications.</li> <li>•<b>Fluidotherapy.</b></li> <li><b>Cryotherapy:</b> Definition, Principles, Physiological and Therapeutic effects, Techniques of application, Indication and contraindications, Dangers, methods of application.</li> <li><b>Traction:</b> Definition, types of traction. Effect of spinal traction, Modes of application, indication contraindication, precaution and amp : limitation of traction. Technique of application.</li> </ul>	<p><b>12</b></p>	<p>Learning and understanding the various superficial heating modalities and learn where to use it in which type of condition for the patient.</p>	<p>3,4</p>
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<b>Practical</b>	<p>The student of Electrotherapy must be able to demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions.</p> <p>1. Technique of treatment and application of hydrocollator packs, cryotherapy, contrast bath, wax therapy, whirl pool bath. (20hrs)</p> <p>2. Faradism under pressure for UL &amp; LL. (10hrs)</p> <p>3. Demonstrate treatment techniques using SWD, IRR and microwave diathermy. (20hrs)</p> <p>4. Demonstrate the techniques of UVR exposure for various conditions. (10hrs)</p> <p>5. Demonstrate treatment techniques using IFT for various regions. (15 hrs)</p> <p>6. Calculation of dosage and technique of application of LASER. (15hrs)</p>	<b>90</b>	<p>Students will be able to demonstrate uses of various electrotherapeutic techniques along with the required dosage.</p>	<p>1,2,3,4,5,6</p>
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**TEXT BOOKS:**

1. Claytons Electrotherapy by Forster & Palastanga
2. Electrotherapy Explained by Low & Reed
3. Clinical Electrotherapy by Nelson

**REFERENCE BOOKS:**

1. Electrotherapy Evidence based practice by Sheila Kitchen
2. Physical agents by Michele Cameroon
3. Principles of Electrotherapy by Michele Cameroon

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Learn the principles, techniques, effects, indications, contraindications, and the dosage parameter for various indications of electrotherapeutic modalities in the restoration of physical functions.	<b>1,2,3,5,8</b>
<b>2</b>	List out the indications, contraindications, dosage of electro therapy modalities, demonstrates the different techniques and describe their effects on various conditions.	<b>1,2,3,4,5,6,8</b>
<b>3</b>	Identify the key physiological effect of the modalities, key contraindications, dangers and precautions and appropriate clinical doses.	<b>3,5,6,7,8</b>
<b>4</b>	Describe the physiological effects and therapeutic effects and uses of various therapeutic ions and topical pharmaco- therapeutic agents to be used for the application of Iontophoresis.	<b>1,2,3,4,5,6,7,8</b>
<b>5</b>	Acquire the skill of application of the electrotherapy modes like UVR, LASER, Superficial heating modalities on models, for the purpose of assessment and treatment.	<b>1,2,3,4,5,6,7,8</b>



### MAPPING TABLE

Course Name: ELECTRO THERAPY												
Course Code:22BPTO222R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	2	1	1	0	1	0	0	1	1	0	0	0
CO2	1	1	1	1	1	2	0	1	0	0	0	0
CO3	0	0	1	0	1	1	1	1	2	1	0	0
CO4	1	2	2	1	1	2	1	1	0	0	0	0
CO5	2	2	2	1	1	2	1	1	1	0	0	0
Average	1.2	1.2	1.4	0.6	1	1.4	0.6	1	0.8	0.2	0	0
Count	6	6	7	3	5	7	3	5	4	1	0	0

SEMESTER – IV												
Course Title	PHARMACOLOGY											
Course code	22BPTO223R	TOTAL CREDITS: 2	L	T	P	S	R	O	C			
			2	0	0	0	0	0	0	2		
PRE-REQUISITE	NIL	CO-REQUISITE	NIL									
Programme	Bachelor in Physiotherapy											
Semester	4 <sup>th</sup>											
Course Objectives	1.To introduce the students to the concepts related to Drugs used in the treatment of Vascular Disease and Tissue Ischemia , Ischemic Heart Disease, Inflammatory / Immune Diseases, 2. Drugs used in treatment of Arthritic Diseases, Disorders of Movement, Geriatrics.											
CO1	Acquainted the students with the commonly used drugs for treating vascular disease and tissue ischemia. disorders and the pharmacology of drugs used to treat them											
CO2	Apprehensive the general understanding of the pharmacology of drugs used in treating various inflammatory conditions.											
CO3	Clear understanding the significance of drug therapy in treating arthritic conditions and correlation between drug therapy and physiotherapy.											
CO4	Apprehend the understanding of different movement											
CO5	Attain knowledge about the effects of drugs on different systems, including geriatrics.											
Unit-No.	Content				Contact Hour	Learning Outcome					KL	

<b>I</b>	<b>Drugs used in the treatment of Vascular Disease and Tissue Ischemia:</b> Vascular Disease,  Hemostasis Lipid-Lowering agents, Antithrombotics, Anticoagulants and Thrombolytics <b>Ischemic Heart Diseases</b> –Nitrates, Beta-Blockers, Calcium Channel Blockers Cerebral Ischemia Peripheral Vascular Disease	<b>5</b>	By the end of this unit the students should have clear knowledge about the drugs actions and adverse reactions in vascular diseases and tissue ischemia	1,2
<b>II</b>	<b>Inflammatory / Immune Diseases:</b> Non-narcotic Analgesic and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactions with NSAIDs.Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic use of Glucocorticoids.	<b>10</b>	By the end of this unit the students should know how about non-narcotics, nonsteroidal anti inflammatory drugs in details	1,2
<b>III</b>	<b>Drugs used in treatment of Arthritic Diseases:</b> Rheumatoid Arthritis, Osteoarthritis, Gout.Drugs used in the treatment of Neuromuscular Immune / Inflammatory Diseases: Myasthenia gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythematosus, Scleroderma, Demyelinating Disease ,Respiratory Pharmacology: Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis.	<b>6</b>	By the end of this unit the students should know in details about drugs used for arthritic conditions	1,2
<b>IV</b>	<b>Disorders of Movement:</b> Drugs used in treatment of Parkinson’s Disease. Antiepileptic Drugs Spasticity and Skeletal Muscle Relaxants.	<b>5</b>	By the end of this unit the students should know about the drug actions used for movement disorders	2,3
<b>V</b>	<b>Geriatrics:</b> Pharmacology and the geriatric Population: Adverse effect of special concern in the Elderly, Dementia, Postural hypotension.	<b>4</b>	By the end of this unit the students should have knowledge about the drugs actions and reactions in geriatric population	3,4,5

#### TEXTBOOKS:

1. Lippincott’s Pharmacology.
2. Essential of Medical Pharmacology byTripathi
3. Text book of Medical Pharmacology byPadmaja uday kumar

#### REFERENCE BOOKS:

1. Pharmacology by N.Murugesh
2. Pharmacology &Pharmacotherapeutics by Sadoskar

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome

1	Acquainted the students with the commonly used drugs for treating vascular disease and tissue ischemia. disorders and the pharmacology of drugs used to treat them	1,3,4,5,7,8
2	Apprehensive the general understanding of the pharmacology of drugs used in treating various inflammatory conditions.	1,3,4,5,8
3	Clear understanding the significance of drug therapy in treating arthritic conditions and correlation between drug therapy and physiotherapy.	1,2,3,4,5,6,7,8
4	Apprehend the understanding of different movement	1,2,3,4,5,6,7,8
5	Attain knowledge about the effects of drugs on different systems, including geriatrics.	1,2,3,4,5,6,7,8

### MAPPING TABLE

		Course Name: PHARMACOLOGY										
Course Code:22BPTO223R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	3	0	3	3	3	0	3	3	1	0	0
	CO2	3	0	2	3	2	0	0	3	1	0	0
	CO3	2	2	3	3	2	3	2	1	1	0	0
	CO4	2	1	3	3	2	3	2	1	0	0	0
	CO5	2	1	3	3	3	3	2	2	0	1	0
	Average	2.4	0.8	2.8	3	2.4	1.8	1.8	2	0.6	0.2	0

	<b>Count</b>	<b>12</b>	<b>4</b>	<b>14</b>	<b>15</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>12</b>	<b>3</b>	<b>1</b>	<b>0</b>
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<b>SEMESTER – IV</b>										
<b>Course Title</b>	<b>MICROBIOLOGY &amp; PATHOLOGY</b>									
<b>Course code</b>	<b>22BPTO224R</b>	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>	
		<b>TOTAL HOURS: 30T</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>							
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>									
<b>Semester</b>	<b>4th</b>									
<b>Course Objectives</b>	<p>1.To introduce the students to the concepts related to the microorganisms and some important disease caused by microorganisms</p> <p>2. The objective of this course is that after lectures, demonstration, the students will be able to understand the importance of microbiology in health science.</p> <p>3. The students will be taught about nutritional disorder, Cardiovascular pathology and hematology.</p>									
<b>CO1</b>	Understand the concept of different kinds of microbial infection and antimicrobial drugs.									
<b>CO2</b>	Able to comprehend the concept of virus and of clinically important viral infection									
<b>CO3</b>	Understand the knowledge of fungi and medically important group of fungi									
<b>CO4</b>	Attainment of concept regarding laboratory diagnosis of microbial infection.									
<b>CO5</b>	Gain the insight about the central nervous system causing microbial infection.									

Unit-No.	Content	Contact Hour	Learning Outcome	KL
<b>I</b>	General Properties: Basic structure and broad classification of viruses, Pathogenesis and pathology of viral infections. Principles of laboratory diagnosis of viral diseases, List of commonly used antiviral agents	<b>3hrs</b>	Students will have a idea concept of virus and the prophylaxis of vial infection	1,2
	<b>Nutritionaldisorders:</b> <input type="checkbox"/> Marasmus, Kwashiorkor <input type="checkbox"/> vitaminedeficiencydisorders  <b>Respiratorysystem:</b> Pneumonia,Bronchitis,Bronchiectasi s,Asthma,Tuberculosis,Lung carcinoma, Lung diseases. <b>Cardiovascularpathology:</b> heartdiseases: <input type="checkbox"/> Vasculardiseases <input type="checkbox"/> Rheumaticheartdisease <input type="checkbox"/> IschemicHeartDisease:	<b>2HRS</b>	Students will have a basic knowledge regarding to the Environmental and Nutritional disorders	
<b>II</b>	General properties of Fungi, classification based on disease, superficial, subcutaneous, deep mycosel opportunistic infections including Mycotoxins, systemic mycoses, General principles of fungal diagnosis, Rapid diagnosis, Method of collection of samples, Antifungal agents.	<b>4hrs</b>	Students will have a gain knowledge of fungi and diagnostic method of fungal infection	1,2

	<p><b>Hematology:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Collection of blood</li> <li><input type="checkbox"/> bonemarrow,</li> <li><input type="checkbox"/> Hematopoiesis</li> <li><input type="checkbox"/> Anemia: Classification, clinicalfeaturesandlabdiagnosis. Irondeficiencyanemia,</li> <li><input type="checkbox"/> Hemolyticanemias: Classification andinvestigation. Hereditary</li> <li><input type="checkbox"/> Thalessemia, sickle cellanemia, Spherocytosisandenzymedeficiencies.</li> <li><input type="checkbox"/> Pancytopenia-Aplastic</li> <li><input type="checkbox"/> Hemostaticdisorders, vascularandplateletdisordersCoagulopathies-inherited, acquiredwithlabdiagnosis.</li> <li><input type="checkbox"/> Leukocyticdisorders:Leukocytosis , Leukemoid reaction,</li> <li><input type="checkbox"/> Leukopenia.Leukemia: Classification, anddiagnosis.</li> <li><input type="checkbox"/> Blood transfusion: grouping and cross matching, transmissibleinfectionsincludingHIVandHEPATITIS.</li> </ul>	3	Students will have a well concepts of hematology, anaemia	
III	<p>Streptococcal infections: Rheumatic fever and Rheumatic heart disease.</p> <p>Pyrexia on unknown origin</p> <p>Poliomyelitis ,Hepatitis , HIVinfections ,</p>	4hrs	Students will have a better understanding regarding common bacterial and viral disease.	
	<p><b>Alimentarytract:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Oralpathology: ulcers,carcinoma,oralcavitydiseasesand tumourofsalivaryglandand esophagus,esophagusinflammator y,functionaldisordersand tumours.</li> </ul> <p>Pancreatitisand pancreatic tumours: exocrine andendocrine</p> <p>Salivaryglandtumours.</p> <p><b>Hepato-BiliaryPathology:</b></p> <p>Jaundice:types,aetio-pathogenesis and diagnosis.Hepatitis:acute,chronic,andneonatal.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Alcoholicliver</li> </ul>	2	Students will have a better understanding regarding different forms of diseases in alimentary tract	1,2

<b>IV</b>	Meningitis, Central nervous System infections, Pelvic inflammatory disease.	<b>2hrs</b>	Students will have a gain knowledge regarding some common central nervous infection causing microbes	2,3
	<p><b>Musculoskeletal system:</b> Osteomyelitis: Acute, Chronic, Tuberculous, Mycetoma. Tumours classification: Benign, Malignant, Metastatic and Synovial sarcoma. Arthritis: Suppurative, Rheumatoid, Osteoarthritis, Gout</p> <p><b>Lymphatic system:</b></p> <ul style="list-style-type: none"> <li>□ Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma. Lymphadenitis-nonspecific and granulomatous</li> <li>□ Causes of lymph node enlargements</li> </ul> <p>Reactive hyperplasia, primary tumours-hodgkin's and non-hodgkin's lymphomas, metastatic tumours.</p>	<b>4</b>	Students will have a basic idea of tumours, arthritis, Rheumatoid and lymphatic system diseases	
<b>V</b>	Malaria, Filariasis Zoonotic diseases, Urinary tract infections	<b>3hours</b>	Students will have a better understanding regarding UTI and parasitic infection	3,4
	<p><b>Endocrine pathology:</b> Diabetes mellitus: types, pathogenesis, pathology, laboratory diagnosis.</p> <p>Non neoplastic lesions of thyroid.</p> <ul style="list-style-type: none"> <li>□ Iodine deficiency goiter, Auto immune thyroiditis, Thyroid toxicosis, Myxedema, Hashimoto's thyroiditis,</li> </ul> <p><b>Dermatopathology:</b></p> <ul style="list-style-type: none"> <li>□ Skin tumours: Squamous cell carcinoma, Basal cell carcinoma, Melanoma.</li> </ul> <p><b>Neuropathology:</b> Inflammations and Infections: TB Meningitis, Pyogenic Meningitis, Viral Meningitis and Brain Abscess. CNS Tumours, Astrocytoma, Neuroblastoma, Meningioma, Medulloblastoma</p>	<b>4</b>	Students will have a better understanding regarding different forms of non-neoplastic lesions of thyroid, skin tumours and neuropathology	

**Text Book:**

1. Text book of Microbiology by Anantha Narayanan
2. Microbiology by Baveja

**Reference book:**

1. Text book of microbiology by Chakraborty
2. Essential of Medical Microbiology by Apurba Kumar Sastry and Sandhya Bhat K
3. Immunology by Kuby
4. Pathology–Harsh Mohan
5. Pathologic Basis of Disease–Robbin and Cotran
6. Textbook of Medical Laboratory Technology Praful B. Godkar, Darshan P. Godkar

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Designed to have a depth knowledge of importance of medical microbiology in human life.	1,2,3,4,5,6,7,8
2	Understand the different terminology commonly used in medical microbiology area.	1,3,4,5,6,7,8
3	Understand the knowledge of antibiotics and aseptic techniques.	1,3,4,5,6,7,8
4	Denote the concept of immune system and its mechanism	1,2,3,4,5,6,7,8
5	Ability to get the concept of bacteria and bacterial infection.	1,2,3,4,5,6,7,8



### MAPPING TABLE

Course Name: MICROBIOLOGY & PATHOLOGY													
Course Code: 22BPTO224R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	
	CO1	3	2	2	1	2	1	1	1	1	1	0	0
	CO2	1	2	1	3	1	1	1	1	1	0	1	0
	CO3	1	2	2	3	2	1	1	1	1	1	1	1
	CO4	2	3	3	2	3	1	2	2	2	1	0	0
	CO5	1	2	1	1	1	1	1	1	1	1	0	0
	Average	1.6	2.2	1.8	2	1.8	1	1.2	1.2	1.2	0.8	0.4	0.2
	Count	8	11	9	10	9	5	6	6	6	4	2	1

SEMESTER – IV										
Course Title	BIostatistics and Research Methodology									
Course code	22B PT O22 5R	TOTAL CREDITS: 2	L	T	P	S	R	O	C	
		TOTAL HOURS: 30	2	0	0	0	0	0	2	
PRE-REQUISITE	NIL	CO-REQUISITE	NIL							
Programme	Bachelor in Physiotherapy									
Semester	4 <sup>th</sup>									
Course Objectives	1.To introduce the students to the concepts related to ,Processing & analysis of data, Testing of hypothesis, Testing of hypothesis. 2.To impart the students to the concepts related to Measure of Central Tendency, Probability and Standard Distributions, Sampling techniques: Need for sampling.									
CO1	Acquire the knowledge of basic research methodology, statistical concepts, methods of statistical analysis and interpretation of data.									
CO2	Apply the methods from basic statistics and research methods for different study types.									
CO3	Develop the ability to apply methods while working on a research project work.									
CO4	Measure the central tendency and the need of it in the study.									
CO5	Draw a random sample from a population means and why it is important.									
Unit-No.	Content	Contact Hour	Learning Outcome					KL		
I	<b>Processing &amp; analysis of data:</b> Processing operations, problems in processing, Types of analysis, Statistics in research, Measures of central tendency, Dispersion, Asymmetry, relationship.	5	By the end of the of the unit students should be able to differentiate the types of analysis, calculate the central tendency.					1,2		

<p align="center"><b>II</b></p>	<p><b>Testing of hypothesis:</b> What is hypothesis? Basic concepts concerning testing of hypothesis, Procedure of hypothesis testing, measuring the power of hypothesis test, Tests of hypothesis, limitations of the tests of hypothesis.</p>	<p align="center"><b>5</b></p>	<p>students should know the research hypothesis and using then in the research studies.</p>	<p align="center">1,2,3</p>
<p align="center"><b>III</b></p>	<p><b>Computer technology:</b> Introduction to Computers, computer application in research, computers &amp; researcher.</p>	<p align="center"><b>5</b></p>	<p>Understanding the Basics of computer technology and its application in research.</p>	<p align="center">2,3,4,5</p>
<p align="center"><b>PART II (BIOSTATISTICS)</b></p> <p align="center"><b>IV</b></p>	<p><b>Measure of Central Tendency:</b> Need for measures of central Tendency, Definition and calculation of mean – ungrouped and grouped, Meaning, interpretation and calculation of median ungrouped and grouped., Meaning and calculation of mode, Comparison of the mean, median and mode, Guidelines for the use of various measures of central tendency.</p> <p><b>Probability and Standard Distributions:</b> Meaning of probability of standard distribution, The binominal distribution, The normal distribution, Divergence from normality – skewness, kurtosis.</p>	<p align="center"><b>10</b></p>	<p>By the end of this unit the students should know how to calculate the central tendency and be able to compare the mean median and modeand applying the probability of standard distribution.</p>	<p align="center">1,2,3,4</p>
<p align="center"><b>V</b></p>	<p><b>Sampling techniques:</b> Need for sampling - Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling designs errors, Sampling variation and tests of significance.</p> <p><b>Parametric and non-parametric tests.</b></p>	<p align="center"><b>5</b></p>	<p>Students should be able to apply the sampling techniques for their research study</p>	<p align="center">3,4,5</p>

**TEXT BOOKS:**

1. Elements of Health Statistics: Rao.N.S.N
2. An introduction of Biostatistics: Sunder Rao.P.S.S.

3. Methods in Bio-Statistics 6<sup>th</sup>Edn. 1997: B.K.Mahajan
4. Biostatistics: A manual of Statistics Methods: K. VisweswaraRao
5. Elementary Statistics 1stEdn, 1990. In Medical Workers: InderbirSingh

**REFERENCE BOOKS:**

1. Statistics in Psychology and education: Great andHenry
2. An Introduction to Gupta C.B. Statistical Methods, 1972: Ram Prasad & Sons
3. Basic Statistics, 3rdEdn.:Simpson G. Kaftha.P
4. Research; Principles and Methods:L Denise F.Poli&Hungler
5. Fundamentals of Research, 4<sup>th</sup> Edn.: David J.fox

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquire the knowledge of basic research methodology, statistical concepts, methods of statistical analysis and interpretation of data.	1,2,3
2	Apply the methods from basic statistics and research methods for different study types.	1,2,3
3	Develop the ability to apply methods while working on a research project work.	1,2,3
4	Measure the central tendency and the need of it in the study.	1,2,3,7
5	Draw a random sample from a population means and why it is important.	1,2,3,4

**MAPPING TABLE**

Course Code:22BPTO225R	Course Name: BIOSTATICS & RESEARCH METHODOLOGY											
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	2	3	1	0	0	0	0	0	2	0	1
	CO2	2	3	1	0	0	0	0	0	1	0	2

	CO3	2	2	1	0	0	0	0	0	2	1	1
	CO4	2	3	1	0	0	0	1	0	1	1	1
	CO5	2	2	1	1	0	0	0	0	1	2	2
	Average	2	2.6	1	0.2	0	0	0.2	0	1.4	0.8	1.4
	Count	10	13	5	1	0	0	1	0	7	4	6

**SEMESTER – IV**

<b>Course Title</b>	<b>ENGLISH FOR EMPLOYABILITY(Communicative English &amp; Soft Skills)</b>											
<b>Course code</b>	<b>22UBPD222R</b>	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>			
		<b>TOTAL HOURS: 60</b>	0	0	4	0	0	0	2			
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>									
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>											
<b>Semester</b>	<b>4<sup>th</sup></b>											
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>To introduce students with the various tools of effective presentation.</li> <li>To instruct, influence, engage, educate, or entertain the listeners.</li> <li>To prepare the students for the campus drives &amp; walking interviews.</li> <li>To gain confidence with the chance to reflection their non-verbal and verbal communication abilities.</li> </ol>											
<b>CO1</b>	Preparation of presentation and delivering it in the classroom will improve their confidence and strengthen their public speaking skills too.											
<b>CO2</b>	It will enable them to handle the audience with confidence by recognizing and transforming the problem areas.											
<b>CO3</b>	It will enable the students to prepare resume in a correct and effective manner.											
<b>CO4</b>	It will enhance value creation, create efficiencies and engage themselves to deliver better results.											
<b>Unit- No.</b>	<b>Content</b>				<b>Contact Hour</b>		<b>Learning Outcome</b>		<b>KL</b>			
<b>I</b>	Presentation Skills 1.Introduction 2.Essential characteristics of a good presentation 3.Preparation of a good presentation				8		Introduction to skills		1,3,5			

<b>II</b>	<b>Public Skills</b> i. Fear of Public Speaking, ii. Understanding and Overcoming Fear of Public Speaking, iii. Confidence and Control, iv. Tips for Presentations and Public Speaking, v. Tips for Using Visual Aids in Presentations, vi. Delivering Presentations Successfully, vii. Doubt Clearing and Summary of Main Points	8	Learn about public skills	1,3,5
<b>III</b>	<b>Practical session on Resume, Curriculum Vitae, Writing cover letter &amp; LinkedIn Profile</b> i. Preparation, submission & screening of Resume. ii. Practical session on cover letter screening session iii. Creating profile in LinkedIn How to utilize it	8	Know about Preparation, submission & screening of Resume	1,3,5
<b>IV</b>	<b>Leadership &amp; Management Skills</b> 1. Concepts of Leadership 2. Leadership Styles 3. Manager VS Leader 4. How to be an Effective Leader Doubt Clearing Session.	10	Know about Concepts of Leadership	1,3,5

<b>V</b>	<b>Interview Skills &amp; Dress code Ethics</b> i. Types of interview- telephonic, virtual& face to face ii. Online interview, personal interview iii. Panel interview iv. Group interview v. Types of interview questions- traditional/common interview question on vi. General Strategies for answering questions, vii. Preparation before the interview, viii. How to dress up for an interview, ix. How to maintain eye contact and positive body language x. Interview do's and don'ts, xi. Introduction to Dress Code Ethics, xii. Purpose and Importance <b>What to Wear During Interview Any Other Formal Meetings –Male&amp; Female</b>	10	Learn about interview skills	1,3,5
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**Text Books**

- What Employers Want: The Work skills Handbook-KarenHolmes,2011
- EnglishGrammarinUse,RaymondMurphy4thedition,CUP

**Reference Book for Soft Skills:**

- Compiled and prepared by the Training and Development team, AdtU Other Learning Resources
- Oxford Business English, M. Duckworth, Essen. Bus. Grammar

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Preparation of presentation and delivering it in the classroom will improve their confidence and strengthen their public speaking skills too.	<b>4,5,6</b>
<b>2</b>	It will enable them to handle the audience with confidence by recognizing and transforming the problem areas.	<b>4,5</b>
<b>3</b>	It will enable the students to prepare resume in a correct and effective manner.	<b>6,7,8</b>
<b>4</b>	It will enhance value creation, create efficiencies and engage themselves to deliver better results.	<b>5,6,7,8</b>

5	Preparation of presentation and delivering it in the classroom will improve their confidence and strengthen their public speaking skills too.	2,5,6,7,8
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RELAT

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOME**

SEMESTER – IV									
Course Title	BASIC ACCLIMATIZING SKILLS (BAS)								
Course code	22UULS201R	TOTAL CREDITS:1	L	T	P	S	R	O / F	C
		TOTAL HOURS:30	0	0	2	0	0	0	1
PRE-REQUISITE	NIL	CO-REQUISITE	NIL						
Programme	Bachelor in Physiotherapy								
Semester	4 <sup>th</sup>								
Course Objectives	1. To impart knowledge of the fundamentals of Hospitality industry and its applications. 2. Students will be able to familiarize with the cooking equipment & Utensils. 3. Students will be able to handle different modes of reservations								
CO1	Students will have basic knowledge of cooking methods.								
CO2	Students will gain the knowledge of organizing & Cleaning of Rooms.								
CO3	Students will be able to gain the travel management concept.								
CO4	Students will be able to acquire the knowledge of basic household amenities for day-to-day use								





Unit- No.	Content	Contact Hour	Learning Outcome	KL
I	<b>Introduction to Accommodation Management</b> <ul style="list-style-type: none"> <li>• Telephone handling technique</li> <li>• Organizing of Rooms.</li> <li>• Cleaning agents.</li> <li>• Cleaning equipment and uses.</li> <li>• Bed making Process.</li> </ul>	8	Introduction to skills	1,3,5
II	<b>Fundamentals of Cooking</b> <ul style="list-style-type: none"> <li>• Definition of cookery–Aim &amp; Objectives of cooking.</li> <li>• Use of basic Cooking equipment</li> <li>• Personal Hygiene and Safety</li> <li>• Use of Fire &amp; Fuels</li> </ul>		Utility of Cooking instruments along with safety and proper utility of fire and fuels during cooking	
III	<b>Methods of Cooking</b> <ul style="list-style-type: none"> <li>□ Different Cuts.</li> <li>□ Use of Herbs and Spices.</li> <li>□ Basic Food and Beverage Preparation.</li> <li>□ Regional food Habits.</li> </ul>		Methods of cooking along with the utility of herbs and spices along with the regional food habits	
IV	<b>Forms &amp;Format's</b> <ul style="list-style-type: none"> <li>□ C –form</li> <li>□ Reservation form</li> <li>□ Registration form</li> <li>□ Passport Application form</li> <li>□ Legal Rent Agreement</li> </ul>		A brief overview about the different forms and proper filling up of these forms	

**Text Books:**

1. Arora K(2011).Theoryofcookery, Frankbrothers&company(pub)pvtltd-NewDelhi.
2. BruceH.Axler,CarolA.Litrides(2010)FoodandBeverageService Volume 1 ofWileyProfessionalRestaurateur, Guides.
3. Mohammed Zulfikar (2010)- IntroductiontoTourismandHotelIndustryIntroductiontoTourismandHotelIndustry.VikasPublishing.
4. SudhirAndrews(2013)FoodandBeverageService:ATrainingManual, TataMcGraw Hill,2013

**RELATIONSHIP BETWEEN THE COURSE (COs) AND PROGRAMME OUTCOMES (POs)**

			Theory	Practical
Component	Internal(DailylabExercises +Prefinaltest)	Marks	50	50
		%(weightage)	25	25
	External(SemEndExam)	Marks	50	50
		%(weightage)	25	25

<b>Mapping between Cos and Pos</b>		
<b>Sl No</b>	<b>Course Outcomes(COs)</b>	<b>Mapped Programme Outcomes</b>
1	Students will have basic knowledge of cooking methods.	4,5
2	Students will gain the knowledge of organizing & Cleaning Of Rooms.	6,7
3	Students will be able to gain the travel management concept	4,5
4	Students will be able to acquire the knowledge of basic Households amenities for day-to-day use.	3,4

Basic Hospitality Knowledge	Telephone handling technique	Organizing of Rooms	Use of basic Cooking equipment	Personal Hygiene and Safety	Utilisation of Fire & Fuels	Use of Herb and Spices	Basic Food and Beverage Preparation	Regional food Habits	Hospitality industry Forms & Formats	Legal Rent Agreement	Life Long Learning
1	2	3	4	5	6	7	8	9	10	11	12
22UULS201R	Basic Acclimatizing Skills(BAS)										

1=Addressed to small extent  
 2= Addressed Significantly  
 3=Major part of the course

SEMESTER – IV									
Course Title	EXTRA CURRICULAR ACTIVITIES								
Course code	22UBEC221	TOTAL CREDITS:1	L	T	P	S	R	O / F	C
		TOTAL HOURS:	0	0	0	4	0	0	1

<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>		
<b>Semester</b>	<b>4<sup>th</sup></b>		

<b>Course Objectives</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to learn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.
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**CONTENT**

AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.

<b>SEMESTER – IV</b>	
<b>Course Title</b>	<b>NUTRITION AND DIET THERAPY</b>

<b>Course code</b>	<b>22BPTO226R</b>	<b>TOTAL CREDITS: 01</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS: 30</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>4<sup>th</sup></b>								
<b>Course Objectives</b>	1.This course will help the students to understand the role of nutrition plays in the current health care delivery system. 2.This course will also help the students to develop skills to implement & evaluating fads and fallacies, and how nutrition can be emphasized to promote health maintenance.								
<b>CO1</b>	Understanding the concepts and principles of nutritional assessment, diagnosis and care, therapeutic modification of diet and routine hospital diets.								
<b>CO2</b>	Gaining the knowledge about the etiology, symptoms and metabolic changes and diet management in various diseases.								
<b>CO3</b>	Applying the principles for calculating ideal body weight and risk factors of nutritional therapy for underweight and overweight individuals.								
<b>CO4</b>	Attain the concept regarding Nutrition in Weight related disorders								
<b>CO5</b>	Gain the insight about the importance of nutrition and diet in various systemic conditions								

#### **TEXT BOOKS:**

1. ICMR.1994. Recommended Dietary Allowances for Indians. Indian council of Medical Research.
2. Khanna, Kumud; Gupta, S.; Passi, S.J.; Seth, R.; Mahna, R. and Puri, S. 1997. Textbook of Nutrition and Dietetics. Elite Publishing House Pvt. Ltd.355p

#### **REFERENCE BOOKS:**

1. Robinson, C.H. and Lawler, M.R.1982. Normal and Therapeutic Nutrition. Oxford &IBH.
2. William SR (1997). Nutrition and Diet Therapy. St. Louis: Times Mirror/ Mosby Publishing.
3. Bendich A and Derelbaum RJ (EDS) 2001. Primary and Secondary Preventive Nutrition. Totowa NJ : Human Press.
4. Mahan K and Escott- Stumps S. 2000. Krauses, Food Nutrition and Diet Therapy.USA: Saunders.

#### **RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>

<b>1</b>	Understanding the concepts and principles of nutritional assessment, diagnosis and care, therapeutic modification of diet and routine hospital diets.	<b>3,4,7</b>
<b>2</b>	Gaining the knowledge about the etiology, symptoms and metabolic changes and diet management in various diseases.	<b>4,7</b>
<b>3</b>	Applying the principles for calculating ideal body weight and risk factors of nutritional therapy for underweight and overweight individuals.	<b>4,7</b>
<b>4</b>	Attain the concept regarding Nutrition in Weight related disorders	<b>7</b>
<b>5</b>	Gain the insight about the importance of nutrition and diet in various systemic conditions	<b>4,7</b>

**SEMESTER – IV**

<b>Course Title</b>	<b>UNIVERSAL HUMAN VALUES(UHV)+PROFESSIONAL ETHICS</b>								
<b>Course code</b>	<b>22UUHV101</b>	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>

	<b>R**</b>	<b>TOTAL HOURS: 45</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	<b>NIL</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>4<sup>th</sup></b>								
<b>Course Objectives</b>	<p>This introductory course input is intended</p> <ol style="list-style-type: none"> <li>1.To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings</li> <li>2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way</li> <li>3.To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature</li> </ol> <p>Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds.</p>								
<b>Course Methodology</b>	<ol style="list-style-type: none"> <li>1. The methodology of this course is explorational and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence</li> <li>2. It is free from any dogma or value prescriptions.</li> <li>3. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.</li> <li>4. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with and then to continue within the student leading to continuous self-evolution.</li> <li>5. This self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs.</li> </ol>								

**Course  
Syllabus:  
Universal  
Human  
Values and  
Professional  
Ethics**

- The whole course is divided into 5 modules.
- After every two lectures of one hour each, there is a 2 hour practice session.
- The teachers are oriented to the inputs through an eight to ten day workshop (Teachers' Orientation Program).
- The Teacher's Manual provides them the lecture outline. The outline has also been elaborated into presentations and provided in a DVD with this book to facilitate sharing.
- The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue. The process of dialogue is enriching for both, the teacher as well as the students.



UNIT1: Course Introduction-Need, Basic Guidelines, Content and Process for Value Education

1. Understanding the need, basic guidelines, content and process for Value Education
2. Self-Exploration–what is it?-its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self-exploration
3. Continuous Happiness and Prosperity-A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facilities-the basic requirements or fulfilment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly-A critical appraisal of the current scenario
6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

UNIT2: Understanding Harmony in the Human Being-Harmony in Myself!

1. Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
2. Understanding the needs of Self (‘I’) and ‘Body’- *Sukh* and *Suvidha*
3. Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)
4. Understanding the characteristics and activities of ‘I’ and harmony in ‘I’
5. Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail
6. Programs to ensure *Sanyam* and *Swasthya*-Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT3: Understanding Harmony in the Family and Society-Harmony in Human-Human Relationship

1. Understanding Harmony in the family–the basic unit of human interaction
2. Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfilment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship
3. Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals
4. Visualizing a universal harmonious order in society- Undivided Society (*Akhand Samaj*), Universal Order (*Sarvabhaum Vyawastha*) - from family to world family!-Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT4: Understanding Harmony in the Nature and Existence-Whole existence as Co-existence

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfilment among the four orders of nature-recyclability and self-regulation in nature

**Guidelines  
and Content  
for Practice  
Sessions**

UNIT 1: Course Introduction-Need, Basic Guidelines, Content and Process for Value Education

PS 1: Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcomings in your life? Observe and analyze them.

Expected outcome: the students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.

PS 2: Now-a-days, there is a lot of voice about many techno-genic maladies such as energy and natural resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc.– all these seem to be man-made problems threatening the survival of life on Earth–What is the root cause of these maladies & what is the way out in your opinion?

On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, criminalization of politics, large scale corruption, scams, breakdown of relationships, generation gap, depression & suicidal attempts, etc.–what do you think, is the root cause of these threats to human happiness and peace–what could be the way out in your opinion ?

**Expected outcome:** the students start finding that technical education without study of human values can generate more problems than solutions. They also start feeling that lack of understanding of human values is the root cause of all problems and the sustained solution could emerge only through understanding of human values and value based living. Any solution brought out through fear, temptation or dogma will not be sustainable.

PS3:

1. Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of
  - i) What is Naturally Acceptable to you in relationship-Feeling of respect or disrespect?
  - ii) What is Naturally Acceptable to you–to nurture or to exploit others? Is your living the same as your natural acceptance or different?
2. Out of the three basic requirements for fulfillment of your aspirations- right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your daily routine.

Expected outcome:

1. The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify right or wrong, and referring to any external source like text or instrument or any other person cannot enable them to verify with authenticity; it will only develop assumptions.

## Reference Material

The primary resource material for teaching this course consists of

a. The text book

R.R Gaur, R Sangal, GP Bagaria, A foundation course in Human Values and professional Ethics,Excelbooks,NewDelhi,2010,ISBN978-8-174-46781-2

b. The teacher's manual

R.R Gaur, R Sangal, GP Bagaria, A foundation course in Human Values and professional Ethics– TeachersManual,Excelbooks,NewDelhi,2010

c. A set of DVDs containing

- Video of Teachers' Orientation Program
- PPTs of Lectures and Practice Sessions
- Audio-visual material for use in the practice sessions

In addition, the following reference books maybe found useful for supplementary reading in connection with different parts of the course:

1. BLBajpai,2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow.Reprinted2008.
2. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Publishers.
3. Sussan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986,1991
4. IvanIllich,1974,*Energy&Equity*,TheTrinityPress,Worcester,andHarperCollins,USA
5. Donella H.Meadows,Dennis L.Meadows, Jorgen Randers, William W. Behrens III, 1972, *limits to Growth* ,Club of Rome's Report, Universe Books.
6. Subhas Palekar, 2000, *How to practice Natural Farming*, Pracheen (Vaidik)Krishi Tantra Shodh, Amravati.
7. A Nagraj, 1998,*Jeevan Vidyaek Parichay*, Divya Path Sansthan, Amar kantik.
8. E.F.Schumacher,1973, *Small is*
9. Beautiful:a studyof economics as if people mattered,Blond&Briggs,Britain.
10. A.N.Tripathy,2003, *Human Values*, New Age International Publishers.

<b>Course Title</b>	<b>INTRODUCTION TO FINANCIAL BUDGETING AND PLANNING</b>								
<b>Course code:</b>	22UUFL201R	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	0	0	2	0	0	0	1
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>4th</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To create awareness among students about the need for possessing financial literacy education.</li> <li>2. Identification of money as a working asset.</li> <li>3. Impart the ability to make better financial decisions</li> </ol>								
<b>CO1</b>	The students would be able to understand the importance of financial knowledge and prepare financial plans and budgets and plan and manage personal finances.								
<b>CO2</b>	The students would be able to understand the need and various kinds of banking institutions' instruments and their utilities.								
<b>CO3</b>	The student would be able to describe the importance of insurance services as social security measures.								
<b>CO4</b>	The student would be able to manage the money and debt more effectively.								

<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<b>Introduction:</b> <ul style="list-style-type: none"> <li>• Meaning, need and importance of Financial Literacy;</li> <li>• Different components of Financial Literacy;</li> <li>• Prerequisites of financial literacy;</li> <li>• Savings – Meaning and Difference between savings and investment;</li> <li>• Types of Financial Institutions and the services provided - Banking and Non-Banking;</li> <li>• Different investment avenues.</li> </ul>	12	Students will Know about Meaning, need and importance of Financial Literacy	1, 2

<p><b>II</b></p>	<p><b>Financial Planning:</b></p> <ul style="list-style-type: none"> <li>• Meaning, need and importance for financial planning,</li> <li>• Economic needs, balancing between economic need and resources;</li> <li>• Three pillars of investments-risk, return, liquidity;</li> <li>• Budgeting and its importance in financial planning;</li> <li>• Steps involved in Financial Planning Process;</li> <li>• Preparation of personal budgets, budget surplus and budget deficit, avenues for savings from surplus, sources for meeting deficit.</li> <li>• Informal Society funds and crowd funding</li> </ul>	<p>12</p>	<p>Students will be able to learn about Financial Planning</p>	<p>3, 4</p>
<p><b>III</b></p>	<p><b>Banks &amp; Post Office - As financial service provider:</b></p> <ul style="list-style-type: none"> <li>• Meaning and evolution of money,</li> <li>• Banks – meaning, types &amp; functions; types of</li> </ul>		<p>Students will learn about Meaning and</p>	<p>3, 4</p>

	accounts; Formalities to open various accounts <ul style="list-style-type: none"> <li>• Different types of Post Office saving schemes: Recurring deposit, savings, term deposit; NSC; Kisan Vikas Patra; Monthly Income scheme (MIS) Account,</li> <li>• Public Provident Funds (PPF), Senior citizen savings scheme (SCSS), Sukanya Samriddhi Accounts,</li> <li>• Indian Postal Order; International Money transfer service; Forex Services;</li> <li>• Money remittance services; Jansuraksha Scheme.</li> </ul>	12	evolution of money	
<b>IV</b>	<b>Insurance - As financial service provider:</b> <ul style="list-style-type: none"> <li>• Different types of Risks and their Management, Diversification of risk;</li> <li>• Meaning, need and importance of Insurance; Types of Insurance – Life Insurance, Health Insurance, General Insurance, Term Insurance,</li> <li>• Pension and retirement policies;</li> <li>• Post office life insurance schemes, Postal life insurance and rural postal life insurance.</li> </ul>	10	Students will understand the Different types of Risks and their Management	1, 2, 3
<b>V</b>	<b>Transformations in Digital Money market:</b> <ul style="list-style-type: none"> <li>• Various functions &amp; innovative services of Banks; Mobile Banking, NEFT, IMPS, RTGS,</li> <li>• Money transfer, Different types of cards- Debit &amp; Credit, E-Banking, Unified payment interface(UPI),</li> <li>• Credit Scoring - CIBIL, Digital Banking, crypto currency and related transactions, Fintech, Block chain; Understanding Digital Payments.</li> </ul>	2	Students will understand the Transformations in Digital Money market	4, 5

### TEXT BOOKS:

T1: The Young Adult's Guide to Financial Success- How To Manage Your Money & Live Better On Less By Edward M. Wolpert

T2: Financial Freedom with Financial Control by Jagmohan Singh Pendown Press

T3: The Richest Man in Babylon (Deluxe Hardbound Edition) by George S. Clason ixia Press Garden City, New York, Ships from and sold by MG BOOKS.

T4: Financial literacy to financial planning by Dr. Purvi Kothari and Mr. Keyur Mehta Nexus Publications Surat Gujarat

T5: Ernst & Young's Personal Financial Planning Guide: Take Control of Your Future and Unlock the Door to Financial Security by Ernst & Young, Robert J. Garner, Robert B. Coplan, Barbara J. Raasch, Charles L. Ratne

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>Course Code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
22BPTO221R	EXERCISE THERAPY	3	1	3	0	1	2	1	2
22BPTO222R	ELECTRO THERAPY	3	1	2	1	0	1	2	2
22BPTO223R	PHARMACOLOGY	3	1	2	1	0	1	2	2
22BPTO224R	MICROBIOLOGY & PATHOLOGY	3	1	2	1	0	1	2	2
22BPTO225R	BIostatistics & RESEARCH METHODOLOGY	0	0	0	2	0	0	1	1
22UUFL201R	FINANCIAL LITERACY	0	0	0	0	1	0	1	2

22UBPD222R	ENGLISH LANGUAGE FOR EMPLOYABILITY	0	0	0	0	0	0	0	1
		<b>CO PO Mapping</b>							
22UBCC221R	CO-CURRICULAR	0	0	0	0	0	0	0	2
22BPTO226R	<b>Course Outcome (CO)</b> NUTRITION AND DIET THERAPY	0	0	0	0	0	0	0	1
	<b>1</b> Understand the importance of financial Knowledge and prepare financial plans and budgets and manage CURRICULARs.							5,7,8	
22UBEC221R	EXTRA CURRICULAR	0	0	0	0	0	0	0	1
22UUHV105R	UNIVERSAL HUMAN VALUES	0	0	0	0	0	0	0	1
	<b>2</b> Understand the need and various kind of banking institutions' instrument and their utilities.							5,7,8	
	<b>3</b> Describe the importance of insurance services as social security measures.							5,7,8	
	<b>4</b> Learn to manage the money and debt more effectively.							5,7,8	
	<b>5</b> Understand the Transformations in Digital Money market.							5,7,8	

SEMESTER – V											
Course Title	CLINICAL ORTHOPAEDICS AND TRAUMATOLOGY										
Course code:	22BPTO311R	TOTAL CREDITS:3	L	T	P	S	R	O	C		
			3	0	0	0	0	0	0	3	
PRE-REQUISITE	ANATOMY, BIOMECHANICS , EXERCISE THERAPY	CO-REQUISITE	NIL								
Programme	Bachelor in Physiotherapy										
Semester	5th										
Course Objectives	1. To introduce the students to the concepts related to Traumatology, Fractures of upper limb, Dislocations of upper limb, Fracture of spine. 2.To introduce the students to Fractures and Dislocations of Lower limb, Dislocations of Lower limb, Soft tissue injuries, Amputations.										
CO1	Acquainted with the knowledge about orthopedic conditions, a Physiotherapist would encounter in their practice.										
CO2	Aquire the knowledge of orthopedic conditions causing disability, list the etiology, clinical features and methods of investigations and management.										
CO3	Carry out a clinical examination, diagnose and plan a treatment for the fractures of spine and dislocations of lower limb.										
CO4	Plan a proper examination and treatment for the soft tissue injuries.										
CO5	Carry out the medical examination and plan a treatment for hand injuries, amputations and spinal cord injuries.										
Unit-No.	Content				Contact Hour	Learning Outcome				KL	



<p><b>I</b></p>	<p><b>Introduction:</b> Introduction to Orthopedics. Clinical examination in an orthopedic patient. Common investigative procedures. Radiological and Imaging techniques in Orthopedics. Inflammation and repair, soft tissue healing.</p> <p><b>Traumatology:</b> Fracture: definition, types, signs and symptoms. Fracture healing. Complications of fractures. Conservative and surgical approaches. Principles of management – (open/closed, immobilization etc) Subluxation. Dislocations- definition, signs and symptoms, management (conservative and operative)</p>	<p><b>12</b></p>	<p>Students should be able to take medical history, carry out clinical examination of the common fractures</p>	<p>1,2,3</p>
<p><b>II</b></p>	<p>Fractures and dislocations of Upper limb</p> <p><b>Fractures of upper limb-</b> causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following: fractures: fracture of clavicle and scapula. Fractures of greater tuberosity and neck of humerus. Fracture shaft of humerus. Supracondylar fracture of humerus. Fracture of capitulum, radial head, olecranon, coronoid, and epicondyles. Side swipe injury of elbow. Both bone fractures of ulna and radius. Fracture of forearm- Monteggia, Galeazzi fracture dislocation. Chauffeur's fracture. Colle's fracture. Smith's fracture. Scaphoid Fracture. Fracture of metacarpals. Bennett's Fracture. Fracture of Phalanges ( proximal and middle )</p> <p><b>Dislocations of upper limb:</b> Anterior dislocation of shoulder- mechanism of injury, clinical feature, complications, conservative management ( Kocher's and Hippocrates maneuver) , Surgical management ( Putti Plat , Bankart's ) and etc. Recurrent dislocation of shoulder. Posterior dislocation of Shoulder- mechanism of injury, clinical features and management. Posterior dislocation of elbow- mechanism of injury, clinical features, complications and management</p>	<p><b>10</b></p>	<p>Students should be able to take medical history, carry out clinical examination and plan a treatment for the common fractures and dislocations of upper limb.</p>	<p>1,2,3,4</p>

<p><b>III</b></p>	<p><b>Fracture of spine:</b></p> <p>Fracture of cervical spine- mechanism of injury, clinical features, complication (Quadriplegia) management – immobilization (collar, cast, brace, traction) <b>MANAGEMENT FOR STABILIZATION.</b> Management of complications (bladder and bowel, Quadriplegia). Clay shoveller’s fracture. Hangman’s fracture, fracture Odontoid. Fracture of Atlas</p> <p>Fracture of thoracic and lumbar regions- mechanism of injury, clinical features, management conservative and surgical of common fractures around thoracic and lumbar regions. Fracture of Coccyx. Fracture of rib cage- mechanism of injury, clinical features, management for fracture ribs, and fracture of sternum.</p> <p><b>Fractures and Dislocations of Lower limb:</b></p> <p>Fracture of pelvis and lower limb- causes, clinical features, mechanism of injury, complications , conservative and surgical managementof the following fractutres:</p> <p>Fracture of pelvis. Fracture of neck of femur- classification, clinical features, complications, management- conservative and surgical. Fractures of trochanters. Fracture shaft femur- clinical features, mechanism of injury, complications, management- conservative and surgical. Supracondylar fracture of femur. Fractures of the condyles of femur. Fracture patella. Fractures of tibial condyles. Both bones fracture of tibia and fibula. Dupuytren’s fracture Maisonneuve’s fracture. Pott’s fracture- mechanism of injury, management. Bimalleolar fracture Trimalleolar fracture Fracture calcaneum – mechanism of injury, complications and management. Fracture of talus. Fracture of metatarsals- stress fracture join’s fracture. Fracture of phalanges.</p> <p>Dislocations of Lower limb- mechanism of injury, clinical features, complications, managementof the following dislocations of lower limb. Anterior dislocation of hip .Posterior dislocation of hip. Central dislocation of hip. Dislocation of patella. Recurrent dislocation of patella.</p>	<p><b>14</b></p>	<p>Students should be able to carry out a clinical examination, diagnose and plan a treatment for the fractures of spine and dislocations of lower limb</p>	<p>1,2,3,4</p>
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IV	<p><b>Soft tissue injuries</b> Define terms such as sprains, strains, contusion, tendinitis, rupture, tenosynovitis, endinosinobursitis. Mechanism of injury of each, clinical features, managements- conservative and surgical of the following soft tissue injuries; Meniscal injuries of knee. Cruciate injuries of knee. Medial and lateral collateral injuries of knee. Lateral ligament of ankle. Wrist sprains. Strains- quadriceps, hamstrings, calfbiceps, triceps etc. contusions- quadriceps, gluteal, calf, deltoid etc. Tendon ruptures- Achilles, rotatorcuffmuscles, biceps, pectorals etc.</p>	3	By the end of the topic the students should be able to understand and plan a proper examination and treatment for the soft tissue injuries	1,2,3,4,5
V	<p>Hand injuries- Mechanism of injury,clinical features,and management of the following : Crush injuries. Flexor and extensor . Burn injuries of hand. Amputationinjuryess : Definition,levels of amputation of both lower and upper limbs,indications, complications. Traumatic Spinal Cord injuries: Clinical features, complications, medical and surgical management of Paraplegia and Quadriplegia.</p>	6	After the completion of the topic the students should be able to know and carry out the medical examination and plan a treatment for hand injuries, amputations and spinal cord injuries	1,2,3,4,5

#### 1. TEXT BOOKS:

1. Outline of Fractures—John Crawford Adams.
2. Outline of Orthopedics. — John Crawford Adams.
3. Text book of Orthopedics.—Maheswari.

#### REFERENCE BOOKS:

1. Apley's Orthopedics.
2. Textbook of Orthopedics and Traumatology—M.N.Natarajan.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquainted with the knowledge about orthopedic conditions, a Physiotherapist would encounter in their practice.	1,2,3,5,8
2	Acquire the knowledge of orthopedic conditions causing disability, list the etiology, clinical features and methods of investigations and management.	1,2,5,8
3	Carry out a clinical examination, diagnose and plan a treatment for the fractures of spine and dislocations of lower limb	1
4	Plan a proper examination and treatment for the soft tissue injuries.	1,4,5,6,7,8
5	Carry out the medical examination and plan a treatment for hand injuries, amputations and spinal cord injuries.	1,2,4,5,6,7,8

### MAPPING TABLE

Course Name: CLINICAL ORTHOPEDICS AND TRAUMATOLOGY												
Course Code:	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
22BPT O311R	CO1	3	2	1	0	1	0	0	1	2	0	0
	CO2	2	1	0	0	1	0	0	1	2	1	0
	CO3	2	0	0	0	0	0	0	1	2	0	0
	CO4	3	0	0	1	1	1	1	1	2	0	0
	CO5	2	1	0	1	1	1	1	1	2	0	0
	Average	2.4	0.8	0.2	0.4	0.8	0.4	0.25	1	2	0.2	0
	Count	12	4	1	2	4	2	2	6	10	1	0

SEMESTER – V									
Course Title	CLINICAL NEUROLOGY AND NEUROSURGERY								
Course code:	22BPTO312R	TOTAL CREDITS:3	L	T	P	S	R	O	C
		TOTAL HOURS: 45T	3	0	0	0	0	0	3
PRE-REQUISITE	NEUROANATOMY, PHARMACOLOGY	CO-REQUISITE	GENERAL MEDICINE AND GENERAL SURGERY						
Programme	Bachelor in Physiotherapy								
Semester	5th								
Course Objectives	<p>1. . To introduce the students to the concepts related to clinical method of neurological examination, Neuro-ophthalmology, Deafness, vertigo imbalance, Cerebo-vascular diseases, Head injury, Higher cortical disorders, Perceptual disorders ,Movement disorders, Cerebellar and coordination disorders, Epilepsy, Infections of brain and spinal cord.</p> <p>2. To introduce the students about the concept of neuro anatomy, medical management and surgical management.</p>								
CO1	Impart the knowledge about relevance aspects of Neurology and Neurosurgery.								
CO2	Identify the diseases the Physiotherapist would encounter in their practice.								
CO3	List the aetiology, pathology, clinical features and treatment methods for various neurological conditions.								
CO4	Acquire skill to diagnose neurological cases.								
CO5	Acquire skill of clinical examination of Neurological System.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	Basic neuro-anatomy and basic neurophysiology the clinical method of neurology: 1. Approach to the Patient with Neurologic Disease. 2. Special Techniques for Neurologic Diagnosis. Neuro-ophthalmology: assessment of visual function- acuity, field, color vision, papillary reflex, accommodation reflex, abnormalities of optic disc , Disorders of optic nerve, Disorders of higher visual processing, Disorders of pupil, Disorders of eye movement	9	To learn about the basic neuro anatomy, neuro physiology, neuro ophthalmology and neurological examinations				1,2,3		
II	Deafness, vertigo imbalance: physiology of hearing, Disorders of hearing, Examination and investigation of hearing, Tests of vestibular dysfunction, vertigo, peripheral vestibular disorder, central vestibular vertigo. Lower cranial nerve paralysis: etiology clinical features, investigations, and management of following disorders- lesions in trigeminal nerve, trigeminal neuralgia, trigeminal sensory neuropathy, lesions in facial nerve, facial palsy, bells palsy, hemi facial spasm, glossopharyngeal neuralgia, lesion of vagus nerve, lesion of spinal accessory nerve, lesion of hypoglossal nerve. Dysphagia- swallowing mechanism, causes of dysphagia, symptoms, examination and management of dysphagia.	9	To learn about the deafness, vertigo, lower cranial nerve palsies, dysphagia				1,2,3,4		

<p><b>III</b></p>	<p>Cerebo-vascular diseases: Define stroke, TIA, RIA, Stroke evaluation, Multi infarct dementia and lacunar infarct. Classification of stroke- Ischemic, haemorrhagic, venous infarcts, risk factors, cause of ischemic stroke, causes of haemorrhagic stroke. Classification of haemorrhagic stroke, classification of stroke based on symptoms, stroke syndrome, investigations, differential diagnosis, medical and surgical management. Head injury: Etiology, classification, clinical signs and symptoms, investigation, differential diagnosis, medical management, surgical management and complications.</p>	<p><b>9</b></p>	<p>To learn about the CVA, Head injury</p>	<p>1,2,3,4</p>
<p><b>IV</b></p>	<p>Higher cortical, neuro physiological and neurobehavioral disorders: Higher cortical disorders- definition, causes and investigation of coma, criteria for diagnosis of brain death. Perceptual disorders- definition, types, classification, investigation &amp; examination. Speech disorders - definition, types, classification, investigation &amp; examination. Epilepsy - causes of blackouts, physiological nature of epilepsy, classification, clinical features, investigation, medical and surgical management of following disorders- non epileptic attack of childhood, epilepsy in childhood, seizures and epilepsy syndrome in adults. Sleep disorders - definition, classification, clinical features &amp; investigation Dementia, Obsessive-compulsive disorders. Movement disorders : Definition, etiology, risk factors, pathophysiology, classification, clinical signs &amp; symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Parkinson’s diseases, Dystonia, Chorea, Ballism, Athetosis, Tics, Myoclonus &amp; Willson’s disease</p>	<p>9</p>	<p>To learn about the higher cortical disorders, Perceptual disorders, Speech disorders, Sleep disorders, Epilepsy, Movement disorders</p>	<p>1,2,3,4,5</p>
<p><b>V</b></p>	<p>Cerebellar and coordination disorders : Etiology, pathophysiology, classification, clinical signs &amp; symptoms, investigations, differential diagnosis, management of Congenital ataxia, Friedreich’s ataxia, Ataxia telangiectasia, Metabolic ataxia, Hereditary cerebellar ataxia, Tabes dorsalis and syphilis. Infections of brain and spinal cord: etiology, pathophysiology, classification, clinical signs &amp; symptoms, differential diagnosis, medical management, surgical management and syndrome, complications of systemic infections on nervous system- Septic encephalopathy, AIDS, Rheumatic fever, Brucellosis, Tetanus and pertussis.</p>	<p>9</p>	<p>To learn about the cerebellar disorders and infections of brain and spinal cord</p>	<p>1,2,3,4,5</p>

**1 TEXT BOOKS:**

1. Neurology and Neurosurgery Illustrated By Kenneth W. Lindsay, Ian Bone, Geraint Fuller

**REFERENCE BOOKS:**

1. Snell's Clinical Neuroanatomy By Ryan Splittgerber

2. Physical rehabilitation by [Susan B. O'Sullivan](#), [Thomas J. Schmitz](#), [George D. Fulk](#)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Impart the knowledge about relevance aspects of Neurology and Neurosurgery.	1,2,3,5,8
2	Identify the diseases the Physiotherapist would encounter in their practice.	1,2,5,8
3	List the aetiology, pathology, clinical features and treatment methods for various neurological conditions.	1
4	Acquire skill to diagnose neurological cases.	1,4,5,6,7,8
5	Acquire skill of clinical examination of Neurological System.	1,2,4,5,6,7,8

Course Code:22BPT0312R	Course Name: CLINICAL NEUROLOGY AND NEUROSURGERY										
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	0	1	0	0	1	2	0	0
CO2	2	1	0	0	1	0	0	1	2	1	0
CO3	2	0	0	0	0	0	0	1	2	0	0
CO4	3	0	0	1	1	1	1	1	2	0	0
CO5	2	1	0	1	1	1	1	1	2	0	0
Average	2.4	0.8	0.2	0.4	0.8	0.4	0.25	1	2	0.2	0
Count	12	4	1	2	4	2	2	6	10	1	0

## MAPPING TABLE

SEMESTER – V									
<b>Course Title</b>	<b>GENERAL MEDICINE</b>								
<b>Course code:</b>	22BPTO313R	<b>TOTAL CREDITS:</b> 2	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>
		<b>TOTAL HOURS:</b> 30T	2	0	0	0	0	0	2
<b>PRE-REQUISITE</b>	PHYSIOLOGY, PHARMACOLOGY	<b>CO-REQUISITE</b>	NIL						
<b>Program me</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>5th</b>								
<b>Course Objectives</b>	1. . To impart the students to the concepts related to diseases of various systems of human body. 2. To introduce the students about the concept of medical management of various diseases.								
<b>CO1</b>	Acquainted with the knowledge about relevant aspects of general medicine.								
<b>CO2</b>	Acquire the knowledge about the diseases the therapist would encounter in their practice.								
<b>CO3</b>	List out the etiology, pathology, clinical features, and treatment methods for various medical conditions.								
<b>CO4</b>	Acquainted with the knowledge and understanding about infection, diseases of blood and deficiency of nutrition.								
<b>CO5</b>	Understand about the cardiovascular and respiratory diseases and its medical management.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	INFECTION: Different types of infection, sources & spread of infection, management of infection, sexually transmitted diseases- HIV infections and AIDS Food Poisoning and Gastroenteritis- Clinical features, Management. Common agents of POISONINGS- clinical features- general management, drug misuse, envenomation.	6	To learn about the infection and food poisoning.				1,2,3		
<b>II</b>	FOOD AND NUTRITION- vitamin and deficiency diseases, protein- energy malnutrition- clinical features and treatment, obesity and its related disorders: causes – complications, management of obesity, diet, exercise and medications	6	To learn about the deficiency diseases.				1,2,3,4		
<b>III</b>	DISEASES OF THE BLOOD: examinations of blood disorders- clinical manifestation of blood disease: anemia- signs and symptoms types and management: hemophilia - causes, clinical features- management.	6	To learn about the diseases of blood.				1,2,3,4		



IV	CARDIOVASCULAR DISEASE : examination of the cardio vascular system – COMMON investigations, ECG, exercise stress testing, clinical features, signs and symptoms, complications, management and treatment of the following diseases and disorders of the heart: pericarditis, myocarditis, rheumatic fever- Heart valve disorders, ischemic heart disease, congenital disorders of the heart, cardiac arrest, Hypertension: definitions, causes, classifications, investigations and management	6	To learn about the cardiovascular diseases.	1,2,3,4.
V	RESPIRATORY DISEASE: Examinations of the respiratory systems- investigations: chest radiographs, pulmonary function test. Clinical manifestations of lung diseases, upper respiratory tract infections; definition, aetiology, clinical features, signs and symptoms, complications, management and treatment of following lung diseases : chronic bronchitis, emphysema, asthma, Bronchiectasis, pneumonia, tuberculosis, fungal diseases, interstitial lung diseases, chronic obstructive lung disease. Respiratory Failure- definition, types, causes, clinical features, diagnosis and management	6	To learn about the respiratory diseases.	1,2,3,4

**TEXT BOOKS:**

1. Davidson’s Principles and Practice of Medicine
2. Harrison’s Internal Medicine
3. Braunwald Text of Cardiology
4. Text Book of Cardiology by Hurst

**REFERENCE BOOKS:**

1. Cash's Textbook of General Medical and Surgical Conditions for Physiotherapists

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquainted with the knowledge about relevant aspects of general medicine.	1,2,3,4,5,6,7,8
2	Acquire the knowledge about the diseases the therapist would encounter in their practice.	1,2,3,4,5,6,7,8
3	List out the etiology, pathology, clinical features, and treatment methods for various medical conditions.	1,2,3,4,5,6,7,8
4	Acquainted with the knowledge and understanding about infection, diseases of blood and deficiency of nutrition.	1,2,3,4,5,6,7,8
5	Understand about the cardiovascular and respiratory diseases and its medical management.	1,2,3,4,5,6,7,8

### MAPPING TABLE

<b>Course Name: GENERAL MEDICINE</b>												
Course Code: 22BPT0313 R	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
	CO1	1	2	1	2	2	2	2	2	2	0	0
	CO2	2	1	1	1	2	2	2	2	1	0	0
	CO3	2	2	2	1	1	1	2	2	1	1	0
	CO4	2	2	1	1	1	2	2	2	2	0	0
	CO5	2	2	1	2	1	2	1	2	1	0	0
	Average	1.8	1.8	1.2	1.4	1.4	1.8	1.8	2	1.4	0.2	0
	Count	9	9	6	7	7	9	9	10	7	1	0

SEMESTER – V										
Course Title		GENERAL SURGERY								
Course code:	22BPT0314R	TOTAL CREDITS:	L	T	P	S	R	O /F	C	
		2	2	0	0	0	0	0	2	
		TOTAL HOURS:	30T							
PRE-REQUISITE	Human Anatomy, Human Physiology	CO-REQUISITE	GENERAL MEDICINE -I							
Programme	Bachelor in Physiotherapy									
Semester	5th									
Course Objectives	<p>1.Focuses on Concepts of Fluid and Electrolyte disturbances ,Blood Transfusion and Nutrition in Surgery.</p> <p>2. Introduce the students about Anaesthesia, Incisions Surgical Clips and Ligatures</p> <p>3. This paper shall focus on Thoracic and Cardiac Surgeries .Surgical Oncology and its Surgical management..</p>									
CO1	Understand about the various types of abdominal Incisions, list the muscles and nerves injuries and its Indications.									
CO2	Plan the appropriate Surgical management for Cancer, and understand the types of cancer.									
CO3	Acquire the knowledge of various deformities of the chest wall, its causes and plan the Surgical management for those conditions.									
CO4	Understand the steps & approaches in surgery & describe the components of soft tissues injury to reach target tissue & list out its complications.									
CO5	Classify, assess, evaluate & describe surgical management of Wounds, Ulcers and Burns									
Unit-No.	Content		Contact Hour	Learning Outcome				KL		
I	Fluid, electrolyte and acid base disturbances- diagnosis and management; nutrition in the surgical patient; wound healingbasic process involved in wound repair, basic phases in the healing process, clinical management of wounds, factors affecting wound healing, scars- types and treatment, haemostasiscomponents, haemostatic disorders, factors affecting bleeding during surgery, Transfusion therapy in surgery- blood components; general post- operative complications and its management,		12	Focuses on Concepts of Fluid and Electrolyte disturbances ,Blood Transfusion and Nutrition in Surgery.				1,2,3		
II	Indications for surgery; types of anesthesia and its effect on the patient; types of incision; clips ligatures and sutures; radiology diagnostic procedures, endoscopy, Biopsy-uses and types. Drainage systems and tubes used after surgery.		10	Introduce the students about Anaesthesia, Incisions Surgical Clips and Ligatures				1,2,3,4		

<b>III</b>	.Causes, clinical presentation, diagnosis and treatment following injury/ trauma in the thoracic cavity- Pneumothorax, Hemothorax, Fracture Rib injury to pericardium and pulmonary contusion	8	This paper shall focus on Thoracic and Cardiac Surgeries	1,2,3,4
<b>IV</b>	Surgical oncology- cancer- definition, Different types of cancer – Ca breast, Ca oesophagus, Ca liver, CA Pancreas CA Colons. Surgical management.	8	This paper shall focus on Thoracic and Cardiac Surgeries .Surgical Oncology and its Surgical management..	1,2,3,4.
<b>V</b>	Disorders of the chest wall, lung and mediastinum- surgical management for the following disorders- chest wall deformities, chest wall tumors, pleural effusion, lung abscess, bronchietasis, broncho genic carcinoma, bronchial adenomas, metastatic tumors of the lung, tracheomalacia, neoplasm's of the trachea, tumors of the mediastinum	10	The students will learn about Various chest wall deformities,causes and Surgical management.	1,2,3,4

**TEXT BOOKS:**

1. CASH textbook of Surgery
2. S.DAS

**REFERENCE BOOKS:**

1. General Surgical Operations- by Kirk/ Williamson
2. Surgery by Nan
3. Baoley and Love's- Short practice of Surgery
4. Chest Disease by Crofton and Douglas.
5. Patrica A Downie, Text book of Heart, Chest Vascular Disease for Physiotherapist, JPBros.
7. .SUSAN O SULLEVAN
8. CHAURASIA for Anatomy
9. Sembulingam for Physiology

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Understand about the various types of abdominal Incisions, list the muscles and nerves injuries and its Indications.	1,2,3,4,5,6,7,8
2	Plan the appropriate Surgical management for Cancer, and understand the types of cancer.	1,2,3,4,5,6,7,8
3	Acquire the knowledge of various deformities of the chest wall, its causes and plan the Surgical management for those conditions.	1,2,3,4,5,6,7,8
4	Understand the steps & approaches in surgery & describe the components of soft tissues injury to reach target tissue & list out its complications.	1,2,3,4,5,6,7,8
5	Classify, assess, evaluate & describe surgical management of Wounds, Ulcers and Burns	1,2,3,4,5,6,7,8

**MAPPING TABLE**

		<b>Course Name: GENERAL SURGERY</b>										
<b>Course Code: 22BPTO314 R</b>	<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>
	<b>CO1</b>	3	2	3	2	2	1	2	3	1	1	1
	<b>CO2</b>	2	2	2	1	3	3	2	3	2	1	1
	<b>CO3</b>	2	2	2	1	2	1	2	2	2	1	2
	<b>CO4</b>	2	3	2	3	1	2	2	2	3	1	1
	<b>CO5</b>	1	2	1	2	2	2	2	3	3	1	2
	<b>Average</b>	2	2.2	2	1.8	2	1.8	2	2.6	2.2	1	1.4
	<b>Count</b>	10	11	10	9	10	9	10	13	11	5	7

<b>SEMESTER – V</b>	
<b>Course Title</b>	<b>COMMUNITY MEDICINE</b>

<b>Course code:</b>	22BPTO315R	<b>TOTAL CREDITS:2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		<b>TOTAL HOURS: 30T</b>	2	0	0	0	0	0	2
<b>PRE-REQUISITE</b>	Human Anatomy, Human Physiology	<b>CO-REQUISITE</b>	GENERAL MEDICINE -I						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>5th</b>								
<b>Course Objectives</b>	1.To introduce the students to the concepts of community health, prevention of disease and promotion of health in physiotherapy field practice. 2.The objective of this course is that after 60hrs of lectures the student will be able to understanding of various aspects of health and disease, methods of health administration, health education and disease preventive measures.								
<b>CO1</b>	Acquainted with the principles and get the knowledge about common health problems at individual and community levels keeping in mind the existing health care.								
<b>CO2</b>	Familiarize with primary health and disease, epidemiology of communicable and non-communicable disease, public health and national programmes of India.								
<b>CO3</b>	Identify health problems and provide community health care services based on their needs.								
<b>CO4</b>	Access and appraise scientific information and carry out epidemiological research by identifying gaps and present the finding of research.								
<b>CO5</b>	Apply the basic concept of health and focus on health needs at community level considering social, cultural, economic and demographic context.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>K L</b>		
<b>I</b>	General concept of health and disease.	<b>3 hours</b>	Learn about common health and disease				1,2,3		
<b>II</b>	Principles of Epidemiology and Epidemiologic methods.	<b>6 hours</b>	Learn about Epidemiology pattern and Epidemiologic methods				1,2,3		
<b>III</b>	Epidemiology of communicable diseases like Poliomyelitis, Viral hepatitis, Malaria, Dengue, Smallpox, Chicken pox, Measles, Mumps, Tuberculosis, Meningitits.	<b>10 hours</b>	Learn about Epidemiology of communicable diseases				1,2,3,4		
<b>IV</b>	Epidemiology of non-communicable Hypertension,Diabetes,stroke,coronary heart disease, cancer,obesity,accidents.	<b>10 hours</b>	Learn about Epidemiology of non-communicable diseases				1,2,3,4.		
<b>V</b>	Public Health Administration – Over all view of the Health Administration setup and Central and State levels. Health care delivery programs in urban and rural areas, Health and Population statistics.	<b>3 hours</b>	Learn about public health administration and population statistics.				1,2,3,4		

#### TEXT BOOKS:

1. Textbook of Preventive & Social Medicine, Dr. J E Park
2. IAPSM's Textbook of Community Medicine, AM Kadri

#### REFERENCE BOOKS:

1. Handbook of Community Medicine, Mangala Subramanlan.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquainted with the principles and get the knowledge about common health problems at individual and community levels keeping in mind the existing health care.	1,2,3,4,5,6,8
2	Familiarize with primary health and disease, epidemiology of communicable and non-communicable disease, public health and national programmes of India.	1,2,3,4,6,7,8
3	Identify health problems and provide community health care services based on their needs.	7,9,10
4	Access and appraise scientific information and carry out epidemiological research by identifying gaps and present the finding of research.	1,2,3,4,5,6,7,8
5	Apply the basic concept of health and focus on health needs at community level considering social, cultural, economic and demographic context.	1,2,3,4,5,6,7,8

**MAPPING TABLE**

Course Name: COMMUNITY MEDICINE												
Course Code: 22BPTO315R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	1	1	1	1	1	1	0	2	1	0	0
CO2	3	2	2	1	0	1	1	2	2	1	1	0
CO3	2	1	3	2	2	2	2	1	2	1	1	0
CO4	1	2	3	2	3	3	2	2	2	1	0	1
CO5	2	1	2	2	2	1	2	2	2	0	1	1
Average	2.2	1.4	2.2	1.6	1.6	1.6	1.6	1.2	2	0.8	0.6	0.4
Count	9	7	11	8	8	7	4	10	4	2	0	0

SEMESTER – V										
Course Title	DIAGNOSTIC IMAGING FOR PHYSIOTHERAPIST									
Course code:	22BPTO316R	TOTAL CREDITS:2	L	T	P	S	R	O / F	C	

		<b>TOTAL HOURS:</b> 30	2	0	0	0	0	0	2
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>5th</b>								
<b>Course Objectives</b>	1. Demonstrate knowledge of specified imaging modalities, relevant anatomy, imaging quality assurance and diagnostic decision making. 2. Describe principles of physics and operation of the imaging equipments 3. Practice professional and ethical responsibilities with high degree of credibility, integrity and social concern.								
<b>CO1</b>	Acquire and apply the basic radiographic terminology and the basic principles of radiology.								
<b>CO2</b>	Implications of commonly used diagnostic images for better patient's management.								
<b>CO3</b>	Type and specification of imaging equipment in use.								
<b>CO4</b>	Safe, effective and efficient operations of imaging equipment and accessories.								
<b>CO5</b>	Capabilities and limitations of image recording systems used locally.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	1. IMAGE INTERPRETATION : a. History b. How a Medical Image Helps c. What Imaging Studies Reveal d. Radiography( x-rays ) e. Fluoroscopy f. Computed Tomography (CT) g. Magnetic Resonance Imaging (MRI) h. Ultrasound i. Endoscopy. j. Nuclear medicine	<b>6hours</b>	Students will have a idea about the different modalities used in radiology and concept of different radiography images.				1,2,3		
<b>II</b>	2. RADIOGRAPHY (X-RAY) a. Production of X-ray tubes b. Equipment components c. Procedures for Radiography d. Benefits versus Risks and Costs e. Indications and contraindications.	<b>6 hours</b>	Students will have a better knowledge about X-ray tubes.				1,2,3		
<b>III</b>	3. FLUOROSCOPY a. What is Fluoroscopy? b. Equipment used for fluoroscopy c. Indications and Contra indications d. How it helps in diagnosis e. The Findings in Fluoroscopy f. Benefits versus Risks and Costs.	<b>6 hours</b>	Students will have a better knowledge about fluoroscopy				1,2,3		



<b>IV</b>	CHAPTER 4. ENDOSCOPY a. What is Endoscopy? b. Equipment used for Endoscopy c. Indications and Contra indications d. How it helps in diagnosis e. The Findings in Endoscopy f. Benefits versus Risks and Costs.	<b>6 hours</b>	Students will have a better knowledge about endoscopy	1,,2,3,4.
<b>V</b>	CHAPTER 5 MAMMOGRAPHY a.Production of mammo X-ray tubes b. Equipment components c. Procedures for Mammography d. Benefits versus Risks and Costs e. Indications and contraindications	<b>6hours</b>	Students will have a better knowledge about soft tissue radiography (breast)	1,2,3,4

**Text Book:**

- Christensen's Physics of Diagnostic Radiology (Thomas S. CURRY.III)
- Textbook of Radiology for residents & technicians (S.K.Bhargava)

**Reference book:**

- CLARK'S Positioning in radiography
- Radiological Procedures (Dr. Bhushan N Lakhkar)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome

1	Acquire and apply the basic radiographic terminology and the basic principles of radiology.	1,2,3,4,5,6,7,8
2	Implications of commonly used diagnostic images for better patient's management. CO3 - Type and specification of imaging equipment in use. CO4 - Safe, effective and efficient operations of imaging equipment and accessories. CO5 - Capabilities and limitations of image recording systems used locally.	1,2,3,4,5,6,7,8
3	Classify the Types and specification of imaging equipment in use.	1,2,3,4,5,6,7,8
4	Acquainted with the knowledge of Safe, effective and efficient operations of imaging equipment and accessories.	1,2,3,4,5,6,7,8
5	Learn the Capabilities and limitations of image recording systems used locally.	1,2,3,4,5,6,7,8

#### MAPPING TABLE

		Course Name: DIAGNOSTIC IMAGING FOR PHYSIOTHERAPIST										
Course Code: 22BPT0316 R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	1	1	1	2	2	1	1	2	2	1	2
	CO2	2	1	1	2	2	2	2	2	2	1	1
	CO3	1	1	1	1	1	2	2	2	2	1	1
	CO4	1	1	1	1	1	2	2	2	3	1	2
	CO5	2	2	1	2	2	2	2	1	1	1	1
	Average	1.4	1.2	1	1.6	1.6	1.8	1.8	1.8	2	1	1.4
	Count	7	6	5	8	8	9	9	9	10	5	7

<b>Course Title</b>	ERGONOMICS IN SPORTS AND PHYSICAL ACTIVITY								
<b>Course code:</b>	22BPTO317R	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	0	0	2	0	0	0	1
<b>PRE-REQUISITE</b>	BIOMECHANICS, EXERCISE THERAPY	<b>CO-REQUISITE</b>	CLINICAL ORTHOPAEDICS & TRAUMATOLOGY						
<b>Programme</b>	Bachelor in Physiotherapy								
<b>Semester</b>	5th								
<b>Course Objectives</b>	<b>Ergonomics in sports and physical activity explains what ergonomics is, how ergonomics solve practical problems in the workplace. It also deals with the principles of ergonomics which are applied in the context of sport and other physical activities when solving practical problems related to human characteristics and capabilities</b>								
<b>CO1</b>	Learn the techniques in maintaining proper posture during sports and physical activity.								
<b>CO2</b>	Understanding of ergonomics in sports and physical activity help the students to give ergonomic advice to patients.								
<b>CO3</b>	Knowledge of ergonomics will help the students to prevent them from injuries in work place, sports and physical activities.								
<b>CO4</b>	Identify the proper orthoses for the patients to prevent from default posture.								
<b>CO5</b>	Learn the techniques in maintaining proper posture during sports and physical activity.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>Physical properties of human structures</b> - Monitoring activity demands, assessing individual characteristics, assessing physiological capabilities, assessing mental load <b>Health and safety</b> – injuries, predisposition to injury, overtraining and overreaching, immunosuppression, risk assessment, human ethics and risk <b>Environmental stress</b> – thermoregulation, altitude, air quality, noise <b>Circadian rhythms</b> – training and time of day, Nocturnal shift work, sleep wake cycle, sleep deprivation or disruption	6	To learn about the risk factors				1,2,3		
<b>II</b>	<b>Sport ergonomics:- Ergonomics models and training modes in sport and leisure</b> – Fitting the task to the person, generic models, the training component, technological training aids	6	To learn about the Sport ergonomics				1,2,3,4		

III	<b>Sport ergonomics:- Competitive and training stress in sport</b> – Physiological loading, spinal loading, physical loading, psychological loading, <b>Sports equipment and playing surfaces</b> – Sports implements, sport surfaces, sports clothing sport shoes, protective functions of sports equipments	6	To learn about the Sport ergonomics	1,2,3
IV	<b>Ergonomics in physical activities:- Fitness for work</b> – Military personnel, prison officers, police officers, bus workers and postal workers, drivers, ambulance workers, professional divers, workplace fitness programs <b>Special populations</b> – Young people, women, elderly people, athletes with disabilities	6	To learn about the Ergonomics in physical activities	1,2,3,4.
V	<b>Ergonomics in physical activities:- Clinical aspects</b> – musculoskeletal loading, overreaching, warming up & cooling down, recovery processes, supplements in clinical contexts	6	To learn about the Ergonomics in physical activities	1,2,3,4,5

**TEXT BOOKS:**

1 .Ergonomics in sport and physical activity by Thomas Reilly

**REFERENCE BOOKS:**

1 .Routledge handbook of ergonomics in sport and exercise

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Learn the techniques in maintaining proper posture during sports and physical activity.	1,2,7,8
2	Understanding of ergonomics in sports and physical activity help the students to give ergonomic advice to patients.	1,2,4,6,7,8
3	Knowledge of ergonomics will help the students to prevent them from injuries in work place, sports and physical activities.	1,2,5,7,8
4	Identify the proper orthoses for the patients to prevent from default posture.	1,2,6,8
5	Learn the techniques in maintaining proper posture during sports and physical activity.	1,2,7,8

### MAPPING TABLE

<b>Course Name: ERGONOMICS IN SPORTS AND PHYSICAL ACTIVITY</b>													
Course Code: 22BPTO317 R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	
	CO1	3	2	3	2	1	3	3	3	3	3	2	2
	CO2	3	2	3	3	2	3	3	3	3	3	2	1
	CO3	2	3	2	3	3	2	2	2	3	3	2	2
	CO4	3	3	3	2	3	3	3	3	3	3	2	2
	CO5	3	3	3	2	3	3	3	3	3	3	2	2
	Average	2.8	2.6	2.8	2.4	2.4	2.8	2.8	2.8	2.8	3	2	1.8
	Count	14	13	14	12	12	14	14	14	14	15	10	9

<b>SEMESTER – V</b>											
<b>Course Title</b>	<b>BASIC OF PHYSICAL EDUCATION</b>										
<b>Course code:</b>	<b>22BPTO301R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>	<b></b>	<b></b>

		2	2	0	0	0	0	0	2
		<b>TOTAL HOURS: 30</b>							
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL						
<b>Program me</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>5th</b>								
<b>Course Objectives</b>	<p>1.To introduce the students to the concepts related to the concept of physical education, sports, yoga and lifestyle, Basic of psychology in sports</p> <p>2. The objective of this course is that after lectures, demonstration, the students will be able to understand the benefits of physical education as needed for the study.</p> <p>3. The major topics covered are sports injuries, planning in sports, training in sports and psychology in sports which will give a better understanding about various responsibilities of a tournaments.</p>								
<b>CO1</b>	The student will able to acquire knowledge of fundamental understanding of physical education particular in the human fitness								
<b>CO2</b>	Acquainted with the understanding of Anxiety and it's types, aggression types, stress types, strength and it's types, endurance and it's types, Aerobic and anaerobic capacity, speed flexibility, co-ordination ability and it's types.								
<b>CO3</b>	This course explain the various drugs that are prohibited during any sports tournament and its physiological as well as psychological/mental behaviour.								
<b>CO4</b>	Acquainted with the understanding of various injuries and help to identify the injuries that takes place during an sports tournament events,and its management.								
<b>CO5</b>	Acquired with the knowledge of various exercise approaches such as isometric exercises, isotonic cexercises etc								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	Changing trends and carrer in physical education &sports -definition and meaning of physical education -Aim and objective of physical education and sports -sports Authority of India (SAI) -Career option available in physical education &sports _khelo india program., nsnis, duties and responsibilities of a coach. and functions.	<b>6hours</b>	Students will have a basic knowledge regarding sports facilities present near them, they will aware regarding SAI,its role and how it works.				1,2,3,4		
<b>II</b>	Training in sports -define and meaning of sports, conditioning and sports training -aims of sports training, systematization of sports, training process -strength and it's types, circuit training -speed, flexibility, Co-ordinative ability and it's types -Technical training, technic, skill and style.	<b>6 hours</b>	Students will have a better knowledge regarding exercises.				1,2,3,4		

<b>III</b>	psychology in sports -Meaning of psychology and sports psychology -Anxiety and it's types, causes of anxiety -aggression, types, causes and role of aggression in sports -stress, types of stress -Long term and short term psychological preparation for the competition	<b>6 hours</b>	Students will have a better understanding regarding different approaches in a tournament.	1,2,3
<b>IV</b>	Planning in sports -Meaning and objective of planning -Tournament-knockout, league or round-robin & combination tournament -procedure to draw fixtures-knockout(bye and seeding) & league (staircase & cyclic methods) -Intramural and extramural competition, meaning and objective	<b>6 hours</b>	Students will have a better understanding regarding planning in tournaments and management.	1,2,3,4.
<b>V</b>	Sports injuries -sports injuries:classification, causes and prevention -Rice treatment -Management of injuries:soft tissue injuries;abrasion, contusion, laceration,incision, sprain and strain, bone and joint injuries; dislocation, fractures. -Doping in sports; Concept of doping and blood doping List of selected drugs Prohibited substances used in sports Wada in sports	<b>6 hours</b>	Students will have a better understanding regarding different injuries that can take place in a sports tournament and certain drugs which are prohibited in a tournament.	1,2,3,4,5

**TEXT BOOKS:**

1. **Health and physical education by Dr VK Sarma**
2. **Life time Physical fitness and wellness by WERNER W. K. HOEGER.**

**REFERENCE BOOKS:**

1. **Basic of physical education and health**
2. **Fundamental of physical education by Mr Ajay Dhankar and Dr Birendra jhanjharia**
3. **Essential of physical education by Ajmer singh**

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The student will able to acquire knowledge of fundamental understanding of physical education particular in the human fitness	<b>1,7,8</b>
<b>2</b>	Acquainted with the understanding of Anxiety and it's types, aggression types, stress types, strength and it's types, endurance and it's types,Aerobic and anaerobic capacity, speed flexibility, co-ordination ability and it's types.	<b>1,2,4,6,7,8</b>
<b>3</b>	This course explain the various drugs that are prohibited during any sports tournament and its physiological as well as psychological/mental behaviour.	<b>1,2,5,7,8</b>
<b>4</b>	Acquainted with the understanding of various injuries and help to identify the injuries that takes place during a sports tournament events, and its management.	<b>1,2,6,8</b>
<b>5</b>	Acquired with the knowledge of various exercise approaches such as isometric exercises, isotonic exercises etc.	<b>2,7,8</b>



SEMESTER – V									
Course Title	INTRODUCTION TO PHYSICAL FITNESS AND WELLNESS								
Course code:	22BPTO302R	TOTAL CREDITS:	L	T	P	S	R	O/F	C
		2	2	0	0	0	0	0	2
PRE-REQUISITE	NIL	CO-REQUISITE	NIL						
		30							
Programme	Bachelor in Physiotherapy								
Semester	5th								
Course Objectives	1.To make the students aware about the basics of Physical Fitness & wellness 2. To develop knowledge on societies Health Care Delivery System including their hygiene & prevention of diseases.								
CO1	Apply the Health status and strategy to be adopted in the society.								
CO2	Learn an overview of fitness and physical health. Student will participate in physical Activities and learn to assess various health parameters.								
CO3	Gain the knowledge about nutrition, weight management, increasing cardiovascular endurance in order to have a fit and healthy life								
CO4	Acquainted with the knowledge about creating an environment that cultivates movement.								
CO5	Apply the values of health and exercise								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Physical Fitness and Wellness Nutrition for Wellness		6	By the end of the of the unit students will have clear knowledge about dimensions of wellness and importance of nutrition for maintaining wellness				1,2,3,4	
II	Body Composition Weight Management		6	By the end of the of the unit students will know about body's composition with keeping an emphasis on weight management				1,2,3,4	
III	Cardiorespiratory Endurance Muscular Strength and Endurance		6	By the end of the of the unit students will be able to discuss about cardiovascular endurance strength and also muscular strength and endurance				1,2,3	
IV	Muscular Flexibility		6	By the end of the of the unit students will know about the individual's flexibility and its importance				1,2,3,4.	
V	Preventing Cardiovascular Disease Stress Management		6	By the end of the of the unit students will have clear knowledge about the prevention of cardiovascular diseases, and importance of stress management				1,2,3,4,5	

**TEXT BOOKS:**

1. Life-time Physical Fitness and Wellness by WERNER W. K. HOEGER And SHARON A. HOEGER

**REFERENCE BOOKS:**

1. ACSM guidelines

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Apply the Health status and strategy to be adopted in the society.	<b>1,3 &amp; 4</b>
<b>2</b>	Learn an overview of fitness and physical health. Student will participate in physical Activities and learn to assess various health parameters.	<b>1,2</b>
<b>3</b>	Gain the knowledge about nutrition, weight management, increasing cardiovascular endurance in order to have a fit and healthy life	<b>7,9,10</b>
<b>4</b>	Acquainted with the knowledge about creating an environment that cultivates movement.	<b>5,7</b>
<b>5</b>	Apply the values of health and exercise	<b>5,8</b>

<b>SEMESTER – V</b>									
<b>Course Title</b>	<b>EXTRACURRICULAR ACTIVITIES</b>								
<b>Course code:</b>	<b>22UBEC311</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL						

<b>Programme</b>	<b>Bachelor in Physiotherapy</b>
<b>Semester</b>	<b>5th</b>
<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners
<b>Course Outcome</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to learn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.
<b>Content</b>	
<p>AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained to represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.</p>	

<b>SEMESTER – V</b>										
<b>Course Title</b>	<b>PHYSICAL ACTIVITY AND PUBLIC HEALTH PRACTICE</b>									
<b>Course code:</b>	<b>22BPTE311R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>	
		<b>1</b>								
		<b>TOTAL HOURS:</b>								
		<b>15</b>	1	0	0	0	0	0	1	

<b>PRE-REQUISITE</b>	<b>EXERCISE THERAPY</b>	<b>CO-REQUISITE</b>	Clinical Orthopaedics	
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>			
<b>Semester</b>	<b>5th</b>			
<b>Course Objectives</b>	1. To introduce to the students the concepts related to Clinical Conditions 2. To introduce to the students the concepts related to diagnosis and treatment 3. To introduce to the students about the Electrotherapeutic modalities			
<b>CO1</b>	Student should be able to understand about clinical decision making and vital signs assessment.			
<b>CO2</b>	Student should be able to understand about Functional assessment and Electro diagnosis			
<b>CO3</b>	The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions.			
<b>CO4</b>	The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.			
<b>CO5</b>	Student should learn the Special test required for diagnosis.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	History of Physical Activity Contributions to Public Health Physiological Adaptations to Moderate-Intensity Aerobic Exercise The Unique Influence of Sedentary Behaviour on Health	<b>3</b>	Student should be able to understand about clinical decision making and vital signs assessment.	1,2,3,4,5
<b>II</b>	Physical Activity in Chronic Disease Prevention Physical Activity and Injury Prevention Physical Activity in Treatment of Chronic Conditions	<b>3</b>	Student should be able to understand about Functional assessment and Electro diagnosis	1,2,3,4,5
<b>III</b>	Physical Activity in Growth and Development Physical Activity and Healthy Adulthood Physical Activity and Healthy Aging Physical Activity and Obesity	<b>3</b>	. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions.	1,2,3,4,5
<b>IV</b>	Physical Activity Measurement	<b>3</b>	. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.	1,2,3,4,5

V	Physical Activity Promotion in Underserved Communities	3	Student should learn the Special test required for diagnosis.	1,2,3,4,5,6
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**TEXT BOOKS:**

**REFERENCE BOOKS:**

1. Manual of nerve conduction velocity techniques – De Lisa, Raven Press.
2. Electro-diagnosis in disease of nerve and muscle – Kimura J, F.A. Davis
3. Clinical Electromyography and Nerve Conduction Studies – Shin J.OH, Williams & Wilkins.
4. Clinical Neurophysiology – Nerve conduction, Electromyography and Evoked Potentials – Mishra & Kalita, Churchill Livingstone.
5. A Practical Treatise On Electro-Diagnosis in Diseases of the Nervous System by Alexander Hughes Bennet (Jan 10, 2010)
6. Introduction to Surface Electromyography, Second Edition by Jeffrey R. Cram (Mar 16, 2010)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Student should be able to understand about clinical decision making and vital signs assessment.	1,7,8

<b>2</b>	Student should be able to understand about Functional assessment and Electro diagnosis	<b>1,2,4,6,7,8</b>
<b>3</b>	The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions.	<b>1,2,5,7,8</b>
<b>4</b>	The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.	<b>1,2,6,8</b>
<b>5</b>	Student should learn the Special test required for diagnosis.	<b>2,7,8</b>

<b>SEMESTER – V</b>									
<b>Course Title</b>	<b>PHYSIOTHERAPY IN PALLIATIVE CARE</b>								
<b>Course code:</b>	<b>22BPTE312R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>

		<b>1</b>								<b>1</b>
		<b>TOTAL HOURS: 15</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	<b>EXERCISE THERAPY</b>	<b>CO-REQUISITE</b>	Clinical Orthopaedics							
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>									
<b>Semester</b>	<b>5th</b>									
<b>Course Objectives</b>	1. To introduce to the students the concepts related to Clinical Conditions 2. To introduce to the students the concepts related to diagnosis and treatment 3. To introduce to the students about the Electrotherapeutic modalities.									
<b>CO1</b>	Students shall be able to understand about Palliative care and rehabilitation.									
<b>CO2</b>	Students shall be able to understand about other common problems with Cancer patients.									
<b>CO3</b>	The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various Cancer patients.									
<b>CO4</b>	The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient. Students shall be able to understand about their Common problems and their management.									
<b>CO5</b>	Students shall be able to understand about their activity and mobilization massage and their treatment.									
<b>Unit-No.</b>	<b>Content</b>					<b>Contact Hour</b>	<b>Learning Outcome</b>			<b>KL</b>
<b>I</b>	Introduction Definition of palliative care The quality of life of the patient Palliative Rehabilitation The physiotherapist role in palliative care					<b>3</b>	Students shall be able to understand about Palliative care and rehabilitation.			1,2,3,4,5
<b>II</b>	Psychological aspects Crisis Worry / Anxiety Depression					<b>3</b>	The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various Cancer patients.			1,2,3,4,5
<b>III</b>	Common problems for patients with a cancer diagnosis in late stages of life Metastasis of the skeleton Pathological fractures Compression of vertebrae affecting the spine					<b>4</b>	Students shall be able to understand about other common problems with Cancer patients.			1,2,3,4,5
<b>IV</b>	Other severe problems treated by physiotherapists Fatigue Physical weakness Pain Different methods of pain treatment					<b>2</b>	The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.			1,2,3,4,5

<b>V</b>	Physical activity /mobilizing Massage and relaxing techniques Heat and cold TENS Acupuncture	<b>3</b>	Students shall be able to understand about their activity and mobilization massage and their treatment.	1,2,3,4,5,6
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**TEXT BOOKS:**

**REFERENCE BOOKS:**

1. Physiotherapy in palliative care – a clinical handbook Ulla Frymark, Lilian Hallgren, Ann-Charlotte Reisberg
2. Physiotherapy in palliative care - Stockholms sjukhem

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Students shall be able to understand about Palliative care and rehabilitation.	<b>1,7,8</b>
<b>2</b>	Students shall be able to understand about other common problems with Cancer patients.	<b>1,2,4,6,7,8</b>
<b>3</b>	The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various Cancer patients.	<b>1,2,5,7,8</b>
<b>4</b>	The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient. Students shall be able to understand about their Common problems and their management.	<b>1,2,6,8</b>
<b>5</b>	Students shall be able to understand about their activity and mobilization massage and their treatment.	<b>2,7,8</b>



Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BPTO311R	CLINICAL ORTHOPAEDICS AND TRAUMATOLOGY	2	3	3	2	2	2	3	3
22BPTO312R	CLINICAL NEUROLOGY AND NEUROSURGERY	2	3	3	2	2	2	3	3
22BPTO313R	GENERAL MEDICINE	1	3	3	1	1	1	2	3
22BPTO314R	GENERAL SURGERY	1	2	1	1	1	1	2	3
22BPTO315R	COMMUNITY MEDICINE	1	2	1	1	1	1	2	3
22BPTO316R	DIAGNOSTIC IMAGING FOR PHYSIOTHERAPIST	3	2	2	1	1	1	3	3
22BPTO317R	ERGONOMICS IN SPORTS AND PHYSICAL ACTIVITY	2	2	2	2	0	0	3	3
22BPTO301R	GENERIC /OPEN/UNIVERSITY ELECTIVE	1	1	1	2	0	0	2	3
22UBCC311	CO-CURRICULAR	0	0	2	1	2	2	1	2
22UBEC311	EXTRA CURRICULAR	0	0	2	1	2	2	1	2
22BPTE311R/22BPTE312R/	PHYSICAL ACTIVITY AND PUBLIC HEALTH PRACTICES  PHYSIOTHERAPY IN PALLIATIVE CARE	2	2	2	1	1	1	2	3
22BPT318R	CLINICAL POSTING BASED PROJECT	3	3	2	1	1	1	3	3

SEMESTER – VI									
Course Title	CLINICAL ORTHOPAEDICS AND TRAUMATOLOGY								
Course code:	22BPTO321R	TOTAL CREDITS:3	L	T	P	S	R	O	C
		TOTAL HOURS: 45T	3	0	0	0	0	0	3
PRE-REQUISITE	ANATOMY, BIOMECHANICS, EXERCISE THERAPY, CLINICAL ORTHOPAEDICS AND TRAUMATOLOGY	CO-REQUISITE	NIL						
Programme	Bachelor in Physiotherapy								
Semester	6 <sup>th</sup>								
Course Objectives	<p>1. To introduce the students to the concepts related Deformities, Congenital deformities, Acquired deformities, Diseases of Bones and Joints, Infective conditions, Arthritic conditions.</p> <p>2. Bone Tumours, Metabolic Bone disease, Inflammatory and Degenerative conditions, Syndromes, Neuromuscular disorders, Orthopaedic surgeries, Regional conditions.</p>								
CO1	Provides the knowledge about orthopaedic conditions the Physiotherapists would encounter in their practice.								
CO2	Able to understand orthopaedic conditions causing disability,								
CO3	List the etiology, clinical features and methods of investigations and management of various orthopaedic conditions.								
CO4	Classify and manage the medical treatment of various orthopaedic surgeries.								
CO5	Understand the different degenerative conditions of the joint and bone and be able to diagnose and manage it.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<p><b>Deformities</b>- clinical features, complications, medical and surgical management of the following Congenital and acquired deformities.</p> <p><b>Congenital deformities</b>- CTEV.COHo Torticollis. Scoliosis. Flat foot. Vertical talus. Hand anomalies- syndactyly, polydactyly and ectrodactyly. Arthrobrryposis multiplex congenital (amyoplasia congenital). Limb deficiencies- Amelia and Phocomelia. Klippedfeil syndrome. Osteognesis imperfect (fragile assium). Cervical rib.</p> <p><b>Acquired deformities</b> –Acquired Torticollis. Scoliosis. Kyphosis. Lordosis. Genuvarum. Genu valgum. Genurcurvatum. Coxavara. Pes cavus. Hallux rigidus. Hallux Valgus, Hammer toe, Metatarsalgia.</p>	10	After completion of the topic the students should be able to understand the concept of all the deformities and congenital deformities.				1,2,3,4,5		

<p><b>II</b></p>	<p><b>Diseases of Bones and Joints:</b> Causes, clinical features, complications, management – Medical and surgical of the following conditions  <b>Infective conditions:</b> Osteomyelitis (acute and chronic), Brodie’s Abscess, TB spine and major joints like shoulder, hip, knee, ankle, elbow etc.  <b>Arthritic conditions:</b> Pyogenic Arthritis, Septic Arthritis, Syphylitic infection of joints,  <b>Bone Tumors:</b> Classification , Clinical features, Management- Medical and surgical following tumors: Osteoma, Osteosarcoma, Osteochondroma, Enchondroma, Ewing’s Scarcoma, Giant cell tumor, Multiple myeloma, metastatic tumor, Perthe’s disease, Slipped capital femoral epiphysis, Avascular necrosis, Metabolic Bone disease: Rickets, Osteomalacia, Osteopenia, Osteoporosis  <b>Inflammatory and Degenerative conditions:</b> Causes, Clinical features, complications, deformities, Radiological features, management- conservative and surgical for the following conditions: Osteoarthritis, Rheumatoid Arthritis, Ankylosing Spondylitis, Gouty arthritis, Psoriatic arthritis, Hemophilic arthritis, Still’s diseases (Juvenile Rheumatoid Arthritis), Charcot’s Joints, Connective tissue disorder- Systemic Lupus Erythematosus, Scleroderma, Dermatomyositis, Poliomyelitis, Mixed connective tissue disease (MCTD).</p>	<p><b>14</b></p>	<p>By the completion of this topic the students should be able to diagnose and plan a medical treatment for the various bones and joint diseases.</p>	<p>1,2,3,4,5</p>
<p><b>III</b></p>	<p><b>Syndromes:</b> causes, clinical features, complications, management – conservative and surgical of the following: Cervicobrachial syndrome, Thoracic outlet syndrome, Vertebro-basilar syndrome, Scalenus syndrome, Costo clavicular syndrome, Levator scapulae syndrome, Piriformis syndrome.  Cervical and lumbar Pathology : indications, classification, types , principles of management – medical and surgical for the following : prolapsed intervertebral disc (PID) , spinal canal stenosis , spondylosis (cervical and lumbar) , spondylolysis , spondylolisthesis, lumbago / lumbo sacral strain, sacralisation, lumbarisation , coccydynia , hemivertebra.</p>	<p><b>9</b></p>	<p>By the end of this topic the students should know the different pathologies of the bones and joints</p>	<p>1,2,3,4,5,6</p>
<p><b>IV</b></p>	<p><b>Orthopedic surgeries :</b> indication , classifications , types , management of following surgeries: Arthrodesis , arthroplasty ( partial and total replacement), osteotomy external fixators , spinal stabilization surgeries( Harrington’s , Luque’s , Steffi plating) etc. limb re-attachments .</p>	<p><b>3</b></p>	<p>By the end they should be able to classify and manage the medical treatment of various orthopaedic surgeries.</p>	<p>1,2,3,4,5,6</p>

V	<p><b>Regional conditions:</b> definition, clinical feature and management of the following regional conditions:</p> <ul style="list-style-type: none"> <li>● Shoulder: Periarthritic shoulder (adhesive capsulitis). Rotator cuff tendinitis. Supraspinatus tendinitis. Bicipital tendinitis. Subacromial bursitis.</li> <li>● Elbow: Tennis elbow. Golfer's elbow. Olecranon bursitis (student's elbow). Tricep tendinitis.</li> <li>● Wrist and hand: De Quervain's tenosynovitis. Ganglion. Trigger finger/thumb. Mallet finger. Carpal tunnel syndrome. Dupuytren's contracture.</li> <li>● Pelvis and hip: IT Band syndrome. Piriformis syndrome. Trochanteric bursitis.</li> <li>● Knee: Osteochondritis dissecans. Prepatellar and Suprapatellar bursitis. Popliteal tendinitis. Patellar tendinitis. Chondromalacia patella. Plica syndrome. Fat pad syndrome (Hoffa's syndrome)</li> </ul> <p><b>Ankle and foot:</b> Ankle sprains. Plantar fasciitis/calcaneal spur. Tarsal tunnel syndrome. Achilles tendinitis. Metatarsalgia. Morton's neuroma.</p>	9	At the end the students should be able to understand the different degenerative conditions of the joint and bone and be able to diagnose and manage it.	1,2,3,4,5,6
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**TEXT BOOKS:**

1. Outline of Fractures—John Crawford Adams.
2. Outline of Orthopedics. — John Crawford Adams.
3. Text book of Orthopedics.—Maheswari

**REFERENCE BOOKS:**

1. Apley's Orthopedics.
2. Textbook of Orthopedics and Traumatology—M.N. Natarajan

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Provides the knowledge about orthopedic conditions the Physiotherapists would encounter in their practice.	1,2,3,4,5,6,7,8
2	Able to understand orthopedic conditions causing disabilit.	1,2,3,4,5,6,7,8
3	List the etiology, clinical features and methods of investigations and management of various orthopedic conditions.	1,2,3,4,5,6,7,8
4	Classify and manage the medical treatment of various orthopaedic surgeries.	1,2,3,4,5,6,7,8
5	Understand the different degenerative conditions of the joint and bone and be able to diagnose and manage it.	1,2,3,4,5,6,7,8

### MAPPING TABLE

Course Name: CLINICAL ORTHOPEDICS AND TRAUMATOLOGY												
Course Code: 22BPTO321R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	2	1	1	1	2	2	2	1	2	0	0
	CO2	2	1	2	1	2	2	2	1	2	0	0
	CO3	2	2	2	1	2	2	3	2	2	0	0
	CO4	2	1	1	1	2	2	3	1	2	0	0
	CO5	1	1	1	1	1	1	2	1	2	0	0
	Average	1.5	1	1	1	1.5	1.5	2	1	2	0	0
	Count	9	5	7	5	9	9	12	6	10	0	0

SEMESTER – VI									
Course Title	CLINICAL NEUROLOGY AND NEUROSURGERY								
Course code:	22BPT0322R	TOTAL CREDITS:3	L	T	P	S	R	O	C
		TOTAL HOURS: 45T	3	0	0	0	0	0	3
PRE-REQUISITE	NEUROANATOMY, PHARMACOLOGY	CO-REQUISITE	GENERAL MEDICINE AND GENERAL SURGERY						
Programme	Bachelor in Physiotherapy								
Semester	6th								
Course Objectives	<p>1. To introduce the students to the concepts related Spinal cord disorders, Brain tumors and spinal tumors, Multiple sclerosis, Pediatric neurology, Polyneuropathy, Focal peripheral neuropathy.</p> <p>2. To introduce the students about the concept of neuro surgeries, infection of brain &amp; spinal cord.</p>								
CO1	Impart and understand about the spinal cord injuries and disorders.								
CO2	Acquire knowledge about brain and spinal tumours, motor neuron diseases and muscle diseases.								
CO3	Acquire skill of clinical examination of a neonate /child with respect to neurological, Musculoskeletal, Respiratory & Cardiovascular conditions.								
CO4	Describe normal development & growth of a child.								
CO5	Acquire knowledge about neuro surgeries.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Spinal cord disorders: Functions of tracts, definition, etiology, risk factors, pathophysiology, classification, clinical signs & symptoms, investigation, differential diagnosis, medical management, surgical management and complications of following disorders- Spinal cord injury, compression by IVD prolapse, spinal epidural abscess, transverse myelitis, viral myelitis, syringomyelia, spina bifida, sub-acute combined degeneration of the cord, hereditary spastic, paraplegia, radiation, myelopathy, progressive encephalomyelitis, conusmedullaris syndrome, bladder & bowel dysfunction and sarcoditis.	9	To learn about the Spinal cord disorders.	1,2,3					

<p><b>II</b></p>	<p>Brain tumors and spinal tumors: classification, clinical features, investigations, medical and surgical management.  Motor neuron diseases: Etiology, Pathophysiology, Classifications, Clinical signs &amp; symptoms, investigations, differential diagnosis, medical management, surgical management &amp; complications of following disorders: Amyotrophic lateral sclerosis, Spinal muscular atrophy, Hereditary bulbar palsy, Neuromyotonia and post-irradiation lumbosacral polyradiculopathy.  Introduction, indications and complication of following neuro surgeries: craniotomy, cranioplasty, stereotactic surgery, deep brain stimulation. Burr- hole shunting.  Lumpectomy, Hemilaminectomy, Rhizotomy, Micro vascular decompression surgery, Endarterectomy, Embolization, Pituitary surgery, Ablative surgery- Thalamotomy and pallidotomy, Coiling of aneurysm, Clipping of aneurysm and Neural implantation.</p>	<p>9</p>	<p>To learn about the motor neuron diseases, brain and spinal tumors and procedure of neuro surgeries</p>	<p>1,2,3,4</p>
<p><b>III</b></p>	<p>Multiple sclerosis- etiology, pathophysiology, classification, clinical signs &amp; symptoms, investigations and differential diagnosis, medical management and complications.  Muscles diseases: classification, investigation, imaging methods, muscle biopsy , management of muscle diseases, classification, etiology, signs and symptoms of following disorders- muscular dystrophy, myotonic dystrophy, myopathy, non-dystrophic myotonia  Pediatric neurology: neural development, etiology, pathophysiology, classification, clinical sign and symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders- Cerebral palsy, hydrocephalus, Arnold chiari malformation, autism, dandy walker syndrome and down syndrome</p>	<p>9</p>	<p>To learn about the Pediatric neurology, Muscles diseases</p>	<p>1,2,3,4</p>

IV	Disorders of neuromuscular junction- etiology, classification, signs & symptoms, investigations, management of following disorders- Myasthenia gravis, Lambert- Eaton syndrome and Botulism. Polyneuropathy- classification of polyneuropathies, hereditary motor sensory neuropathy, hereditary sensory & autonomic neuropathies, amyloid neuropathy. Acute idiopathic. Polyneuropathies. Guillain- Barre syndrome- causes, clinical features, management of GBS, chronic idiopathic polyneuropathies, diagnosis of polyneuropathy, nerve biopsy Therapeutic and diagnostic agent of toxicity, metal toxicity, environmental and physical insults, plant & fungal poisoning, animal poison and complications of organ transplantation	9	To learn about the Disorders of neuromuscular junction, polyneuropathy, metal toxicity etc	1,2,3,4,5,6
V	Focal peripheral neuropathy: clinical diagnosis of focal neuropathy, neurotmesis, axonotmesis, neuropraxia. Etiology, risk factors, classification, neurological signs and symptoms, investigations, management of following disorders- RSD, nerve tumors, brachial plexus palsy, thoracic outlet syndrome, lumbosacral plexus lesion, phrenic and intercostal nerve palsy, median nerve palsy, ulnar nerve palsy, radial nerve palsy, musculocutaneous nerve palsy, anterior and posterior interosseous nerve palsy, axillary nerve palsy, long thoracic nerve palsy, suprascapular nerve palsy, sciatic nerve palsy, tibial nerve palsy, common peroneal nerve palsy, femoral nerve palsy, obturator nerve palsy, pudendal nerve palsy.	9	To learn about the peripheral neuropathy	1,2,3,4,5,6

**TEXT BOOKS:**

1. Neurology and Neurosurgery Illustrated By Kenneth W. Lindsay, Ian Bone, Geraint Fuller
2. Davidson's Principles and Practice of Medicine
3. Textbook of Neurology- Victor Adams
4. Brains Clinical Neurology.
5. Brains Diseases of Nervous System

**REFERENCE BOOKS:**

1. Snell's Clinical Neuroanatomy By Ryan Splittgerber
2. Physical rehabilitation by [Susan B. O'Sullivan](#), [Thomas J. Schmitz](#), [George D. Fulk](#)



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
S N	Course Outcome (CO)	Mapped Program Outcome
1	Impart and understand about the spinal cord injuries and disorders.	1,2,3,4,5,6,7,8
2	Acquire knowledge about brain and spinal tumours, motor neuron diseases and muscle diseases.	1,2,3,4,5,6,7,8
3	Acquire skill of clinical examination of a neonate /child with respect to neurological, Musculoskeletal, Respiratory & Cardiovascular conditions.	1,2,3,4,5,6,7,8
4	Describe normal development & growth of a child.	1,2,3,4,5,6,7,8
5	Acquire knowledge about neuro surgeries.	1,2,3,4,5,6,7,8

**MAP  
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Course Name: CLINICAL NEUROLOGY AND NEUROSURGERY												
Course Code: 22BPTO322R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	2	1	1	1	2	2	2	2	1	2	0	0
CO2	2	1	2	1	2	2	2	2	1	2	0	0
CO3	2	2	2	1	2	2	3	2	2	2	0	0
CO4	2	1	1	1	2	2	3	1	2	2	0	0
CO5	1	1	1	1	1	1	2	1	2	2	0	0
Average	1.5	1	1	1	1.5	1.5	2	1	2	2	0	0
Count	9	5	7	5	9	9	12	6	10	10	0	0

SEMESTER – VI										
Course Title	GENERAL MEDICINE									
Course	22BPTO323R	TOTAL CREDITS:	L	T	P	S	R	O/F	C	

<b>code:</b>		2	2	0	0	0	0	0	0	2
		<b>TOTAL HOURS:</b> 30								
<b>PRE-REQUISITE</b>	PHYSIOLOGY, PHARMACOLOGY	<b>CO-REQUISITE</b>	NIL							
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>									
<b>Semester</b>	<b>6th</b>									
<b>Course Objectives</b>	1. To introduce the students to the concepts related Endocrine diseases, Diseases of the digestive system, Diseases of the skin, Paediatrics, Psychiatric disorders. 2. To introduce the students about the concept of medical management of various diseases.									
<b>CO1</b>	List out the etiology, pathology, clinical features and treatment methods for various medical conditions.									
<b>CO2</b>	Acquainted with the knowledge of various diseases the therapist would encounter in their practice.									
<b>CO3</b>	Plan out the diagnoses for various kinds of diseases encountered by the therapists.									
<b>CO4</b>	Understand the diseases of Endocrine and the diseases of the digestive system.									
<b>CO5</b>	Acquainted with the knowledge of Diseases of the skin, Paediatric conditions as well as Psychiatric disorders.									
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>		
<b>I</b>	ENDOCRINE DISEASES: common presenting symptoms of endocrine disease – common classical disease presentations , clinical features and its management; diabetes mellitus ; aetiology and pathogenesis of diabetes- clinical manifestations of the disease- management of the disease- complications of diabetes	6	To learn about the endocrine diseases					1,2,3		
<b>II</b>	DISEASES OF THE DIGESTIVE SYSTEM: clinical manifestations of gastro intestinal disease – aetiology , clinical features, diagnosis , complications ,and treatment of the following conditions: reflux , oesophagitis , achlasia Cardia , carcinoma of oesophagus, GI bleeding, peptic ulcer disease, carcinoma of stomach , pancreatitis, mal absorption syndrome, ulcerative colitis, peritonitis, infections of alimentary tracts; clinical manifestations of liver diseases – aetiology , clinical features, diagnosis, complications and treatment of the following conditions: viral hepatitis , wilson’s disease, alphas-antitrypsin deficiency, tumors of the liver, gall stones, cholecystitis	6	To learn about the diseases of the digestive system.					1,2,3,4		

<b>III</b>	DISEASES OF THE SKIN : examination and clinical manifestations of skin diseases; causes , clinical features and management of the following skin conditions : leprosy , psoriasis, pigmentary anomalies, vasomotor disorders, dermatitis, coccal and fungal parasitic and viral infections	<b>6</b>	To learn about the diseases of the skin.	1,2,3,4
<b>IV</b>	PEDIATRICS: problems and management of LBW infants, perinatal problems and management , congenital abnormalities and management , respiratory conditions of childhood , cerebral palsy- causes, complications , clinical manifestations , treatment ; spina bifida – management and treatment , epilepsy- types, diagnosis and treatment; recognizing developmental delay , common causes of delay; orthopaedic and neuromuscular disorders in childhood , clinical features and management; sensory disorders – problems resulting from loss of vision and hearing ; learning and behavioral problems – hyperactivity , autism , challenging behaviours, educational delay , the clumsy child	6	To learn about the paediatrics problems.	1,2,3,4.
<b>V</b>	PSYCHIATRIC DISORDERS : classifications , causes , clinical manifestations and treatment methods used in psychiatry	6	To learn about the psychiatric disorders	1,2,3,4

**TEXT BOOKS:**

1. Davidson’s Principles and Practice of Medicine
2. Harrison’s Internal Medicine
3. Braunwald Text of Cardiology
4. Text Book of Cardiology by Hurst

**REFERENCE BOOKS:**

1. Cash's Textbook of General Medical and Surgical Conditions for Physiotherapists

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	List out the etiology, pathology, clinical features and treatment methods for various medical conditions.	1,2,3,4,5,6,7,8
2	Acquainted with the knowledge of various diseases the therapist would encounter in their practice.	1,2,3,4,5,6,7,8
3	Plan out the diagnoses for various kinds of diseases encountered by the therapists.	1,2,3,4,5,6,7,8
4	Understand the diseases of Endocrine and the diseases of the digestive system.	1,2,3,4,5,6,7,8
5	Acquainted with the knowledge of Diseases of the skin, Paediatric conditions as well as Psychiatric disorders.	1,2,3,4,5,6,7,8

### MAPPING TABLE

Course Name: GENERAL MEDICINE												
Course Code: 22BPT0323R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	1	2	1	1	2	2	2	2	3	1	0
	CO2	2	1	1	1	2	2	2	2	2	0	0
	CO3	2	2	2	1	1	1	2	2	2	0	0
	CO4	2	2	1	1	1	2	1	2	2	0	0
	CO5	1	2	1	2	1	2	1	2	1	0	0
	Average	1.6	1.8	1.2	1.2	1.4	1.8	1.6	2	2	0.2	0
	Count	8	9	6	6	7	9	8	10	10	1	0

SEMESTER – VI	
Course Title	GENERAL SURGERY

<b>Course code:</b>	<b>22BPT0324R</b>	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		<b>TOTAL HOURS: 30</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	Human Anatomy, Human Physiology	<b>CO-REQUISITE</b>	GENERAL MEDICINE						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>6th</b>								
<b>Course Objectives</b>	<p>1. Focuses on Concepts of Heart diseases. Congenital and Acyanotic heart disease and its Surgical management.</p> <p>2. Introduce the students about Thoracic surgeries its Indications and an Overview of Cardiac Surgeries.</p> <p>3. This paper shall focus on diseases about Arteries and Veins. ENT and Ophthalmology</p>								
<b>CO1</b>	Acquainted with the knowledge of various types of heart diseases and Thoracic and Cardiac Surgeries Procedures.								
<b>CO2</b>	Impart the knowledge of Burns, its complications and surgical management. Acquainted with definitions, indication, incisions, physiological changes, and the complications for common operations like cholecystectomy, colostomy, ileostomy, gastrectomy, hernias, appendicectomy, mastectomy, nephrectomy, prostatectomy.								
<b>CO3</b>	List out the common problems of ear. Knowledge about otitis media, otosclerosis, functional achonia and deafness, and plan out its management. Acquainted with the definition of facial palsy classification, medical and surgical management of lower motor neuron type of facial palsy.								
<b>CO4</b>	Plan out the surgical management for ophthalmologic conditions like refraction's, conjunctivitis, glaucoma, corneal ulcer, iritis, cataract, retinitis, detachment of retina, defects of extra- ocular muscles.								
<b>CO5</b>	Classify, assess, evaluate & describe the surgical management Head Injuries.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<p><b>1.Surgical Management of congenital and ischemic heart diseases-</b> acyanotic congenital heart disease and cyanotic congenital heart disease: patient ductus arteriosus, coarctation of aorta, atrial septal defect , ventricular septal defect, tetralogy of fallot, transposition of great vessels ,– coronary heart disease , cardiac tumors</p> <p><b>2. Thoracic surgeries- thoracotomy</b> – definition, types of incisions with emphasis to the site of incision, muscles cut and complications .lung surgeries: pneumonectomy, lobectomy, segmentectomy- indications, physiological changes and complications; thoracoplasty ,pleurectomy, pleurodesis and decortications of the lung. Cardiac surgeries – an overview of the cardiopulmonary bypass machine- extracardiac operations , closed heart surgery, open heart surgery: transplant surgery- heart, lungs and kidney-indications , physiological changes and complications</p>	<b>6</b>	The students will be able to understand about various types of Heart diseases about Thoracic and Cardiac Surgeries.				1,2,3		

II	<p><b>3. Diseases of the arteries and veins:</b> definition, aetiology, clinical features, signs and symptoms, complications, management and treatment of the following diseases: arteriosclerosis, atherosclerosis, aneurysm, buerger's disease, raynaud's disease, thrombophlebitis, deep vein thrombosis, pulmonaty embolism, varicose veins.</p> <p><b>4. Definitions,</b> indication, incision , physiological changes and complications following common operations like cholecystectomy, colostomy, ileostomy, gastrectomy, hernias , appendicectomy, mastectomy , neprectomy, prostectomy ,</p>	5	This paper shall focus on diseases about Arteries and Veins. ENT and Ophthalmology	1,2,3,4
III	<p><b>5. Burn:</b> definition, classification, causes, prevention, pathological changes, complications, clinical features and management. Skin grafts – types , crafting procedures, survival of skin graft; flaps – types and uses of flaps</p>	7	The students will come to know about Burns and its complications and its surgical management. Definitions, indication, incision , physiological changes and complications	1,2,3,4
IV	<p><b>6. ENT:</b> common problems of ear , otitis media, otosclerosis, functional achonia and deafness, management facial palsy classification, medical and surgical management of lower motor neuron type of facial palsy</p>	5	The students will also know about ENT: common problems of ear, otitis media, otosclerosis, functional achonia and deafness, management facial palsy classification, medical and surgical management of lower motor neuron type of facial palsy.	1,2,3,4.
V	<p><b>7. Ophthalmology:</b> ophthalmologic surgical conditions , refraction's , conjunctivitis, glaucoma, corneal ulcer, iritis , cataract, retinitis, detachment of retina, defects of extra – ocular muscles – surgical management</p>	7	Ophthamology : ophthamologic surgical conditions, refraction's, conjunctivities, glaucoma, corneal ulcer, iritis, cataract, retinitis, detachment of retina, defects of extra- ocular muscles- surgical management	1,2,3,4,5

**TEXT BOOKS:**

1. General Surgical Operations – by Kirk /Williamson
2. Surgery by Nan
3. Bailey and Love's – Short Practice of Surgery
4. Chest Disease by Crofton and Douglas.

5. Patrica A Downie, Text book of Heart, Chest Vascular Disease for physiotherapists, JP Bros

**REFERENCE BOOKS:**

1.General Surgical Operations- by Kirk/ Williamson

2. Surgery by Nan

3. Baoley and Love’s- Short practice of Surgery

4. Chest Disease by Crofton and Douglas.

5. Patrica A Downie, Text book of Heart, Chest Vascular Disease for Physiotherapist, JPBros.

6.SUSAN O SULLEVAN

7. CHAURASIA for Anatomy

8.Sembulingam for Physiology

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

**MAPPING TABLE**

		<b>Course Name: GENERAL SURGERY</b>											
<b>Course Code: 22BPTO32 4R</b>	<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	
	<b>CO1</b>	3	2	2	2	2	2	1	2	3	3	1	2
	<b>CO2</b>	2	2	2	1	3	3	2	2	2	3	1	2
	<b>CO3</b>	2	2	2	1	2	1	2	2	2	2	1	1
	<b>CO4</b>	1	3	2	3	1	3	2	2	2	2	1	1
	<b>CO5</b>	1	2	1	2	2	2	2	2	3	1	1	1
	<b>Average</b>	1.8	2.2	1.8	1.8	2	2	2	2	2.4	2.2	1	1.4
	<b>Count</b>	9	11	9	9	10	10	10	10	12	11	5	7

SEMESTER – VI										
Course Title	COMMUNITY MEDICINE									
Course code:	22BPTO325R	TOTAL CREDITS:2	L	T	P	S	R	O / F	C	
		TOTAL HOURS: 30	2	0	0	0	0	0	0	2
PRE-REQUISITE	SOCIOLOGY, PSYCHOLOGY, STATISTICS, PATHOLOGY AND MICROBIOLOGY	CO-REQUISITE	GENERAL MEDICINE							
Programme	Bachelor in Physiotherapy									
Semester	6th									
Course Objectives	<p>1 .To introduce the students to the concepts of community health, prevention of disease and promotion of health in physiotherapy field practice.</p> <p>2. The objective of this course is that after 60hrs of lectures the student will be able to understanding of various aspects of health and disease, methods of health administration, health education and disease preventive measures..</p>									
CO1	Designed to give the student the knowledge, diagnose and manage common health problems at individual and community levels keeping in mind the existing health care.									
CO2	Acquainted with the principles and components of Occupational and mental health, Family planning, Health Education, Nutrition, Environment, Vulnerable group and Disaster management.									
CO3	Analyze and interpret health problems and provide community health care services based on the community needs.									
CO4	Identify groups which require special attention including occupational health, family problem, mental health, nutrition.									
CO5	Implement health education, established surveillance system, prepare for disaster management and manage human resources.									
Unit-No.	Content		Contact Hour	Learning Outcome				KL		
I	<b>Occupational health:</b> Definition, scope, occupational disease and hazards. Social security and other measures for the protection of occupational hazards, accidents and disease.		<b>3 hours</b>	Learn about occupational health and its protection.				1,2,3		
II	<b>Family planning-</b> Objectives of national Family Planning programmes and Family planning methods. A general idea of advantages and disadvantages of methods. Mental Health – Community aspects of mental health: role of physiotherapists / therapists in Mental Health: Problems such as mental retardation.		<b>6 hours</b>	Learn about family planning, mental health				1,2,3		
III	<b>Health Education</b> Philosophy, Main Principles and Objectives. Methods and Tools of health education: Individual and group methods. International health.		<b>10 hours</b>	Learn about health education, international health				1,2,3,4		



<b>IV</b>	<b>Nutrition and Health:</b> Classification of foods, Nutritional profiles of principal foods, Nutritional problems in public health, Community nutrition programmes. Environment and Health: Components of environment, Water and air pollution and public health: Pollution control, Disposal of waste, Medical entomology	<b>10 hours</b>	Learn about nutrition and environmental health	1,2,3,4,5
<b>V</b>	<b>Hospital waste management:</b> Sources of hospital waste, Health hazards, Waste management. Disaster Management: Natural and man-made disasters, Disaster impact and response, Relief phase, Epidemiologic surveillance and disease control, Nutrition, Rehabilitation, Disaster preparedness. Health problems of Vulnerable group - Pregnant and lactating women, infants and Pre-school children Occupation groups and Geriatrics.	<b>3 hours</b>	Learn about hospital waste management, disaster management, health problems of vulnerable group.	1,2,3,4,5

**TEXT BOOKS:**

1. Textbook of Preventive & Social Medicine, Dr. J E Park
2. IAPSM's Textbook of Community Medicine, AM Kadri

**REFERENCE BOOKS:**

1. Handbook of Community Medicine, Mangala Subramanlan.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Designed to give the student the knowledge, diagnose and manage common health problems at individual and community levels keeping in mind the existing health care.	1,2,3,4,5,6,7,8
2	Acquainted with the principles and components of Occupational and mental health, Family planning, Health Education, Nutrition, Environment, Vulnerable group and Disaster management.	1,2,3,4,5,6,7,8
3	Analyze and interpret health problems and provide community health care services based on the community needs.	1,2,3,4,5,6,7,8
4	Identify groups which require special attention including occupational health, family problem, mental health, nutrition.	1,2,3,4,5,6,7,8
5	Implement health education, established surveillance system, prepare for disaster management and manage human resources.	1,2,3,4,5,6,7,8

### MAPPING TABLE

Course Code: 22BPTO325 R	Course Name: COMMUNITY MEDICINE											
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	3	1	2	1	1	2	2	2	2	1	0
	CO2	2	1	1	1	1	2	1	2	2	1	0
	CO3	1	2	3	2	1	3	2	2	1	2	0
	CO4	1	2	3	1	2	3	2	2	1	2	0
	CO5	1	1	2	1	1	2	2	2	1	2	0
	Average	1.6	1.4	2.2	1.2	1.2	2.4	1.8	2	1.4	1.6	0
	Count	8	7	11	6	6	12	9	8	4	8	0

SEMESTER – VI										
Course Title		DIAGNOSTIC IMAGING FOR PHYSIOTHERAPIST								
Course code:	22BPTO326R	TOTAL CREDITS:2	L	T	P	S	R	O / F	C	
		TOTAL HOURS: 30	2	0	0	0	0	0	2	
PRE-REQUISITE	NIL	CO-REQUISITE	NIL							
Programme	Bachelor in Physiotherapy									
Semester	6th									
Course Objectives	1.Demonstrate knowledge of specified imaging modalities, relevant anatomy, imaging quality assurance and diagnostic decision making. 2.Describe principles of physics and operation of the imaging equipments 3.Practice professional and ethical responsibilities with high degree of credibility, integrity and social concern									
CO1	Identify relevant anatomy on diagnostic images.									
CO2	Classify different types of musculoskeletal imaging and the information gathered.									
CO3	Choose basic strategies for plain film computed tomography and magnetic resonance images.									
CO4	Explain the cost and utilisation issues associated with diagnostic imaging procedures.									
CO5	Utilize the content and relevance of an imaging reports.									
Unit-No.	Content		Contact Hour	Learning Outcome				KL		
I	CHAPTER 4. COMPUTED TOMOGRAPHY (CT) a. What is Computed Tomography? b. Equipment used for Computed Tomography c. Indications and Contra indications d. How it helps in diagnosis e. The Findings in Computed Tomography f. Benefits versus Risks and Costs.		6hours	Students will have a concept of images and differentiation”s				1,2,3		
II	CHAPTER 5. MAGNETIC RESONANCE IMAGING (MRI) a. What is MRI? b. Equipment used for MRI c. Indications and Contra indications d. How it helps in diagnosis e. The Findings in MRI f. Benefits versus Risks and Costs g. Functional of MRI		6 hours	Students will have a gain knowledge of images				1,2,3		

<b>III</b>	CHAPTER 6. ULTRASOUND a. What is Ultrasound? b. Equipment used for Ultrasound c. Indications and Contra indications d. How it helps in diagnosis e. The Findings in Ultrasound f. Benefits versus Risks and Costs.	<b>6hours</b>	Students will have a better knowledge of USG	1,2,3
<b>IV</b>	CHAPTER 7. NUCLEAR MEDICINE a.What is Nuclear Medicine? b.PET and SPECT. b. Equipment used for Nuclear Medicine c. Indications and Contra indications d. How it helps in diagnosis. e. Benefits versus Risks and Costs.	<b>6 hours</b>	Students will have a better knowledge about	1,2,3,4.
<b>V</b>	CHAPTER 8. SPECIAL PROCEDURE a.Introduction b. Indication and contra indication c. contrast used in procedure d. Equipments	<b>6 hours</b>	Students will have a gain knowledge about contrast media and images	1,2,3,4

**Text Book:**

- Christensen's Physics of Diagnostic Radiology (Thomas S. CURRY.III)
- Textbook of Radiology for residents & technicians (S.K.Bhargava)

**Reference book:**

- CLARK'S Positioning in radiography
- Radiological Procedures (Dr. Bhushan N Lakhkar)

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify relevant anatomy on diagnostic images.	1,2,3,4,5,6,7,8
2	Classify different types of musculoskeletal imaging and the information gathered.	1,2,3,4,5,6,7,8
3	Choose basic strategies for plain film computed tomography and magnetic resonance images.	1,2,3,4,5,6,7,8
4	Utilize the content and relevance of an imaging reports.	1,2,3,4,5,6,7,8
5	Utilize the content and relevance of an imaging reports.	1,2,3,4,5,6,7,8

### MAPPING TABLE

Course Code: 22BPT0326 R	Course Name: DIAGNOSTIC IMAGING FOR PHYSIOTHERAPIST											
	CO	P O 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO1	1	1	1	2	2	1	1	2	1	1	1	
CO2	2	2	1	2	2	2	2	2	2	1	2	
CO3	1	1	1	1	1	1	2	2	2	1	2	
CO4	1	1	1	1	1	2	2	2	1	1	1	
CO5	1	2	1	2	2	2	2	1	3	2	2	
Average	1.2	1.4	1	1.6	1.6	1.6	1.8	1.8	1.8	1.2	1.6	
Count	6	7	5	8	8	8	9	9	9	6	8	

SEMESTER – VI										
<b>Course Title</b>	<b>EXTRACURRICULAR ACTIVITIES</b>									
<b>Course code:</b>	<b>22UBEC321</b>	<b>TOTAL CREDITS:1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>	
		<b>TOTAL HOURS:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>	
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL							
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>									
<b>Semester</b>	<b>6th</b>									
<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners									
<b>Course Outcome</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to learn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.									
<b>Content</b>										
AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.										

SEMESTER – VI										
<b>Course Title</b>	<b>BASIC OF PHYSICAL EDUCATION</b>									
<b>Course code:</b>	<b>22BPTO301R</b>	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>	
		<b>TOTAL HOURS: 30</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL							
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>									
<b>Semester</b>	<b>6th</b>									

<b>Course Objectives</b>	1.To introduce the students to the concepts related to the concept of physical education, sports, yoga and lifestyle, Basic of psychology in sports 2. The objective of this course is that after lectures, demonstration, the students will be able to understand the benefits of physical education as needed for the study. 3. The major topics covered are sports injuries, planning in sports, training in sports and psychology in sports which will give a better understanding about various responsibilities of a tournaments.
<b>CO1</b>	The student will able to acquire knowledge of fundamental understanding of physical education particular in the human fitness.
<b>CO2</b>	Acquainted with the understanding of Anxiety and it's types, aggression types, stress types, strength and it's types, endurance and it's types, Aerobic and anaerobic capacity, speed flexibility, co-ordination ability and it's types
<b>CO3</b>	This course explain the various drugs that are prohibited during any sports tournament and its physiological as well as psychological/mental behaviour.
<b>CO4</b>	Acquainted with the understanding of various injuries and help to identify the injuries that takes place during a sports tournament events, and its management.
<b>CO5</b>	Acquired with the knowledge of various exercise approaches such as isometric exercises, isotonic exercises etc.

<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Changing trends and career in physical education & sports -definition and meaning of physical education -Aim and objective of physical education and sports -sports Authority of India (SAI) -Career option available in physical education & sports _khelo india program., nsnis, duties and responsibilities of a coach. and functions.	<b>6hours</b>	Students will have a basic knowledge regarding sports facilities present near them, they will aware regarding SAI, its role and how it works.	1,2,3
<b>II</b>	Training in sports -define and meaning of sports, conditioning and sports training -aims of sports training, systematization of sports, training process -strength and it's types, circuit training -speed, flexibility, Co-ordinative ability and it's types -Technical training, technic, skill and style.	<b>6 hours</b>	Students will have a better knowledge regarding exercises.	1,2,3
<b>III</b>	psychology in sports -Meaning of psychology and sports psychology -Anxiety and it's types, causes of anxiety -aggression, types, causes and role of aggression in sports -stress, types of stress -Long term and short term psychological preparation for the competition	<b>6 hours</b>	Students will have a better understanding regarding different approaches in a tournament.	1,2,3

IV	Planning in sports -Meaning and objective of planning -Tournament-knockout, league or round-robin & combination tournament -procedure to draw fixtures-knockout(bye and seeding) & league (staircase & cyclic methods) -Intramural and extramural competition, meaning and objective	6 hours	Students will have a better understanding regarding planning in tournaments and management.	1,2,3
V	Sports injuries -sports injuries:classification, causes and prevention -Rice treatment -Management of injuries:soft tissue injuries;abrasion, contusion, laceration,incision, sprain and strain, bone and joint injuries; dislocation, fractures. -Doping in sports; Concept of doping and blood doping List of selected drugs Prohibited substances used in sports Wada in sports	6 hours	Students will have a better understanding regarding different injuries that can take place in a sports tournament and certain drugs which are prohibited in a tournament.	1,2,3

**TEXT BOOKS:**

- 1 .Health and physical education by Dr VK Sarma
- 2.Life time Physical fitness and wellness by WERNER W. K. HOEGER.

**REFERENCE BOOKS:**

- 1.Basic of physical education and health
2. Fundamental of physical education by Mr Ajay Dhankar and Dr Birendra jhanjharia
3. Essential of physical education by Ajmer singh

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome



1	The student will able to acquire knowledge of fundamental understanding of physical education particular in the human fitness.	1,2,3,4,5,6,7,8
2	Acquainted with the understanding of Anxiety and it's types, aggression types, stress types, strength and it's types, endurance and it's types, Aerobic and anaerobic capacity, speed flexibility, co-ordination ability and it's types	1,2,3,4,5,6,7,8
3	This course explain the variousdrugsthatareprohibitedduringanysportstournamentanditsphysiologicalaswellaspsychological/mentalbehaviour.	2,3,4,7,8
4	Acquainted with the understanding of various injuries and help to identify the injuries that takes place during an sports tournament events, and its management.	1,2,4,5,6,7,8
5	Acquired with the knowledge of various exercise approaches such as isometric exercises, isotonic exercises etc.	1,2,3,4,7,8

SEMESTER – VI										
<b>Course Title</b>	<b>INTRODUCTION TO PHYSICAL FITNESS AND WELLNESS</b>									
<b>Course code:</b>	<b>22BPTO304R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>	
		<b>2</b>								
		<b>TOTAL HOURS:</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL							
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>									
<b>Semester</b>	<b>6th</b>									
<b>Course Objectives</b>	1.To make the students aware about the basics of Physical Fitness & wellness 2. To develop knowledge on societies Health Care Delivery System including their hygiene & prevention of diseases.									

<b>CO1</b>	Students will understand the Health status and strategy to be adopted in the society.			
<b>CO2</b>	Students will learn an overview of fitness and physical health. Student will participate in physical Activities and learn to assess various health parameters			
<b>CO3</b>	They will also gain knowledge about nutrition, weight management, increasing cardiovascular endurance in order to have a fit and healthy life			
<b>CO4</b>	Students will gain knowledge about creating an environment that cultivates movement			
<b>CO5</b>	Students will gain knowledge regarding values of health and exercise.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Physical Fitness and Wellness Nutrition for Wellness	<b>6</b>	By the end of the of the unit students will have clear knowledge about dimensions of wellness and importance of nutrition for maintaining wellness	1,2,3
<b>II</b>	Body Composition Weight Management	<b>6</b>	By the end of the of the unit students will know about body's composition with keeping an emphasis on weight management	1,2,3
<b>III</b>	Cardiorespiratory Endurance Muscular Strength and Endurance	<b>6</b>	By the end of the of the unit students will be able to discuss about cardiovascular endurance strength and also muscular strength and endurance	1,2,3,4
<b>IV</b>	Muscular Flexibility	<b>6</b>	By the end of the of the unit students will know about the individual's flexibility and its importance	1,2,3,4,5
<b>V</b>	Preventing Cardiovascular Disease Stress Management	<b>6</b>	By the end of the of the unit students will have clear knowledge about the prevention of cardiovascular diseases, and importance of stress management	1,2,3,4,5

**TEXT BOOKS:**

1. Life-time Physical Fitness and Wellness by WERNER W. K. HOEGER And SHARON A. HOEGER

**REFERENCE BOOKS:**

1. ACSM guidelines

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	<b>Students will understand the Health status and strategy to be adopted in the society.</b>	<b>1,2,3,4,5,6,7,8</b>
<b>2</b>	<b>Students will learn an overview of fitness and physical health. Student will participate in physical Activities and learn to assess various health parameters</b>	<b>1,2,3,4,5,6,7,8</b>

3	They will also gain knowledge about nutrition, weight management, increasing cardiovascular endurance in order to have a fit and healthy life	1,2,3,4,7,8
4	Students will gain knowledge about creating an environment that cultivates movement	1,2,4,5,6,7,8
5	Students will gain knowledge regarding values of health and exercise.	1,2,3,4,7,8

SEMESTER – VI									
<b>Course Title</b>	<b>PROSTHETICS &amp; ORTHOTICS</b>								
<b>Course code:</b>	22BPTO317R	<b>TOTAL CREDITS:</b> 1	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>
		<b>TOTAL HOURS:</b> 30	0	0	2	0	0	0	1
<b>PRE-REQUISITE</b>	BIOMECHANICS, EXERCISE THERAPY, ANATOMY	<b>CO-REQUISITE</b>	CLINICAL ORTHOPAEDICS & TRAUMATOLOGY						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>6th</b>								
<b>Course Objectives</b>	<b>Introduction to this subject explains about the prosthetics and orthotics , how to solve problems in workplace and in activities of daily living. The objective of this subject is to make the disabled person independent in their daily activities.</b>								
<b>CO1</b>	Understand the principles and effects of Prosthetics & Orthotics in maintaining the functional abilities.								
<b>CO2</b>	Knowledge and understanding of Prosthetics will be able to help students to know the importance of prostheses after amputation.								
<b>CO3</b>	Advice proper orthoses to the patients to prevent from default posture and DEFORMITIES								
<b>CO4</b>	Advice proper orthoses in congenital deformities.								
<b>CO5</b>	Refer for advance orthoses and prostheses.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	Introduction to Prosthetics & orthotics <ul style="list-style-type: none"> <li>Definitions of various terminologies, brief Historical development in India, Various materials used in Orthotics.</li> </ul>	6	To learn about the basics of Prosthetics & orthotics				1,2,3		

II	Different types of Prostheses & Orthoses in lower limb <ul style="list-style-type: none"> <li>● Conventional foot. Rocker, SACH foot, modified SACH Foot. Jaipur Foot, Seattle foot, Flex foot, Quantum foot, Peg Roelite foot, Carbon copy foot, Syme's, trans tibial</li> <li>● AFO (Ankle foot orthosis): Conventional AFO-, Plastic AFO (custom moulded), Articulated A.F.O &amp; various types of ankle joints Club foot Orthosis: Orthotic management of CTEV, Ankle support Orthotic management of Anesthetic Foot. Orthosis for the management of fracture below knee.</li> </ul>	6	To learn about the Different types of Prostheses & Orthoses in lower limb	1,2,3
III	Different types of Prostheses & Orthoses in upper limb <ul style="list-style-type: none"> <li>● Prostheses used after amputation</li> <li>● Orthoses – splints and braces</li> <li>● Spinal orthoses</li> </ul>	6	To learn about the various types of Prostheses & Orthoses in upper limb	1,2,3,4
IV	Study of prosthetic feet and shoe modifications <ul style="list-style-type: none"> <li>● Single axis, Double axis, Multi-axial foot, other kinds of feet etc. Heel Height adjustment, Adjustable ankle, various kinds of ankle mechanisms.</li> <li>● Medial/Lateral raise (Inside /outside shoe), M.T. Bar (Inside / Outside shoe), Arch support, Meta tarsal pad, Calcaneal heel wedge, Heel raise, Thomas Heel, Heel pad for Calcaneal spur, Various types of Arch Supports , Various types of Foot Orthoses for diabetic feet and other sensory deficiencies</li> </ul>	6	To learn about the prosthetic feet and shoe modifications	1,2,3,4,5
V	Gait Deviations and Analysis <ul style="list-style-type: none"> <li>● Person with Chopart, Symes, Trans-tibial prosthesis. Check-Out Procedures with Chopart, Symes &amp; Trans-tibial prosthesis.</li> </ul>	6	To learn about the Gait Deviations of amputated person	1,2,3,4,5

**TEXT BOOKS:**

Orthotics and Prosthetics in Rehabilitation by Kevin C Chui Milagros Jorge Sheng-Che Yen Michelle M. Lusardi, Elsevier - Health Sciences Division

**REFERENCE BOOKS:**

1. Textbook of Rehabilitation by S Sunder



	<b>CO5</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>
	<b>Average</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2.8</b>	<b>2.8</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2.8</b>	<b>1.8</b>	<b>1.8</b>
	<b>Count</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>14</b>	<b>14</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>14</b>	<b>9</b>	<b>9</b>

<b>SEMESTER – VI</b>												
<b>Course Title</b>	<b>PHYSICAL AND FUNCTIONAL DIAGNOSIS</b>											
<b>Course code:</b>	<b>22BPT0328R</b>	<b>TOTAL CREDITS:</b> <b>1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O / F</b>	<b>C</b>			
			<b>TOTAL HOURS:</b> <b>60</b>	0	0	0	4	0	0	1		
<b>PRE-REQUISITE</b>	Clinical Ortho Clinical Neuro	<b>CO-REQUISITE</b>	Electrotherapy									
<b>Programme</b>	Bachelor in Physiotherapy											
<b>Semester</b>	6th											
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li><b>1. To introduce the students the concept related to clinical conditions.</b></li> <li><b>2. To introduce the students the concept related to diagnosis and treatment.</b></li> <li><b>3. To introduce the students about the electrotherapeutic modalities.</b></li> </ol>											
<b>CO1</b>	Student should be able to understand about clinical decision making and vital signs assessment.											
<b>CO2</b>	Student should be able to understand about Functional assessment and Electrodiagnosis											
<b>CO3</b>	Assessing and planning Physiotherapy interventions of various clinical conditions.											
<b>CO4</b>	Re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.											
<b>CO5</b>	Learn the Special test required for diagnosis.											
<b>Unit-No.</b>	<b>Content</b>						<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>

<b>I</b>	<ul style="list-style-type: none"> <li>● Clinical Decision Making – Planning Effective Treatment. Clinical decision making models, Team approach, Foundation for clinical decision making.</li> <li>● Vital Signs. Identification of reasons for monitoring vital signs; importance of monitoring vital signs; common techniques of monitoring vital signs; identification and analysis of normal values with that of abnormal values.</li> <li>● Principles and application of investigative and imaging techniques in Physiotherapy</li> <li>● Blood test</li> <li>● Arterial Blood Gas (ABG) analysis</li> <li>● Pulmonary Function Test (PFT)</li> <li>● Radiological examination</li> <li>● Computerized Tomography (CT)</li> <li>● Magnetic Resonance Imaging (MRI)</li> <li>● Ultrasonography (US)</li> <li>● Electrocardiography (ECG)</li> </ul> <p>Dope testing</p>	<b>15</b>	<p>Student should be able to understand about clinical decision making and vital signs assessment</p>	<p>1,2,3</p>
<b>II</b>	<p>Evaluation assessment and treatment planning strategies for musculoskeletal, neurological, cardiopulmonary, sports specific and other physiotherapy conditions: Principles of evaluation, clinical manifestations, general and specific clinical examination.</p> <p>Physiotherapy assessment of the following:</p> <p>Range of motion (ROM)  Tone  Muscular strength and endurance  Flexibility  Coordination  Non equilibrium test  Equilibrium test</p>	<b>10</b>	<p>Student should be able to understand about Functional assessment and Electro diagnosis</p>	<p>1,2,3</p>



<b>III</b>	Functional Evaluation Various scoring methods in functional assessment Validity and reliability Fitness evaluation Aerobic Anaerobic  Assessment of cognitive, perceptual dysfunctions and vestibular dysfunction	<b>15</b>	The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions.	1,2,3,4
<b>IV</b>	Electro-Diagnosis: Characteristics and components of Electro therapeutic stimulation systems and Electro physiological assessment devices. Instrumentation for neuromuscular electrical stimulation. Electrical properties of muscle and nerve. Neurobiology of afferent pain transmission and central nervous system mechanisms of pain modulation. Electrical stimulation and circulation. Clinical Electro physiological testing: Instruments, Techniques and Interpretations of: Nerve conduction velocity including Repetitive Nerve Stimulation (RNS) Electromyography Bio-feedback technique	<b>10</b>	. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.	1,2,3,4,5
<b>V</b>	Concepts of electro physiological studies in neuro muscular diseases as a diagnostic and therapeutic tool. Evoked potentials – VEP, SSEP, MEP, BAEP	<b>10</b>	. Student should learn the Special test required for diagnosis.	1,2,3,4,5,6

**TEXT BOOKS:**

**REFERENCE BOOKS:**

1. Manual of nerve conduction velocity techniques – De Lisa, Raven Press.
2. Electro-diagnosis in disease of nerve and muscle – Kimura J, F.A. Davis
3. Clinical Electromyography and Nerve Conduction Studies – Shin J.OH, Williams & Wilkins.
4. Clinical Neurophysiology – Nerve conduction, Electromyography and Evoked Potentials – Mishra & Kalita, Churchill Livingstone.
5. A Practical Treatise On Electro-Diagnosis in Diseases of the Nervous System by Alexander Hughes Bennet (Jan 10, 2010)
6. Introduction to Surface Electromyography, Second Edition by Jeffrey R. Cram (Mar 16, 2010)

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping									
SN	Course Outcome (CO)				Mapped Program Outcome				
Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	Student should be able to understand about clinical decision making and vital signs assessment.	1,2,3,4,5,6,7,8							
2	Student should be able to understand about Functional assessment and Electrodiagnosis	1,2,3,4,5,6,7,8							
3	Assessing and planning Physiotherapy interventions of various clinical conditions.	1,2,3,4,5,6,7,8							
4	Re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.	1,2,3,4,5,6,7,8							
5	Learn the Special test required for diagnosis.	1,2,3,4,5,6,7,8							

### MAPPING TABLE

Course Name: PHYSICAL AND FUNCTIONAL DIAGNOSIS												
Course Code: 22BPTO3 28R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	3	3	3	3	3	3	3	3	3	3	2
	CO2	3	3	3	3	3	3	3	3	3	3	2
	CO3	3	3	3	3	3	3	3	3	3	3	2
	CO4	3	3	3	3	3	3	3	3	3	3	2
	CO5	3	3	3	2	2	3	3	3	2	2	1
	Average	3	3	3	2.8	2.8	3	3	3	2.8	2.8	1.8
	Count	15	15	15	14	14	15	15	15	14	14	9

22BPTO321R	CLINICAL ORTHOPAEDICS AND TRAUMATOLOGY	2	3	3	2	2	2	3	3
22BPTO322R	CLINICAL NEUROLOGY AND NEUROSURGERY	2	3	3	2	2	2	3	3
22BPTO323R	GENERAL MEDICINE	1	3	3	1	1	1	2	3
22BPTO324R	GENERAL SURGERY	1	2	1	1	1	1	2	3
22BPTO325R	COMMUNITY MEDICINE	1	2	1	1	1	1	2	3
22BPTO326R	DIAGNOSTIC IMAGING FOR PHYSIOTHERAPIST	3	2	2	1	1	1	3	3
22BPTO327R	PROSTHETICS AND ORTHOTICS	2	2	2	2	1	1	3	3
22BPTO302R	GENERIC /OPEN/UNIVERSITY ELECTIVE	1	1	1	2	0	0	2	3
22UBCC321	CO-CURRICULAR	0	0	2	1	2	2	1	2
22UBEC321	EXTRA CURRICULAR	0	0	2	1	2	2	1	2
22BPTO328R	PHYSICAL AND FUNCTIONAL DIAGNOSIS	2	2	2	1	1	1	2	3
22BPT329R	CLINICAL POSTING BASED PROJECT	3	3	2	1	1	1	3	3

**SEMESTER – VII**

<b>Course Title</b>	<b>PT IN ORTHOPEDICS CONDITIONS</b>								
<b>Course code</b>	<b>22BPTO411R</b>	<b>TOTAL CREDITS: 4</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS: 30T+60P</b>	2	0	4	0	0	0	4
<b>PRE-REQUISITE</b>	Human anatomy, Human Physiology, Biomechanics of Human Motion	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>7th</b>								

<b>Course Objectives</b>	<p>1. To introduce the students to the concepts related PT assessment for orthopedic conditions, Objective, Fractures, Palpation, Specific fracture in dislocations.</p> <p>2. To introduce the students to the concepts related Degenerative and inflammatory conditions.</p> <p>3. To introduce the students to the concepts related Infective conditions, Deformities, Poliomyelitis</p>			
<b>CO1</b>	Acquire knowledge in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.			
<b>CO2</b>	Identify disabilities due to musculoskeletal dysfunctions, also about the pathophysiology associated risk factor with its management .			
<b>CO3</b>	Plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function.			
<b>CO4</b>	Plan pre and post operative physiotherapy assessment, goals, precautions and PT management.			
<b>CO5</b>	Plan, prescribe and acquire the skill of executing of short and long PT treatment by selecting appropriate treatment tools for maximum functional independence in ADL at home and work place.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<p>PT assessment for orthopedic conditions – SOAP format, SUBJECTIVE,- history taking, informed consent, personal history, past history, medical history, socio-economical history, chief complains, history of present illness, pain assessment – intensity ,character, aggravating factors, relieving factors, site and location.</p> <p>OBJECTIVE: On Observation- body built, swelling, muscles atrophy, deformities, and attitude of limb, posture and gait. On PALPATION: Tenderness, grades, muscle spasm, swelling- methods of swelling assessment. Bony prominence, soft tissue texture and integrity, vasomotor disturbances. On Examination: ROM-Active and passive, resisted isometric test, limb length- apparent true and segmental, girth measurement, muscle length testing, muscle tightness, contracture and flexibility, manual muscle testing, peripheral neurological examination- dermatomes ,myotomes and reflexes, Investigation, Special test and functional test, prescription of home programme, documentation of the case records</p>	5	<p>1. This student will gain knowledge in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.</p> <p>2. The student will be able to identify disabilities due to musculoskeletal dysfunctions.</p> <p>3. The student will be able to plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function</p>	1,2,3,4

<p><b>II</b></p>	<p><b>FRACTURES-</b> Types, classification, signs, symptoms, complications, fracture healing factors affecting fracture healing. Principles of fracture management- reduction-open and closed, immobilization, sling, cast, brace, slab, traction, manual, mechanical, skin, skeletal, lumbar and cervical traction, external fixation, functional cast bracing, PT management in complications early and late-shock, compartment syndrome , VIC, Fat embolism, delayed and malunion, RSD , myositis ossification, AVN, Pressure sores etc, Physiotherapy assessment in fracture cases ,Aims of PT management in fracture cases ,Short and long term goal, Principles of PT management in fractures-guidelines for fracture treatment during period of immobilization and guideline for treatment after immobilization period.  <b>SPECIFIC FRACTURE IN DISLOCATIONS:</b> PT assessment and management of upper limb fractures and dislocations. PT assessment and management of lower limb fractures and dislocations including pelvic. PT assessment and management of spinal fractures. Selection and application of physiotherapeutic techniques, maneuver's, modalatie for preventive, curative and rehabilitative means in all conditions.</p>	<p>11</p>	<ol style="list-style-type: none"> <li>1. This student will gain knowledge in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.</li> <li>2. The student will be able to identify disabilities due to musculoskeletal dysfunctions.</li> <li>3. The student will be able to plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function</li> </ol>	<p>1,2,3</p>
<p><b>III</b></p>	<p>Principles of various schools of thought in manual therapy (briefly Maitland and Mckenzie)  <b>DEGENERATIVE AND INFLAMMATORY CONDITIONS:</b> definition , signs and symptoms, clinical features ,path physiology , radiological features, medical and surgical management , Describe PT assessment and management for following conditions- Osteoarthritis –emphasis mainly on knee, hip and hand , rheumatoid arthritis , ankylosing spondylitis, gout , perthes disease , pariarhritic shoulder.  <b>INFECTIVE CONDITIONS:</b> definition, signs and symptoms, clinical features , pathophysiology, radiological features , medical and surgical management for following conditions- osteomyelities- acute and chronic, septic arthritis , pyogenic arthritis , TB spine and major joints –knee and hip.</p>	<p>8</p>	<ol style="list-style-type: none"> <li>1. This student will gain knowledge in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.</li> <li>2. The student will be able to identify disabilities due to musculoskeletal dysfunctions.</li> <li>3. The student will be able to plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function</li> </ol>	<p>1,2,3,4,5</p>

<p><b>IV</b></p>	<p>Define, review the postural abnormalities of spine column, clinical features , deformities, medical and surgical management. Describe PT assessment and management and home program.  <b>DEFORMITIES:</b> Review in detail the causes, signs and symptoms, radiological features, medical and surgical management. Describe the PT . Assessment and management of the following conditions.  <b>Congenital:</b> CTEV , CDH, torticollis, pesplanus, pescavus and other common deformities  <b>Acquired:</b> Scoliosis, Kyphosis, Coxavara, Genuvarum, valgum and recurvatum.</p>	<p>5</p>	<ol style="list-style-type: none"> <li>1. This student will gain knowledge in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.</li> <li>2. The student will be able to identify disabilities due to musculoskeletal dysfunctions.</li> <li>3. The student will be able to plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function</li> </ol>	<p>2,3,4,5,6</p>
<p><b>V</b></p>	<p><b>Cerebral Palsy:</b> definition, etiology, classification, clinical features, complications, deformities, medical and surgical management and home programme with special emphasis on carrying techniques.PT management after surgical conection.  <b>POLIOMYEELITIS:</b> Definition, etiology, types, pathophysiology, cliniacal features, deformit ies, medical and surgical management. PT. Assessment and management after surgical connections and reconstructive surgeries- Emphasis on tendon transfer and home programme.</p>	<p>4</p>	<ol style="list-style-type: none"> <li>1. This student will gain knowledge in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.</li> <li>2. The student will be able to identify disabilities due to musculoskeletal dysfunctions.</li> <li>3. The student will be able to plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function</li> </ol>	<p>3,4,5,6</p>
<p><b>PRACTICAL</b></p>	<p>Practical shall be conducted for all the relevant topics discussed in theory in the following forms:</p> <ol style="list-style-type: none"> <li>1. Bedside case presentations and case discussions</li> <li>2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.</li> </ol>	<p>60</p>	<p>The objective of the course is that after the specified hours of practicals and demonstrations the student will be able to practice, demonstrate and apply various treatment techniques in musculoskeletal conditions.</p>	<p>1,2,3,4,5</p>

**TEXT BOOKS:**

1. Tidy's physiotherapy
2. Clinical orthopaedic rehabilitation- Brotzman.
3. Textbook of orthopaedics-cash

**REFERENCE BOOKS:**

1. Orthopaedic physiotherapy- jayantjoshi.
2. Physical rehabilitation assessment and treatment

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Acquire knowledge in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.	<b>1,2,3,4,5,6,7,8</b>
<b>2</b>	Identify disabilities due to musculoskeletal dysfunctions, also about the pathophysiology associated risk factor with its management .	<b>1,2,3,4,5,6,7,8</b>
<b>3</b>	Plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function.	<b>1,2,3,4,5,6,7,8</b>
<b>4</b>	Plan pre and post operative physiotherapy assessment, goals, precautions and PT management.	<b>1,2,3,4,5,6,7,8</b>
<b>5</b>	Plan, prescribe and acquire the skill of executing of short and long PT treatment by selecting appropriate treatment tools for maximum functional independence in ADL at home and work place.	<b>1,2,3,4,5,6,7,8</b>

## MAPPING TABLE

Course Name: PT IN ORTHOPEDICS CONDITIONS												
Course Code: 22BPTO411 R	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO1	3	2	3	1	1	2	2	2	3	1	2	
CO2	2	2	1	2	1	2	1	2	2	1	1	
CO3	3	2	2	2	2	2	2	2	3	1	1	
CO4	2	1	2	1	1	2	2	2	3	1	1	
CO5	2	2	2	1	2	2	2	2	3	2	1	
Average	2.4	1.8	2	1.4	1.4	2	1.8	2	2.8	1.2	1.2	
Count	12	9	10	7	7	10	9	10	14	6	6	

### SEMESTER – VII

SEMESTER – VII									
Course Title	PT IN NEUROLOGICAL CONDITIONS								
Course code	22BPTO412R	TOTAL CREDITS: 4	L	T	P	S	R	O/ F	C
			TOTAL HOURS: 30T+60P	2	0	4	0	0	0
PRE-REQUISITE	Human Anatomy, Human Physiology, Exercise therapy, Electro therapy, Clinical Neurology	CO-REQUISITE	Community based Rehabilitation.						
Programme	Bachelor in Physiotherapy								
Semester	7 <sup>th</sup>								
Course Objectives	1. To introduce the students to the concepts related Neurological Assessment : Observation, palpation, Higher mental function, Motor examination, Reflexes, Sensory examination, Balance examination. 2. To impart the students to the concepts related knowledge in neurology and neurosurgery with skills to apply these in clinical situation of dysfunction and neurological pathology. 3. To introduce the students to the concepts related knowledge to plan and set treatment goals and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore neurological functions.								
CO1	Equipped with knowledge in neurology and neurosurgery skills to apply these in clinical situation of dysfunction and neurological pathology.								
CO2	Identify disabilities due to neurological dysfunction.								
CO3	Plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore neurological functions.								



<b>CO4</b>	Acquired with the knowledge of normal neurodevelopment, with specific reference to locomotion			
<b>CO5</b>	Advice & give parents education in Neuro-pediatric care.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<p><b>Neurological Assessment:</b></p> <p>I. Required materials forex amination</p> <p>ii.Chief complaints</p> <p>iii. History taking- present, past, medical, familial, personal histories</p> <p>iv.Observation, palpation</p> <p>v.Higher mental function- consciousness, orientation, wakefulness, memory, speech, reading, language, writing, calculations, perception, left right confusion, reasoning and judgement.</p> <p>vi. Motor examination- muscle power, muscle tone, spasticity ,flaccidity</p> <p>vii. Reflexes- developmental, superficial, deep tendon reflexes</p> <p>viii.Sensory examination- superficial, deep, cortical sensations</p> <p>ix.Special tests- Romberg’s test, kernig’s sign, battle’s sign, glabellar tap signetc</p> <p>x.Balance examination, co – ordinationexamination</p> <p>xi.Gait analysis- kinetics and kinematics (quantitative and qualitativeanalysis)</p> <p>xii.Functional analysis, assessment tools and scales- modified ash worth scale, berg balance scale, FIM scale. Barthel index, GCS, Mini Mental state examination, Rancho Los Amigos Scale for head injury, APGAR score, ASIA Scale, Reflex grading, Differential diagnosis</p>	19 Hrs	The students should be able to do a proper and detailed assessment of Neurological conditions.	1,2,3,4
<b>II</b>	<p>Neuro physiological Techniques:</p> <p>i. Concepts, principles, Techniques</p> <p>ii. Effects of following Neuro physiological Techniques–</p> <p>NDT, PNF, Roods sensory motor approach, Sensory Integration Approach, Brunnsstorm movement therapy, MRP, Contemporary task oriented approach, Muscle re-education approach and constraint induced movement therapy</p>	19 Hrs	The students should be able to demonstrate and perform various Neuro physiological techniques.	1,2,3

<b>III</b>	Paediatric Neurology: i)Paediatric examination, developmental milestones, developmental reflexes ii)Neuro developmental screening tests iii)History , observation, palpation, milestone examination, motor and sensory examination, reflex testing, differential diagnosis, balance and co- ordination examination iv)Gait analysis- functional analysis, list of problems and complications, short and long term goals v)Management of systemic complications, management of mechanical complications vi)Use of various neurophysical approaches and modalities in risk babies, minimum brain damage, developmental disorders, CP, Autism, Down's Syndrome ,Hydrocephalus, Chorea, Spina bifida, Syringomyelia	18 Hrs	The students should be able to do a proper and detailed assessment and techniques of management of Paediatric Neuro Conditions.	1,2,3,4,5
<b>IV</b>	Evaluation and management of Brain & Spinal cord Disorders: i)History, observation, palpation, higher mental function, Cranial nerve examination, motor and sensory examination, reflex testing, differential diagnosis, balance and co- ordination examination ii)Gait analysis- functional analysis, list of problems and complications, short and long termgoals iii)Management of systemic complications, management of mechanical complications	18 Hrs	The students should be able to do a detailed assessment and management of Brain and Spinal cord Disorders.	2,3,4,5,6
<b>V</b>	Use of various neurophysical approaches and modalities in CVA, Meningitis, Encephalitis, Head injury, Brain tumours, Perpetual disorders, Amyotrophic lateral Sclerosis, Multiple Sclerosis	16 Hrs	The students should be able to demonstrate the uses of various neurophysical approaches and modalities.	1,2,3,4,5,6
<b>PRACTICAL</b>	Practical shall be conducted for all the relevant topics discussed in theory in the following forms: 1. Bedside case presentations and case discussions 2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.	60	The objective of the course is that after the specified hours of practicals and demonstrations the student will be able to practice, demonstrate and apply various treatment techniques in neurological conditions.	1,2,3,4,5

**TEXT BOOKS:**

1. Tidy's physiotherapy
2. Cash's Textbook of Neurology for physiotherapists

**REFERENCE BOOKS:**

1. Neurological rehabilitation by DUmphred.
2. Physical rehabilitation Assessment and treatment – O' Sullivan Schmitz

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Equipped with knowledge in neurology and neurosurgery skills to apply these in clinical situation of dysfunction and neurological pathology.	<b>1,8</b>
<b>2</b>	Identify disabilities due to neurological dysfunction.	<b>1,2 &amp; 8</b>
<b>3</b>	Plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore neurological functions.	<b>3,6&amp;8</b>
<b>4</b>	Acquired with the knowledge of normal neurodevelopment, with specific reference to locomotion	<b>1,8</b>
<b>5</b>	Advice & give parents education in Neuro-pediatric care.	<b>7,8</b>

	<b>Course Name: PT IN NEUROLOGICAL CONDITIONS</b>											
<b>Course Code:</b>	<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>

**MAPPING TABLE**

<b>22BPTO412R</b>	<b>CO1</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>3</b>
	<b>CO2</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>2</b>
	<b>CO3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>1</b>
	<b>CO4</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>
	<b>CO5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>3</b>
	<b>Average</b>	<b>1.8</b>	<b>0.4</b>	<b>0.6</b>	<b>0</b>	<b>0</b>	<b>0.4</b>	<b>0.6</b>	<b>1</b>	<b>3</b>	<b>1.6</b>	<b>2.4</b>
	<b>Count</b>	<b>9</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>5</b>	<b>15</b>	<b>8</b>	<b>12</b>

**SEMESTER – VII**

<b>Course Title</b>	<b>PT IN CARDIOTHORACIC CONDITIONS AND GENERAL CONDITION</b>										
<b>Course code</b>	<b>22BPTO413R</b>	<b>TOTAL CREDITS: 4</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>		
		<b>TOTAL HOURS: 30T+60P</b>	2	0	4	0	0	0	4		

<b>PRE-REQUISITE</b>	Human Anatomy, Human Physiology, Exercise therapy, Electro therapy.	<b>CO-REQUISITE</b>	NIL	
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>			
<b>Semester</b>	7 <sup>th</sup>			
<b>Course Objectives</b>	1. To introduce the students to the concepts related Cardiopulmonary system, Anatomical & physiological differences, Physiotherapy techniques, Drug Therapy. 2. To impart the students to the concepts related Investigations and tests of Cardiopulmonary system. 3. To make the students understand about the concepts related general health conditions..			
<b>CO1</b>	Apply the knowledge in assessing and planning Physiotherapy interventions for various cardiothoracic general, medical, and surgical conditions.			
<b>CO2</b>	Monitor patients' vital signs and provide appropriate interventions to patients.			
<b>CO3</b>	Assess the patient as necessary, to monitor the patient regarding treatment.			
<b>CO4</b>	Learn to select strategies for a cure, care & prevention; adopt restorative & rehabilitative measures for maximum possible functional independence of a patient at home, workplace & in the community.			
<b>CO5</b>	Learn to execute effective Physio therapeutic measures with appropriate clinical reasoning to improve general surgical & medical conditions.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Applied anatomy & physiology of cardiopulmonary system Anatomical & physiological differences between adult & pediatric cardiopulmonary system	7	1. The students will have the knowledge in assessing and planning Physiotherapy interventions of various cardiothoracic general, medical and surgical conditions.  2. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment.  3. The students will have the knowledge in monitor patient's vital sign and to provide appropriate interventions to patient.	1,2,3,4

<p><b>II</b></p>	<p>Bedside assessment of the patient- Adult &amp; Pediatric</p> <p>Investigations and tests-</p> <p>a. Exercise tolerance testing- Cardiac &amp; pulmonary</p> <p>b. Radiographs</p> <p>c. Pulmonary Function Test</p> <p>d. Arterial Blood Gases</p> <p>e. ECG</p> <p>f. Haematological &amp; Biochemical tests</p>	<p>10</p>	<p>1. The students will have the knowledge in assessing and planning Physiotherapy interventions of various cardiothoracic general, medical and surgical conditions.</p> <p>2. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment.</p> <p>3. The students will have the knowledge in monitor patient's vital sign and to provide appropriate interventions to patient.</p>	<p>1,2,3</p>
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<p><b>III</b></p>	<p>Physiotherapy techniques to increase lung volume-</p> <ul style="list-style-type: none"> <li>a. controlled mobilization, positioning, breathing exercises</li> <li>b. Neurophysiological Facilitation of Respiration</li> <li>c. Mechanical aids- Incentive Spirometry, CPAP,IPPB</li> </ul> <p>Physiotherapy techniques to decrease the work of breathing-</p> <ul style="list-style-type: none"> <li>a. Measures to optimize the balance between energy supply and demand, positioning</li> <li>b. Breathing re-education- Breathing control techniques</li> <li>c. Mechanical aids- IPPB,CPAP,BIPAP</li> </ul> <p>Physiotherapy techniques to clear secretions-</p> <ul style="list-style-type: none"> <li>a. Hydration, Humidification &amp; Nebulization</li> <li>b. Mobilization &amp; Breathing exercises</li> <li>c. Postural drainage</li> <li>d. Manual techniques- Percussion, Vibration &amp; Shaking, Rib Springing, ACBT, Autogenic Drainage</li> <li>e. Mechanical Aids-PEP, Flutter,IPPB</li> <li>f. Facilitation of Cough &amp; Huff</li> <li>g. Nasopharyngeal Suctioning</li> </ul> <p>Drug Therapy-</p> <ul style="list-style-type: none"> <li>a. Drugs to prevent and treat inflammation</li> <li>b. Drugs to treat Bronchospasm</li> <li>c. Drugs to treat Breathlessness</li> <li>d. Drugs to help sputum clearance</li> <li>e. Drugs to inhibit coughing</li> <li>f. Drugs to improve ventilation</li> <li>g. Drugs to reduce pulmonary hypertension</li> <li>h. Drug delivery dozes</li> <li>i. Inhalers &amp; Nebulizers</li> </ul>	<p>15</p>	<ol style="list-style-type: none"> <li>1. The students will have the knowledge in assessing and planning Physiotherapy interventions of various cardiothoracic general, medical and surgical conditions.</li> <li>2. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment.</li> <li>3. The students will have the knowledge in monitor patient's vital sign and to provide appropriate interventions to patient.</li> </ol>	<p>1,2,3,4,5</p>
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<p><b>IV</b></p>	<p>Management of wound ulcers-</p> <ul style="list-style-type: none"> <li>a. Care of ulcer and wounds</li> <li>b. Care of surgical scars- UVR and other electrotherapeutics for healing of wounds</li> <li>c. Prevention of Hyper granulated Scars, Keloids</li> <li>d. Electrotherapeutic measures for relief of pain during mobilization of scar tissues</li> </ul>	<p>7</p>	<ol style="list-style-type: none"> <li>1. The students will have the knowledge in assessing and planning Physiotherapy interventions of various cardiothoracic general, medical and surgical conditions.</li> <li>2. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment.</li> <li>3. The students will have the knowledge in monitor patient's vital sign and to provide appropriate interventions to patient.</li> </ol>	<p>2,3,4,5,6</p>
<p><b>V</b></p>	<p>Physiotherapy in Dermatology-</p> <ul style="list-style-type: none"> <li>a. Documentation of assessment, treatment and follow up of skin Conditions</li> <li>b. U.V.R in various skin conditions: Vitiligo, Hair loss, Pigmentation, Infected wound ulcers</li> <li>c. Faradic foot bath for Hyper hydrosis</li> <li>d. Massage maneuvers for cosmetic purposes of skin- use of specific oil as medium</li> <li>e. Care of anaesthetic hand &amp; foot</li> </ul> <p>Evaluation, planning and management of leprosy- prescription, fitting and training with prosthetic and orthotic devices</p> <p>Neonatal &amp; Pediatric Physiotherapy-</p> <ul style="list-style-type: none"> <li>a. Chest physiotherapy for children</li> <li>b. The Neo natal unit</li> <li>c. Modifications of Chest Physiotherapy for specific Neonatal disorders</li> <li>d. Emergencies in the Neo natal unit</li> </ul> <p>Introduction to ICU-</p> <ul style="list-style-type: none"> <li>a. ICU Monitoring- Apparatus, Airways &amp; Tubes used in the ICU</li> <li>b. Physiotherapy in the ICU</li> <li>c. Common conditions in the ICU- Tetanus, Head injury, Lung disease, Pulmonary Oedema, Multiple Organ Failure, Neuromuscular Disease, Smoke Inhalation, Poisoning, Aspiration, Near Drowning, ARDS, Shock</li> <li>d. Dealing with an Emergency Situation in the ICU</li> </ul>	<p>11</p>	<ol style="list-style-type: none"> <li>1. The students will have the knowledge in assessing and planning Physiotherapy interventions of various cardiothoracic general, medical and surgical conditions.</li> <li>2. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment.</li> <li>3. The students will have the knowledge in monitor patient's vital sign and to provide appropriate interventions to patient.</li> </ol>	<p>1,2,3,4,5,6</p>

<b>PRACTICAL</b> <b>L</b>	Practical shall be conducted for all the relevant topics discussed in theory in the following forms: 1. Bedside case presentations and case discussions 2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.	60	The objective of the course is that after the specified hours of practicals and demonstrations the student will be able to practice, demonstrate and apply various treatment techniques in cardiorespiratory conditions.	1,2,3,4,5
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**TEXT BOOKS:**

1. tidy's Physiotherapy
2. Cash's textbook of chest, heart, vascular disorder for Physiotherapist.
3. Physical rehabilitation of assessment and treatment – O'sullivan Schmitz

**REFERENCE BOOKS:**

1. Chest physiotherapy and intensive care unit by Mackenzi.
2. The Brompton guide to Chest Physiotherapy DUGasket

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply the knowledge in assessing and planning Physiotherapy interventions for various cardiothoracic general, medical, and surgical conditions.	1,2,3,4,5,6,7,8
2	Monitor patients' vital signs and provide appropriate interventions to patients.	1,2,3,4,5,6,7,8
3	Assess the patient as necessary, to monitor the patient regarding treatment.	1,2,3,4,5,6,7,8
4	Learn to select strategies for a cure, care & prevention; adopt restorative & rehabilitative measures for maximum possible functional independence of a patient at home, workplace & in the community.	1,2,3,4,5,6,7,8
5	Learn to execute effective Physio therapeutic measures with appropriate clinical reasoning to improve general surgical & medical conditions.	1,2,3,4,5,6,7,8

### MAPPING TABLE

<b>Course Name: PT IN CARDIOTHORACIC CONDITIONS AND GENERAL CONDITION</b>												
Course Code:	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
22BPT0413 R	CO1	3	2	2	2	3	3	3	2	3	1	3
	CO2	3	2	2	2	3	3	3	2	3	1	2
	CO3	3	2	2	2	3	3	3	2	3	1	1
	CO4	3	2	2	2	3	3	3	2	3	3	3
	CO5	3	2	2	2	3	3	3	2	3	2	3
	Average	3	2	2	2	3	3	3	2	3	1.6	2.4
	Count	15	10	10	10	15	15	15	10	15	8	12

**EMESTER – VII**

<b>Course Title</b>	<b>PT IN OBSTETRICS &amp; GYNAECOLOGY AND GENERAL SURGERY</b>								
<b>Course code</b>	<b>22BPTO414R</b>	<b>TOTAL CREDITS: 3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		<b>TOTAL HOURS: 30T+30T</b>	2	0	2	0	0	0	3
<b>PRE-REQUISITE</b>	Human anatomy, Human Physiology, Surgery, Exercise Therapy, Electrotherapy.	<b>CO-REQUISITE</b>	NIL						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>7<sup>th</sup></b>								
<b>Course Objectives</b>	1. To introduce the students the concepts related to Clinical obstetrics and gynaecology. 2. To impart the students the concepts related to Physiotherapeutic assessment pattern in obstetrics and gynaecology. 3. To give awareness to the students about the Pelvic inflammatory diseases								
<b>CO1</b>	Acquainted with the knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.								
<b>CO2</b>	Plan out assessment for various clinical conditions of medical and surgical conditions and plan the appropriate Physiotherapy interventions.								
<b>CO3</b>	Re-assess the patient as necessary, and to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.								
<b>CO4</b>	Describe and understand the normal & abnormal physiological events during the Puberty, Pregnancy, Labour, Puerperium, & Pre, Peri & Post Menopause.								
<b>CO5</b>	Discuss the common Pregnancy complications, Labour, Puerperium & Pre, Peri and Post Menopausal stage & various aspects of Urogenital Dysfunction and the physiotherapy management.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	Clinical obstetrics and gynecology: a. Brief review of anatomy and physiology of female reproductive organ b. Physiology of puberty and menstruation, abnormalities and common problems of menstruation c. Pregnancy- fertilization, development of the fetus, normal gestation, multiple gestations, common complications during pregnancy like PIH, Eclampsia, diabetes, hepatitis, German MEASLES, TORCH	<b>15</b>	1. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG. 2. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.				1,2,3,4		

<p><b>II</b></p>	<p>a. Neoplasm of female reproductive system b. Polycystic ovarian diseases</p>	<p><b>10</b></p>	<p>1. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.</p> <p>2. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of medical and surgical conditions.</p> <p>3. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.</p>	<p>1,2,3</p>
<p><b>III</b></p>	<p>Physiotherapeutic assessment pattern in obstetrics and gynecology ( subjective and objective)</p>	<p><b>8</b></p>	<p>1. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.</p> <p>2. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of medical and surgical conditions.</p> <p>3. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.</p>	<p>1,2,3,4,5</p>
<p><b>IV</b></p>	<p>Labor: a. Normal events of 1st ,2nd and 3rd stages of labor b. Complications during labor and management Normal delivery, physiotherapy management in antenatal period d. Post natal- puerperium, lactation, physiotherapy management in post natal period e. Contraception c. Family planning</p>	<p><b>17</b></p>	<p>1. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.</p> <p>2. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of medical and surgical conditions.</p> <p>3. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.</p>	<p>2,3,4,5,6</p>

V	Pelvic inflammatory diseases: a. Introduction, clinical features b. Physiotherapy in PID	10	<p>1. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.</p> <p>2. The students must be able to have knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of medical and surgical conditions.</p> <p>3. The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.</p>	1,2,3,4,5,6
PRACTICAL	<p>Practical shall be conducted for all the relevant topics discussed in theory in the following forms:</p> <p>1. Bedside case presentations and case discussions</p> <p>2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.</p>	30	<p>The objective of the course is that after the specified hours of practicals and demonstrations the student will be able to practice, demonstrate and apply various treatment techniques in OBG and general surgery conditions.</p>	1,2,3,4,5

**TEXT BOOKS:**

1. General medical and surgical conditions for physiotherapy ( cash and cash)

**REFERENCE BOOKS:**

1. Physiotherapy in obstetrics and gynecology (polden jill mental)

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquainted with the knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.	1,2,3,4,5,6,7,8
2	Plan out assessment for various clinical conditions of medical and surgical conditions and plan the appropriate Physiotherapy interventions.	1,2,3,4,5,6,7,8
3	Re-assess the patient as necessary, and to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.	1,2,3,4,5,6,7,8
4	Describe and understand the normal & abnormal physiological events during the Puberty, Pregnancy, Labour, Puerperium, & Pre, Peri & Post Menopause.	1,2,3,4,5,6,7,8
5	Discuss the common Pregnancy complications, Labour, Puerperium & Pre, Peri and Post Menopausal stage & various aspects of Urogenital Dysfunction and the physiotherapy management.	1,2,3,4,5,6,7,8

### MAPPING TABLE

<b>Course Name: PT IN OBSTETRICS &amp; GYNAECOLOGY AND GENERAL SURGERY</b>												
Course Code: 22BPTO414R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	3	2	2	2	3	2	2	3	2	2	1
	CO2	3	3	3	2	3	2	3	3	2	2	1
	CO3	3	3	3	3	3	2	3	3	2	1	0
	CO4	3	2	3	2	3	2	2	3	2	1	1
	CO5	3	3	3	3	3	3	3	3	2	1	1
	Average	3	2.6	2.8	2.4	3	2.2	2.6	3	2	1.4	0.8
	Count	15	13	14	12	15	11	13	15	10	7	4

**SEMESTER – VII**

SEMESTER – VII									
Course Title	<b>COMMUNITY BASED REHABILITATION</b>								
Course code	<b>22BPTO415R</b>	TOTAL CREDITS: 3	L	T	P	S	R	O/ F	C
		TOTAL HOURS: 30T+30P	2	0	2	0	0	0	3
PRE-REQUISITE	Knowledge of Human anatomy, Human physiology, Biomechanics of human motion, Community Medicine, General medicine and surgery..	CO-REQUISITE	PT in orthopaedic, PT in Neurological conditions, PT in Cardiothoracic conditions and general conditions, PT in OBG						
Programme	<b>Bachelor in Physiotherapy</b>								
Semester	<b>7<sup>th</sup></b>								
Course Objectives	1.To introduce the students to the concepts related Rehabilitation: Definition, Principles of Community based Rehabilitation, Disability, 2.To impart the students to the concepts related Role of voluntary Organizations in CBR. 3.To introduce the students to the concepts related to the role of Physiotherapy in CBR, Rehabilitation programmes for various conditions								
CO1	Integrate the knowledge gained by the students in community medicine and other areas with skills to apply these in clinical situations of health and disease and its prevention.								
CO2	Identify rehabilitation methods to prevent disabilities and dysfunctions due to various disease conditions. and plan and set treatment goals and apply the skills gained in rehabilitating and restoring functions.								
CO3	Plan and set treatment goals and apply the skills gained in rehabilitating and restoring functions.								
CO4	Evaluate the role of PT in National policies for the rehabilitation of the disabled.								
CO5	Describe the general concepts about health, disease and physical fitness.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	1.Rehabilitation: Definition, Types. 2.Introduction to Community Based Rehabilitation: Definition, Historical review, Concept of CBR, Need for CBR, Difference between Institution based and Community based Rehabilitation, Objectives of CBR, Scope of CBR, Models of CBR.	5 Hrs	The students will be able to understand and explain the types,concept, objectives, scope and models of CBR.					1,2,3,4	
II	Principles of Community based Rehabilitation. W.H.O.'s policies-about rural health care concept of primary /tertiary health centers-district hospitals etc. Members of CBR team .Role of P.T.-Principles of a team work of Medical person/P.T./O.T. audiologist/speech therapist /P.&O./vocational guide in C.B.R. of physically handicapped person. Concept of multipurpose health worker. Role of family members in the rehabilitation of a physically handicapped. Rehabilitation acts, Ethical issues in rehabilitation	8Hrs	The students will be able to demonstrate the role of various team members of rehabilitation.					1,2,3	



<b>III</b>	<p>1. Disability: Causes of disability, Types of disability, Brief review of term Impairment/disability/handicap and ICIDH, ICF Classification, Disability in developed countries, Disability in developing countries. Disability Surveys: Demography. Screening: Early detection of disabilities and developmental disorders, Prevention of disabilities- Types and levels.</p> <p>2.Role of voluntary Organizations in CBR: Charitable Organizations, Voluntary health agencies – National level and International NGO's . National and International Health Organizations: WHO, UNICEF, UNDP, UNFPA, FAO, ILO, World bank, USAID, SIDA, DANIDA, Rockfeller, Ford foundation, CARE, RED CROSS.</p>	10 Hrs	The students will be able to explain the different types and causes of disability, prevention and various voluntary organizations.	1,2,3,4,5
<b>IV</b>	Role of Physiotherapy in CBR: Screening for disabilities, Prescribing exercise programme, Prescribing and devising low cost locally available assistive aids. Orthotics and prosthetics for upper limb, lower limb and spine. Modifications physical and architectural barriers for disabled, Disability prevention, Strategies to improve ADL & IADL.	10Hrs	The students will be able to explain the role of physiotherapy in community, the orthotics and prosthetics of limbs, architectural barriers.	2,3,4,5,6
<b>V</b>	Rehabilitation programmes for various neuromusculoskeletal and cardiothoracic disabilities- a)Amputation b)Stroke c)Brain injury d) Cerebral palsy e)Poliomyelitis f)Peripheral nerve injuries g)Vascular and haematological condition h) Cardio respiratory dysfunction i)Chronic pain j) Burns k)Arthritis l)Obesity m) spinal cord injury.	10 Hrs	The students will be able to demonstrate the rehabilitation programmes of various conditions.	4,5,6
<b>PRACTICAL:</b>	Rehabilitation of – stroke/spinal cord injury /amputation/ cerebral palsy/Peripheral nerve injuries/cardiovascular dysfunction, Burn. (assessment/management)	30 Hrs	The students will be able to demonstrate the techniques of approaches and the management of these.	1,2,3,4,5,6

**TEXT BOOKS:**

1. Physical rehabilitation assesment and treatment- 4th ed. Susan B. O’Sullivan.
2. Social and preventive medicine-K.Park

**REFERENCE BOOKS:**

1. CBR- S.Sundar,& Neurological rehabilitation – DarcyUmphred. Text book of medicine-Davidson

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Integrate the knowledge gained by the students in community medicine and other areas with skills to apply these in clinical situations of health and disease and its prevention	1,2,3,4,5,7,8
2	Identify rehabilitation methods to prevent disabilities and dysfunctions due to various disease conditions. and plan and set treatment goals and apply the skills gained in rehabilitating and restoring functions.	1,2,3,4,5,7,8
3	Plan and set treatment goals and apply the skills gained in rehabilitating and restoring functions	1,2,3,4,5,6,7,8
4	Evaluate the role of PT in National policies for the rehabilitation of the disabled.	1,2,3,4,5,7,8
5	Describe the general concepts about health, disease and physical fitness.	1,2,3,4,5,7,8

### MAPPING TABLE

Course Code: 22BPT0415 R	Course Name: COMMUNITY BASED REHABILITATION												
	CO	PO1	PO 2	PO 3	P O 4	PO5	PO 6	PO7	PO8	PSO1	PSO2	PSO3	
	CO1	3	2	2	1	2	0	2	3	3	1	3	
	CO2	2	3	3	2	1	0	2	1	3	3	3	
	CO3	2	2	3	2	2	1	2	2	3	1	1	
	CO4	1	2	2	3	3	0	1	1	3	3	3	
	CO5	2	1	2	1	3	0	1	2	3	1	3	
	Average	2	2	2.4	1.8	2.2	0.2	1.6	1.6	3	1.8	2.6	
	Count	10	10	12	9	11	1	8	9	15	9	14	
	<b>SEMESTER – VII</b>												

Course Title	ALLIED THERAPEUTICS AND SPORTS PHYSIOTHERAPY								
Course code	22BPTO416R	TOTAL CREDITS: 2	L	T	P	S	R	O/ F	C
		TOTAL HOURS: 30T	2	0	0	0	0	0	2
PRE-REQUISITE	Human anatomy, Human Physiology,	CO-REQUISITE	Clinical Orthopaedic, Clinical Neurology						
Programme	Bachelor in Physiotherapy								
Semester	7th								
Course Objectives	<p>1. To introduce the students to the concepts related Introduction to exercise physiology, Concept of health and Physical fitness.</p> <p>2. To introduce the students to the concepts related to assessment of co-ordination, speed, reaction time, agility, balance.</p> <p>3. To introduce the students to the concepts related to Acupuncture and Naturotherapy.</p>								
CO1	Describe about the basic exercise physiology, Physical fitness, and to assess co-ordination, speed, reaction time, agility, balance.								
CO2	Acquainted about the basic principles of exercise prescription.								
CO3	Discuss to understand about Body dimensions and measurement techniques and training of physical performance and skills.								
CO4	Plan out the discussion to understand about the Diet and nutrition: basic principles. Stress and its management								
CO5	Familiarize about the basic of Acupuncture and also it will enables them to understand about the basic of Naturotherapy.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>SECTION I:</b> <b>Introduction to exercise physiology.</b> <b>Concept of health and Physical fitness.</b> <b>Assessment of co-ordination, speed, reaction time, agility, balance.</b>		10	This course enables the students to understand about the basic exercise physiology, Physical fitness, and to assess co-ordination, speed, reaction time, agility, balance.				1,2,3,4	
II	<b>Principles exercise prescription.</b>		3	This course enables the students to understand about the basic principles of exercise prescription.				1,2,3	
III	<b>Body dimensions and measurement techniques.</b> <b>Training of physical performance and skills.</b>		6	This course enables the students to understand about Body dimensions and measurement techniques.  Training of physical performance and skills				1,2,3,4,5	
IV	<b>Diet and nutrition: basic principles.</b> <b>Stress and its management.</b>		5	Enables the students to understand about the Diet and nutrition: basic principles. Stress and its management.				2,3,4,5,6	
V	<b>SECTION II:</b> <b>Acupuncture.</b> <b>Naturotherapy.</b>		8	This topic will enables the students to understand about the basic of Acupuncture and also it will enables them to understand about the basic of Naturotherapy.				1,2,3,4,5,6	

**TEXT BOOKS:**

1. Text book of sports medicine – by Peter Brukner and KarimKhan
2. Practical exercise therapy by Margaret Hollis , 4th edition

**REFERENCE BOOKS:**

1. Therapeutic exercise by Kishner & Colby, the edition; Jaypee Publication.
2. Alternative Therapies by Swati Bhagat

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe about the basic exercise physiology, Physical fitness, and to assess co-ordination, speed, reaction time, agility, balance.	<b>1,3,8</b>
<b>2</b>	Acquainted about the basic principles of exercise prescription.	<b>1,3,8</b>
<b>3</b>	Discuss to understand about Body dimensions and measurement techniques and training of physical performance and skills.	<b>1,8</b>
<b>4</b>	Plan out the discussion to understand about the Diet and nutrition: basic principles. Stress and its management	<b>1,8</b>
<b>5</b>	Familiarize about the basic of Acupuncture and also it will enables them to understand about the basic of Naturotherapy.	<b>1,8</b>



<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL	
<b>Program me</b>	<b>Bachelor in Physiotherapy</b>			
<b>Semester</b>	<b>7th</b>			
<b>Course Objectives</b>	<p>1. To identify the demographic trends affecting and Mortality, and Morbidity in geriatric.</p> <p>2. To Describe the Age-related changes in Cardiovascular System, Pulmonary system, Musculoskeletal system, Nervous system and cognition, and also Physiological response to exercise in elderly.</p> <p>3. To have knowledge about drugs in elderly and also knowledge about the principle of geriatric prevention and rehabilitation</p>			
<b>CO1</b>	Students will have an idea about the Demographic, Mortality, and Morbidity and also will able to do proper Geriatric Assessment, Functional assessment and assessment instruments.			
<b>CO2</b>	Students will gain the knowledge about Age-related changes in Cardiovascular System, Pulmonary system, musculoskeletal system, Nervous system and cognition.			
<b>CO3</b>	Students will gain the knowledge about Physiological response to exercise in elderly.			
<b>CO4</b>	Students will have a better knowledge about drugs in elderly.			
<b>CO5</b>	Students will have a better knowledge about the principle of geriatric prevention and rehabilitation.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Introduction: A) Demographic, Mortality, and Morbidity. B) Geriatric Assessment. Functional assessment and assessment instruments.	<b>7 hours</b>	Students will have a idea about the Demographic, Mortality, and Morbidity and also will able to do proper Geriatric Assessment, Functional assessment and assessment instruments.	1,2,3
<b>II</b>	Age-related changes in Cardiovascular System, Pulmonary system, Musculoskeletal system, Nervous system and cognition.	<b>7 hours</b>	Students will gain the knowledge about Age-related changes in Cardiovascular System, Pulmonary system, Musculoskeletal system, Nervous system and cognition.	1,2,3
<b>III</b>	Physiological response to exercise in elderly.	<b>5 hours</b>	Students will gain the knowledge about Physiological response to exercise in elderly.	1,2,3
<b>IV</b>	Drugs in elderly: Drugs, Route of administration of drugs, Effect, Side effect, Adverse drug reaction.	<b>5 hours</b>	Students will have a better knowledge about drugs in elderly.	1,2,3

<b>V</b>	A) Principle of geriatric rehabilitation. B) Prevention and Rehabilitation in geriatric. C) Case study.	<b>6 hours</b>	Students will have a better knowledge about the principle of geriatric prevention and rehabilitation.	1,2,3
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**Text Book:**

1. Physical rehabilitation assessment and treatment- 4th ed. Susan B. O'Sullivan.
2. MultaniNK.,and Verma SK.,Principles of geriatric physical therapy. Jaypee Brothers Medical Publishers.1st ed.,2007
3. Guccione AA, Geriatric Physical Therapy, 3rd. Ed, Mosby 2012
4. Physiology of Sport and Exercise. by Jack H. Wilmore and David L

**Reference book:**

- 1.Principles of Geriatric Physiotherapy Book by Narinder Kaur Multani and Satish Kumar Verma.
2. Davidson's Principles and Practice of Medicine International Edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Students will have an idea about the Demographic, Mortality, and Morbidity and also will able to do proper Geriatric Assessment, Functional assessment and assessment instruments.	<b>1,2,3,6,7,8</b>
<b>2</b>	Students will gain the knowledge about Age-related changes in Cardiovascular System, Pulmonary system, musculoskeletal system, Nervous system and cognition.	<b>1,2,7,8</b>
<b>3</b>	Students will gain the knowledge about Physiological response to exercise in elderly.	<b>1,2,3,8</b>
<b>4</b>	Students will have a better knowledge about drugs in elderly.	<b>1,4,5,7,8</b>
<b>5</b>	Students will have a better knowledge about the principle of geriatric prevention and rehabilitation.	<b>1,2,3,7,8</b>

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BPTO411R	PT IN ORTHOPAEDICS CONDITIONS	3	3	3	2	2	2	3	3
22BPTO412R	PT IN NEUROLOGICAL CONDITIONS	3	3	3	2	2	2	3	3
22BPTO413R	PT IN CARDIOTHORACIC CONDITIONS AND GENERAL CONDITIONS	3	3	3	2	2	1	2	3
22BPTO414R	PT IN OBSTETRICS & GYNAECOLOGY & GENERAL SURGERY.	3	3	1	1	1	1	2	3
22BPTO415R	COMMUNITY BASED REHABILITATION	3	2	1	1	1	1	2	3
22BPTO416R	ALLIED THERAPEUTICS AND SPORTS PHYSIOTHERAPY	3	2	2	1	1	1	3	3
22BPTO417R	GERIATRIC REHABILITATION	3	3	2	2	1	1	3	3
22UBCC411	CO-CURRICULAR	0	0	2	1	2	2	1	2
22BPT418R	CLINICAL POSTING BASED PROJECT	3	3	2	2	2	2	3	3

**SEMESTER – VIII**

<b>Course Title</b>	<b>PT IN ORTHOPEDICS CONDITIONS</b>
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<b>Course code</b>	<b>22BPTO421R</b>	<b>TOTAL CREDITS: 4</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
			<b>TOTAL HOURS: 30T+60P</b>	2	0	4	0	0	0
<b>PRE-REQUISITE</b>	Human anatomy, Human Physiology, Biomechanics of Human Motion	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>8th</b>								
<b>Course Objectives</b>	1. To introduce the students to the concepts related Leprosy, Amputations, Spinal conditions. 2. To introduce the students on the effects of spinal traction, Osteoporosis, Orthopaedics surgeries, Shoulder joint, Elbow and forearm, Wrist and hand, Hip, Ankle and foot. 3. To introduce the students the introduction to Bio-engineering, Sports physiotherapy, Applied yoga in orthopedic conditions, Knee.								
<b>CO1</b>	Integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology of wrist elbow and wrist.								
<b>CO2</b>	Identify disabilities due to musculoskeletal dysfunctions.								
<b>CO3</b>	Plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function of hip knee and ankle joints.								
<b>CO4</b>	Plan sports specific protocols for treatment and training the individuals involved in different sports activities.								
<b>CO5</b>	Acquire proper knowledge of orthotics and prosthetics and prescribe those on impaired and disable persons.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Leprosy: Definition, cause, clinical features, medical and surgical management. PT assessment, aims, and management after surgical procedures such as tendon transfer both pre and post operatively.</b> <b>Amputations: Definition, levels, indications, types, PT assessment, aims, management pre and post operatively. PT management with emphasis on stump care and bandaging. Pre and post prosthetic training, checking out prosthesis, complications of amputations and its management.</b> <b>Spinal conditions: Review thaw causes, signs and symptoms</b> ,investigations, radiological features, neurological signs, Pt assessment aims and management and home programme of the following conditions: Cervical spondylosis, Lumbar spondylosis, spondylolisthesis, spinal canal stenosis, spondylolysis, sacro iliac joint dysfunction, sacralisation, lumbarisation, ntervertebral disc prolapsed, occydynia, spina bifida occulta. <b>Effects of spinal traction, types of traction , modes of application, indications for spinal traction, contraindications, precautions, limitations of traction.</b>	9	This subject serves to integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.					1,2,3,4	

II	<p><b>Osteoporosis- Causes, pre disposing factors, investigations and treatment.</b></p> <p><b>Orthopaedics surgeries: Pre and post operative PT assessment, goals, precautions and PT management of following surgeries such as: Athrodesis, Osteotomy, arthroplasty- Partial and total – excision arthroplasty, excision arthroplasty with implant, inter positional arthroplasty and total replacement; tendon transplant soft tissue release, tenotomy ,myotomy, lengthening; arthroscopy, spinal stabilization, re-attachment of limbs, external fixators, synovectomy.</b></p>	4	<p>Students should be able to plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function.</p>	1,2,3
III	<p><b>Shoulder joint: Shoulder instabilities , TOS, RSD, Impingment syndrome- conservative and post operative PT management. Total shoulder replacement and hemi replacement. Post operative Pt management. AC joint injuries- rehabilitation. Rotator cuff tears conservative and surgical repair. Sub acromial decompression.Post operative PT management.</b></p> <p><b>Elbow and forearm: Excision of radial head- Post operative PT management. Total elbow arthroplasty. Post operative PT management.</b></p> <p><b>Wrist and hand: Total wrist arthroplasty. Repair of rupture extensor tendon. Carpal tunnel syndrome. Flexor and extensor tendon laccrations. Post operative Pt management.</b></p>	8	<p>This subject serves to integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.</p>	1,2,3,4,5
IV	<p><b>Hip: joint surgeries- hemi and total hip replacement- Post operative PT management, tendinitis and bursitis- PT management.</b></p> <p><b>Knee lateral retinacular release, chondroplasty- post operative management. Realignment of extensor mechanism. ACL and PCL reconstruction surgeries- Post operative rehabilitation.</b></p> <p><b>Meniscectomy and meniscal repair- Post operative management. Plica syndrome, patellar dysfunction and Hoffa’s syndrome- Conservative management TKR and rehabilitation protocol. Patellar tendon ruptures and patellectomy rehabilitation.</b></p> <p><b>Ankle and foot: Ankle instability. Ligamentus tears Post operative management.</b></p>	6	<p>This subject serves to integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.</p>	2,3,4,5,6

V	<p>Introduction to Bio-engineering: Classification of orthosis and prosthesis: biomechanical principles of orthotic and prosthetic application; designing of upper extremity</p> <p>Sports physiotherapy: physical fitness, stages of soft tissue healing, treatment guideline for soft tissue injuries, acute, sub acute and chronic stages. Repair of soft tissue rupture. Soft tissue injuries-prevention and rehabilitation of lateral ligaments sprain of ankle, rotator cuff injuries, collateral and cruciate injuries of knee, meniscal injuries of knee, supraspinatus and bicipital tendinitis, prepatellar and sub acromial bursitis, tennis and golfer elbow, hamstring strain, quadriceps contusion and TA rupture, dequervain's tenosinovitis, trigger and mallet finger, planter fasciitis, wrist sprain.</p> <p>Applied yoga in orthopedic conditions.</p>	4	The objective of the course is that after the specified hours of lectures and demonstrations the student will be able to identify disabilities due to musculoskeletal dysfunctions.	3,4,5,6
PRACTICAL	<p>Practical shall be conducted for all the relevant topics discussed in theory in the following forms:</p> <ol style="list-style-type: none"> <li>1. Bedside case presentations and case discussions</li> <li>2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.</li> </ol>	60	The objective of the course is that after the specified hours of practicals and demonstrations the student will be able to practice, demonstrate and apply various treatment techniques in musculoskeletal dysfunctions.	1,2,3,4,5

**TEXT BOOKS:**

1. Tidy's Physiotherapy
2. Clinical orthopaedic rehabilitation-Brotzman.
3. Textbook of orthopaedics-cash

**REFERENCE BOOKS:**

1. Orthopedic physiotherapy- Jayant joshi
4. Physical rehabilitation assessment and treatment

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology of wrist elbow and wrist.	1,2,3,4,5,6,7,8
2	Identify disabilities due to musculoskeletal dysfunctions.	1,2,3,4,5,6,7,8
3	Plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function of hip knee and ankle joints.	1,2,3,4,5,6,7,8
4	Plan sports specific protocols for treatment and training the individuals involved in different sports activities.	1,2,3,4,5,6,7,8
5	Acquire proper knowledge of orthotics and prosthetics and prescribe those on impaired and disable persons.	1,2,3,4,5,6,7,8

**MAPPING  
TABLE**

<b>Course Name: PT IN ORTHOPEDICS CONDITIONS</b>												
<b>Course Code: 22BPTO421R</b>	<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
	<b>CO1</b>	3	1	2	1	2	2	2	2	3	2	1
	<b>CO2</b>	3	2	1	2	1	2	1	2	2	1	1
	<b>CO3</b>	3	2	2	2	2	2	2	2	3	0	2
	<b>CO4</b>	2	1	2	3	1	2	2	2	3	2	1
	<b>CO5</b>	2	2	2	1	2	3	2	2	3	1	2
	<b>Average</b>	2.6	1.6	1.8	1.8	1.6	2.2	1.8	2	2.8	1.2	1.4
	<b>Count</b>	13	8	9	9	8	11	9	10	14	6	7

**SEMESTER – VIII**

<b>Course Title</b>	<b>PT IN NEUROLOGICAL CONDITIONS</b>
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<b>Course code</b>	22BPTO422R	<b>TOTAL CREDITS: 4</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		<b>TOTAL HOURS: 30T+60P</b>	2	0	4	0	0	0	4
<b>PRE-REQUISITE</b>	Human Anatomy, Human Physiology, Exercise therapy, Electro therapy, Clinical Neurology	<b>CO-REQUISITE</b>	Community based Rehabilitation.						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>8th</b>								
<b>Course Objectives</b>	1. To introduce the students to the concepts related Evaluation and Management of Cerebellar, Spinal cord and Muscle disorders. 2. To impart the students to the concepts related analysis, Evaluation and Management of Peripheral nerve, Injuries and Disorders, Assessment and Management of Neurological Gaits, Pre & Post-surgical assessment & treatment. 3. To introduce the students to the concepts related to Yoga in neurological conditions.								
<b>CO1</b>	Acquire the knowledge in neurology and neurosurgery with skills to apply these in clinical situation of dysfunction and neurological pathology.								
<b>CO2</b>	Identify disabilities due to neurological dysfunction.								
<b>CO3</b>	Plan and set treatment goals and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in the clinical situations to restore neurological functions.								
<b>CO4</b>	Plan, prescribe & execute short term & long term treatment, with special reference to relief of Neuropathic & psycho-somatic pain, mat exercises, functional re-education, gait training, postural & functional training for A.D.L., ergonomic								
<b>CO5</b>	Equipped with the basic understanding of Yoga for neurological conditions.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>Evaluation and Management of Cerebellar, Spinal cord and Muscle disorders:</b> i) History, observation, palpation, motor and sensory examination, reflex testing, differential diagnosis, balance and co- ordinationexamination ii) Gait analysis- functional analysis, list of problems and complications, short and long termgoals iii) Management of systemic complications, management of mechanicalcomplications iv) Use of various neurologicalapproaches and modalities in Ataxia, Sensory ataxia, Parkinson’s disease, Muscular dystrophy(DMD), Myasthenia gravis, Eaton- Lambert Syndrome, Spinal tumours, Spinal cord injury, Transverse myelitis, Bladder & Bowel dysfunction, Spinal muscular atrophies, Poliomyelitis, Post Polio Syndrome	19	The students should be able to do a proper evaluation and management of cerebellar ,spinal cord and muscle disorders.				1,2,3,4		

<b>II</b>	<b>Evaluation and Management of Peripheral nerve Injuries and Disorders :</b> i) History, observation, palpation, motor and sensory examination, reflex testing, differential diagnosis, balance and co-ordination examination. ii) Management of systemic complications, management of mechanical complications iii) Use of various neurological approaches and modalities in Hereditary motor sensory neuropathy, Gullian- Barre Syndrome, Brachial plexus palsy, Thoracic outlet Syndrome, Lumbosacral plexus lesions, Phrenic and intercostals nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Axillary nerve palsy, Long Thoracic nerve palsy, Suprascapular nerve palsy, Sciatic nerve palsy, Tibial nerve palsy, Common Peroneal nerve palsy, Femoral nerve palsy, Obturator iii) nerve palsy and Pudendal nerve palsy	19	The students should be able to do a proper evaluation and management Peripheral nerve Injuries and Disorders	1,2,3
<b>III</b>	<b>Assessment and Management of Neurological Gaits:</b> i) Quantitative (kinetics & kinematics) analysis ii) List of problems, short & long term goals iii) Management of following neurological gaits: Hemiplegic gait, Parkinson's gait, High Step gait, Hyperkinetic gait, Hypokinetic gait, Waddling gait, Scissoring gait, Choreoform gait, Diplegic gait, Myopathic gait	18	The students should be able to do a proper assessment and management of Neurological Gaits.	1,2,3,4,5
<b>IV</b>	<b>Pre &amp; Post surgical assessment &amp; treatment:</b> i) Spinal disc herniation, Spinal stenosis, Spinal cord trauma ii) Head trauma, Brain tumours, Tumours of spine, Cerebral Aneurysm, Subarachnoid Haemorrhage, Epilepsy, Parkinson's disease, Chorea, Hemiballism, Psychiatric disorders, Malformation of the Nervous System, Carotid artery stenosis, Arteriovenous malformations & Spinal bifida	18	The students should be able to do a proper <b>assessment</b> and management Pre and Post surgical conditions.	2,3,4,5,6
<b>V</b>	<b>Yoga:</b> Applied Yoga in neurological conditions	16	The student will be able to learn the basic Yoga for neurological conditions.	1,2,3,4,5,6
<b>PRACTICAL</b>	Practical shall be conducted for all the relevant topics discussed in theory in the following forms: 1. Bedside case presentations and case discussions 2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.	60	The objective of the course is that after the specified hours of practicals and demonstrations the student will be able to practice, demonstrate and apply various treatment techniques in neurological disorders.	1,2,3,4,5

#### TEXT BOOKS:

1. Physical rehabilitation Assessment and treatment – O' Sullivan Schmitz
2. Cash's Textbook of Neurology for physiotherapists

**REFERENCE BOOKS:****1. Neurological rehabilitation by D Umphred****2. Tidy's physiotherapy****RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Acquire the knowledge in neurology and neurosurgery with skills to apply these in clinical situation of dysfunction and neurological pathology.	<b>1,8</b>
<b>2</b>	Identify disabilities due to neurological dysfunction.	<b>1,2&amp;8</b>
<b>3</b>	Plan and set treatment goals and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in the clinical situations to restore neurological functions.	<b>3,6&amp;8</b>
<b>4</b>	Plan, prescribe & execute short term & long term treatment, with special reference to relief of Neuropathic & psycho-somatic pain, mat exercises, functional re-education, gait training, postural & functional training for A.D.L., ergonomic	<b>3,6&amp;8</b>
<b>5</b>	Equipped with the basic understanding of Yoga for neurological conditions.	<b>1,8</b>

## MAPPING TABLE

		<b>Course Name: PT IN NEUROLOGICAL CONDITIONS</b>											
Course Code: 22BPTO422 R	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	
	CO1	3	0	0	0	0	0	0	0	1	3	1	3
	CO2	3	2	0	0	0	0	0	0	1	3	1	2
	CO3	0	0	3	0	0	2	0	0	1	3	1	1
	CO4	0	0	3	0	0	1	0	0	1	3	3	3
	CO5	3	0	0	0	0	0	0	0	1	3	2	3
	Average	1.8	0.4	1.2	0	0	0.6	0	0	1	3	1.6	2.4
	Count	9	2	6	0	0	3	0	0	5	15	8	12

<b>SEMESTER – VIII</b>										
Course Title	<b>PT IN CARDIOTHORACIC CONDITIONS AND GENERAL CONDITION</b>									
Course code	22BPTO423R	TOTAL CREDITS: 4	L	T	P	S	R	O/ F	C	
		TOTAL HOURS: 30T+60P	2	0	4	0	0	0	4	
PRE-REQUISITE	Human Anatomy, Human Physiology, Biomechanics of human motion, Exercise Therapy.	CO-REQUISITE	NIL							
Programme	<b>Bachelor in Physiotherapy</b>									
Semester	<b>8<sup>th</sup></b>									
Course Objectives	1. To introduce the students to the concepts related to the knowledge in assessing and planning Physiotherapy interventions of various cardiothoracic conditions. 2. To understand the concepts related to the knowledge in assessing and planning Physiotherapy interventions of various general, medical and surgical conditions. 3. To assess the patient as necessary, to monitor the patient in regard to treatment, to monitor patient's vital sign and to provide appropriate interventions to patient.									
CO1	Apply the knowledge in assessing and planning Physiotherapy interventions for various cardiothoracic general, medical, and surgical conditions.									
CO2	Monitor patients' vital signs and provide appropriate interventions to patients.									
CO3	Assess the patient as necessary, to monitor the patient regarding treatment.									



<b>CO4</b>	Learn to select strategies for a cure, care & prevention; adopt restorative & rehabilitative measures for maximum possible functional independence of a patient at home, workplace & in the community.			
<b>CO5</b>	Learn to execute effective Physio therapeutic measures with appropriate clinical reasoning to improve general surgical & medical conditions.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<b>Physiotherapy in Obstructive lung conditions</b> Physiotherapy in Restrictive lung conditions Management of Breathlessness Pulmonary Rehabilitation Respiratory failure- Oxygen Therapy & Mechanical Ventilation	7	The students will have the knowledge in assessing and planning Physiotherapy interventions of various cardiothoracic general, medical and surgical conditions.	1,2,3,4
<b>II</b>	<b>Physiotherapy following lung surgeries</b> Physiotherapy Management following cardiac surgeries Cardiac Rehabilitation Abdominal Surgeries- Management of Pulmonary Restorative Dysfunction following Surgical procedures on Abdomen & Thorax	10	The student must be able to re-assess the patient as necessary, to monitor the patient in regard to treatment.	1,2,3
<b>III</b>	<b>Burns Management-</b> <b>a.</b> Role of Physiotherapy in the management of burns, post grafted cases Mobilization & Musculo- skeletal restorative exercises following burns Physiotherapy management following PVD Management of Amputations following Diabetes, PVD- Prosthesis in amputation of lower limbs following ulcers and gangrene Physiotherapy interventions in the management of medical, surgical and Radiation Oncology Cases	15	The students will have the knowledge in monitor patient's vital sign and to provide appropriate interventions to patient.	1,2,3,4,5
<b>IV</b>	<b>Treatment Response to exercise and Implications of Physiotherapy in the following disease conditions-</b> a. Hypertension b. Diabetes c. Renalfailure d. Obesity	7	The students will have the knowledge in monitor patient's vital sign and to provide appropriate interventions to patient.	2,3,4,5,6
<b>V</b>	<b>Applied Yoga in Cardio- respiratory conditions</b>	11	The students will have the knowledge in assessing and planning Physiotherapy interventions of various cardiothoracic general, medical and surgical conditions.	1,2,3,4,5,6

<b>PRACTICAL</b>	Practical shall be conducted for all the relevant topics discussed in theory in the following forms: 1. Bedside case presentations and case discussions 2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.	60	The objective of the course is that after the specified hours of practicals and demonstrations the student will be able to practice, demonstrate and apply various treatment techniques in cardiorespiratory conditions.	1,2,3,4,5
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### TEXT BOOKS:

1. Tidy's Physiotherapy

2. Cash's textbook of chest, heart, vascular disorder for Physiotherapist.

3. Physical rehabilitation of assessment and treatment – O'sullivan Schmitz

4. Essentials of cardiopulmonary Physical therapy by Hillegass and Sadowsky.

### REFERENCE BOOKS:

1. Chest physiotherapy and intensive care unit by Mackenzi.

2. The Brompton guide to Chest Physiotherapy DUGasket

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply the knowledge in assessing and planning Physiotherapy interventions for various cardiothoracic general, medical, and surgical conditions.	1,2,3,4,5,6,7,8
2	Monitor patients' vital signs and provide appropriate interventions to patients.	1,2,3,4,5,6,7,8
3	Assess the patient as necessary, to monitor the patient regarding treatment.	1,2,3,4,5,6,7,8

4	Learn to select strategies for a cure, care & prevention; adopt restorative & rehabilitative measures for maximum possible functional independence of a patient at home, workplace & in the community.	1,2,3,4,5,6,7,8
5	Learn to execute effective Physio therapeutic measures with appropriate clinical reasoning to improve general surgical & medical conditions.	1,2,3,4,5,6,7,8

### MAPPING TABLE

Course Name: PT IN CARDIOTHORACIC CONDITIONS AND GENERAL CONDITION												
Course Code:	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
22BPTO423R	CO1	3	2	2	2	3	3	3	2	3	1	3
	CO2	3	2	2	2	3	3	2	2	3	1	2
	CO3	3	2	2	2	3	3	3	2	3	1	1
	CO4	2	2	2	2	2	3	3	2	3	3	3
	CO5	3	2	2	2	3	3	3	2	3	2	3
	Average	2.8	2	2	2	2.8	3	2.8	2	3	1.6	2.4
	Count	15	10	10	10	15	15	15	10	15	8	12

SEMESTER – VIII										
Course Title	PT IN OBSTETRICS & GYNAECOLOGY AND GENERAL SURGERY									
Course code	22BPTO424R	TOTAL CREDITS: 3	L	T	P	S	R	O/F	C	
		TOTAL HOURS: 30T+30P	2	0	2	0	0	0	3	
PRE-REQUISITE	Human anatomy, Human Physiology, General Surgery, Exercise Therapy, Electrotherapy.	CO-REQUISITE	NIL							
Programme	Bachelor in Physiotherapy									
Semester	8 <sup>th</sup>									
Course Objectives	1. To impart the students to the concepts related Physiotherapy in obstetrics. 2. To deliver the students the concepts related Physiotherapy in gynaecology, Uro genital dysfunction, Menopause. 3. To introduce the students to the concepts related Physiotherapy in General surgeries.									
CO1	Carry out an assessment and planning of Physiotherapy interventions of various clinical conditions related to Obstetrics and Gynaecology.									

<b>CO2</b>	Acquainted with the knowledge of assessing and planning Physiotherapy interventions of various medical and surgical conditions.			
<b>CO3</b>	Carry out re assessment of the patient as necessary, knowledge of monitoring the patient regarding treatment, and to provide appropriate interventions to patient.			
<b>CO4</b>	Plan out the management of common complications of Pregnancy, Labour, Puerperium & Pre, Peri & Post-Menopausal stage & various aspects of Urogenital Dysfunction.			
<b>CO5</b>	Acquainted with the knowledge of acquiring the skills of the clinical examination of Pelvic Floor.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Physiotherapy in obstetrics and gynaecology: a. Complications of pregnancy and relieving pregnancy related discomfort with physiotherapy, b. Physiotherapy pre & post CS c. Role of PT in bladder and bowel dysfunction, d. Role of physiotherapy in urogenital dysfunction	<b>20</b>	1. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.  2. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of medical and surgical conditions.  3. The student must be able to re assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.	1,2,3,4
<b>II</b>	Uro genital dysfunction: a. Uterine prolapsed- classification and management, b. Cystocoele, rectocoele, enterocoele.	10	1. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.  2. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of medical and surgical conditions.  3. The student must be able to re assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.	1,2,3

<p><b>III</b></p>	<p>Menopause:  a) Pre and post menopause physiology  b) Diagnosis and treatment of musculoskeletal pain and dysfunction postmenopause</p>	<p><b>10</b></p>	<p>1. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.</p> <p>2. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of medical and surgical conditions.</p> <p>3. The student must be able to re assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.</p>	<p>1,2,3,4,5</p>
<p><b>IV</b></p>	<p>General surgeries:  a. Introduction, principles of physiotherapy for surgical patients, surgical procedures  b. Abdominal surgery,  c. Adrenalectomy,  d. Breast surgery  e. Colonic and rectal surgery- colostomy, ileostomy  f. Genitor urinary surgery-nephrectomy, prostatectomy, cystectomy</p>	<p><b>10</b></p>	<p>1. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.</p> <p>2. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of medical and surgical conditions.</p> <p>3. The student must be able to re assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.</p>	<p>2,3,4,5,6</p>

V	Hernia- femoral, inguinal, umbilical, incisional Thyroidectomy Pt management in general surgeries.	10	<p>1. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of OBG.</p> <p>2. The subject is designed to provide knowledge in assessing and planning Physiotherapy interventions of various clinical conditions of medical and surgical conditions.</p> <p>3. The student must be able to re assess the patient as necessary, to monitor the patient in regard to treatment, and to provide appropriate interventions to patient.</p>	1,2,3,4,5,6
PRACTICAL	<p>Practical shall be conducted for all the relevant topics discussed in theory in the following forms:</p> <p>1. Bedside case presentations and case discussions</p> <p>2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.</p>	30	The objective of the course is that after the specified hours of practicals and demonstrations the student will be able to practice, demonstrate and apply various treatment techniques in OBG and general surgery conditions.	1,2,3,4,5

**TEXT BOOKS:**

**1. General medical and surgical conditions for physiotherapy ( cash and cash)**

**REFERENCE BOOKS:**

**1. Physiotherapy in obstetrics and gynecology (polden jill mental)**

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome



	<b>CO5</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>0</b>
	<b>Average</b>	<b>3</b>	<b>2.4</b>	<b>2.6</b>	<b>2.4</b>	<b>2.4</b>	<b>2.2</b>	<b>2.2</b>	<b>2.2</b>	<b>1.8</b>	<b>0.8</b>	<b>0.4</b>
	<b>Count</b>	<b>15</b>	<b>12</b>	<b>13</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>9</b>	<b>4</b>	<b>2</b>

<b>SEMESTER – VIII</b>												
<b>Course Title</b>		<b>COMMUNITY BASED REHABILITATION</b>										
<b>Course code</b>	<b>22BPTO425R</b>	<b>TOTAL CREDITS: 3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>			
			2	0	2	0	0	0	3			
<b>PRE-REQUISITE</b>		<b>CO-REQUISITE</b>										
Human Anatomy, Human Physiology, Clinical Orthopaedics and traumatology, Clinical neurology and neurosurgery, Community medicine.		E		PT in orthopaedic, PT in Neurological conditions, PT in Cardiothoracic conditions and general conditions, PT in OBG								
<b>Programme</b>		<b>Bachelor in Physiotherapy</b>										
<b>Semester</b>		<b>8th</b>										
<b>Course Objectives</b>		1.To introduce the students to the concepts related Disability Evaluation, National District Level Rehabilitation Programme, Vocational training in rehabilitation. 2.To impart the students to the concepts related to Geriatric problems. 3.To make the understand the students to the concepts related to Industrial health.										
<b>CO1</b>		Evaluation of disability and planning for prevention and rehabilitation.										
<b>CO2</b>		Understand the prevalence and incidence of various conditions responsible for increasing morbidity in the specific community – role of PT in improving morbidity, expected clinical and functional recovery, reasons for non-compliance in specific community environment solution for the same.										
<b>CO3</b>		Apply the skills gained in rehabilitating and restoring functions.										
<b>CO4</b>		Identify with clinical reasoning the prevailing contextual (e.g. environmental and psycho-social cultural factors, causing high risk responsible for various dysfunctions and morbidity related to sedentary life style and specific community like women, children, aged as well as industrial workers and describe planning strategies of interventional policies to combat such problems.										
<b>CO5</b>		Conduct as small project {cross sectional study /survey} to access to the prevalence of specific physical health problem and /or morbidity in specific community – which may be based at the institutional level or in field.										
<b>Unit-No.</b>	<b>Content</b>					<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>	



<b>I</b>	Disability Evaluation: Introduction, What, Why and How to evaluate, Quantitative versus Qualitative data, Uses of evaluation findings.	5 Hrs	The student will be able to discuss and explain about disability.	1,2,3,4
<b>II</b>	<ul style="list-style-type: none"> <li>• National District Level Rehabilitation Programme: Primary rehabilitation unit, Regional training center, District rehabilitation center, Primary Health center, Village rehabilitation worker, Anganwadi worker.</li> <li>• Extension services and mobile units: Introduction, Need, Camp approach.</li> </ul>	5 Hrs	The student will be able to understand and apply the approach of camps and extension services.	1,2,3
<b>III</b>	Vocational training in rehabilitation: Introduction, Need, Vocational evaluation, Vocational rehabilitation services.	6 Hrs	The student will be able to deliver the vocational training to the disabled and also do a proper evaluation.	1,2,3,4,5
<b>IV</b>	Geriatrics- Physiology of Aging /degenerative changes-Musculoskeletal /Neuromotor /cardio – respiratory- /Metabolic, Endocrine, Cognitive, Immune systems. Role of Physio Therapy in Hospital based care, Half-way homes, Residential homes, Meals on wheels etc. Home for the aged, Institution based Geriatric Rehabilitation. Few conditions:Alzheimer’s disease, Dementia, Parkinson’s Disease, Incontinence, Iatrogenic drug reactions, etc. Ethics of Geriatric Rehabilitation, Woman and child care: Introduction .	8 Hrs	The student will be able to do a proper assessment of geriatric population and also plan a management for the same.	2,3,4,5,6
<b>V</b>	<p>Industrial health:</p> <p>I. Ability Management -Job analysis: - Job description, Job demand Analysis, Task Analysis, Ergonomic Evaluation including Anthropometric data collection, Injury Prevention, Employee Fitness Programme, Disability Management:- Acute care, Concept of Functional Capacity Assessment, Work Conditioning, Work Hardening.</p> <p>II. Environmental stress in the industrial area–</p> <p>A. Physical agents e.g. heat / cold, light, noise, vibration, UV radiation, ionizing radiation</p> <p>B. Chemical agents-inhalation, local action and ingestion</p> <p>C. Mechanical hazards-overuse/fatigue injuries due to ergonomic alternation and Mechanical stresses.</p> <p>III. Work related musculoskeletal disorder.</p>	8 Hrs	The student will be able to do a job analysis, job description and ergonomic evaluation of people in different working areas.	4,5,6

<b>Practical:</b>	<ul style="list-style-type: none"> <li>• Geriatrics cases- assessment/treatment/rehabilitation.</li> <li>• Assessment and management- Work related musculoskeletal disorders-UL/LL/SPINE.</li> <li>• Outreach clinic/camp</li> </ul>	30 Hrs	The student will be able to assess, treat and rehabilitate various conditions in community setting.	1,2,3,4,5,6
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### TEXT BOOKS:

1. Physical rehabilitation assessment and treatment- 4th ed. Susan B. O'Sullivan.
2. Social and preventive medicine-K. Park
3. CBR- S. Sundar

### REFERENCE BOOKS:

1. Neurological rehabilitation – Darcy Umphred.
2. Text book of medicine-Davidson

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Evaluation of disability and planning for prevention and rehabilitation.	1,2,3,4,5,7,8
2	Understand the prevalence and incidence of various conditions responsible for increasing morbidity in the specific community – role of PT in improving morbidity, expected clinical and functional recovery, reasons for non-compliance in specific community environment solution for the same.	1,2,3,4,5,7,8
3	Apply the skills gained in rehabilitating and restoring functions.	1,2,3,4,5,6,7,8

4	Identify with clinical reasoning the prevailing contextual (e.g. environmental and psycho-social cultural factors, causing high risk responsible for various dysfunctions and morbidity related to sedentary life style and specific community like women, children, aged as well as industrial workers and describe planning strategies of interventional policies to combat such problems.	1,2,3,4,5,7,8
5	Conduct as small project {cross sectional study /survey} to access to the prevalence of specific physical health problem and /or morbidity in specific community – which may be based at the institutional level or in field.	1,2,3,4,5,7,8

### MAPPING TABLE

	<b>Course Name: COMMUNITY BASED REHABILITATION</b>											
<b>Course Code: 22BPTO425 R</b>	<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>
<b>CO1</b>	3	2	2	1	2	0	2	3	3	3	1	3
<b>CO2</b>	2	3	3	2	1	0	2	1	3	3	3	3
<b>CO3</b>	2	2	3	2	2	1	2	2	3	3	1	1
<b>CO4</b>	1	2	2	3	3	0	1	1	3	3	3	3
<b>CO5</b>	2	1	2	1	3	0	1	2	3	3	1	3
<b>Average</b>	2	2	2.4	1.8	2.2	0.2	1.6	1.6	3	3	1.8	2.6
<b>Count</b>	10	10	12	9	11	1	8	9	9	15	9	14

**SEMESTER – VIII**

<b>Course Title</b>	<b>ALLIED THERAPEUTICS AND SPORTS PHYSIOTHERAPY</b>								
<b>Course code</b>	<b>22BPTO426R</b>	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
			<b>TOTAL HOURS: 30T</b>	2	0	0	0	0	
<b>PRE-REQUISITE</b>	Human anatomy, Human Physiology,	<b>CO-REQUISITE</b>	Clinical Orthopaedic, Clinical Neurology						
<b>Programme</b>	<b>Bachelor in Physiotherapy</b>								
<b>Semester</b>	<b>8th</b>								
<b>Course Objectives</b>	1. To introduce the students to the concepts related Sports Medicine, Sports, and Sports Injuries, 2. To impart the students concept of evaluation in sports injury, Principles of sports injury rehabilitation, Pharmacology in sports. 3. To introduce the students the concept of Magneto therapy and Yoga asana.								
<b>CO1</b>	Acquainted with the basic principles of physical education and application in health, physical fitness.								
<b>CO2</b>	Carry out the discussion about the basic Sports training.								
<b>CO3</b>	Describe about mechanism of sports injuries and their management in physiotherapy is also studied.								
<b>CO4</b>	Discuss the basic of Magnetotherapy.								
<b>CO5</b>	Describe about the basic of Yoga asana								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		

<b>I</b>	Sports Medicine: Definition: Sports injury,sports medicine, sports physiotherapy Sports and Sports Injuries: a. Introduction. b. Frequency and site of injury. c. Etiological Factors. d. Investigation in sports injury. e. Diagnosis and prognosis	<b>9</b>	This course enables the students to understand about the basic principles of physical education and application in health, physical fitness. Enables the students to understand about the basic Sports training. Enables the students to understand about mechanism of sports injuries and their management in physiotherapy is also studied.	1,2,3,4
<b>II</b>	Evaluation in sports injury, Pre participation evaluation in sports Principles of sports injury rehabilitation Pharmacology in sports.	<b>10</b>	Enables the students to understand about the basic Sports training. Enables the students to understand about mechanism of sports injuries and their management in physiotherapy is also studied.	1,2,3
<b>III</b>	Fatigue.	<b>3</b>	1. This course enables the students to understand about Fatigue.	1,2,3,4,5
<b>IV</b>	Magneto therapy.	<b>5</b>	This course enables the students to understand about the basic of Magnetotherapy.	2,3,4,5,6
<b>V</b>	Yoga asana.	<b>5</b>	This course enables the students to understand about the basic of Yoga asana.	1,2,3,4,5,6

### TEXT BOOKS:

1. Text book of sports medicine – by Peter Brukner and KarimKhan
2. Practical exercise therapy by Margaret Hollis , 4th edition

**REFERENCE BOOKS:**

1. Therapeutic exercise by Kishner & Colby, the edition; Jaypee Publication.
2. Alternative Therapies by Swati Bhagat

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Acquainted with the basic principles of physical education and application in health, physical fitness.	<b>1,3,6,7,8</b>
<b>2</b>	Carry out the discussion about the basic Sports training.	<b>2,4,7</b>
<b>3</b>	Describe about mechanism of sports injuries and their management in physiotherapy is also studied.	<b>2,3,6,7,8</b>
<b>4</b>	Discuss the basic of Magnetotherapy.	<b>4,8</b>

5	Describe about the basic of Yoga asana	4,5
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Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
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**MAPPING TABLE**

		Course Name: ALLIED THERAPEUTICS AND SPORTS PHYSIOTHERAPY										
Course Code: 22BPT0426 R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
	CO1	3	0	1	0	0	1	1	1	2	1	2
	CO2	0	3	0	1	0	0	1	0	2	1	2
	CO3	0	1	3	0	0	1	1	1	2	0	1
	CO4	0	0	0	3	0	0	0	1	1	1	1
	CO5	0	0	0	3	3	0	0	0	1	1	1
	Average	3	3	3	3	3	1	2	1	1.6	0.8	1.4
	Count	3	4	7	7	3	2	3	3	8	4	7

22BPTO421R	PT IN ORTHOPAEDICS CONDITIONS	3	3	3	2	2	2	3	3
22BPTO422R	PT IN NEUROLOGICAL CONDITIONS	3	3	3	2	2	2	3	3
22BPTO423R	PT IN CARDIOTHORACIC CONDITIONS AND GENERAL CONDITIONS	3	3	3	2	2	1	2	3
22BPTO424R	PT IN OBSTETRICS & GYNAECOLOGY & GENERAL SURGERY.	3	3	1	1	1	1	2	3
22BPTO425R	COMMUNITY BASED REHABILITATION	3	2	1	1	1	1	2	3
22BPTO426R	ALLIED THERAPEUTICS AND SPORTS PHYSIOTHERAPY	3	2	2	1	1	1	3	3
22BPTO427R	CLINICAL POSTING BASED PROJECT	3	3	2	2	2	2	3	3





# Assam down town University

## Curriculum and Syllabus

### Master of Physiotherapy



OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**

July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022



*Chairperson  
Board of Studies*



*Member Secretary  
Academic Council*



## ***Vision***

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## ***Missions***

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community.

# Program Details

## Programme Overview

The Master of Physiotherapy course is a 2-year full-time program with 4 semesters leading to the degree that equips the student with analytical, evidence-based and Hands on learning skills. The program is generic in nature and has a component of additional learning of one area leading to an elective in that area. A student of MPT is likely to impart research basis to validate techniques during professional practice. The duration of the certified study for Master in Physiotherapy degree course under Faculty of physiotherapy shall extend over a period of four academic semesters (two years).

### I. Specific Features of the Curriculum

**Professional Excellence:** Exhibit expertise, advanced clinical proficiency, and empathetic patient care attitude across diverse subfields including musculoskeletal, neurological, Cardiorespiratory, and paediatric domains for better healthcare outcomes

**Practice in Research:** Able to develop new rehabilitation technology, methodology or protocol by doing research in physiotherapy

**International Competency:** Demonstrate global professional competencies by attaining interdisciplinary knowledge through specialized certifications offered on international learning platforms.

### II. Eligibility Criteria:

Candidates admitted into the Master of Physiotherapy course should have passed the BPT degree examination of this University or an examination of any other University (on campus full time course) accepted by the authorities of this University as equivalent thereto. Candidates who have passed BPT Examination other than Assam downtown University, Guwahati shall obtain migration certificate from the parent university.

### III. Program Educational Objectives (PEOs):

PEO1: AdtU Physiotherapy Postgraduates will be prepared with specialized training in any one of the physiotherapeutic specializations: musculoskeletal and sports, neurological, cardiorespiratory and paediatrics for successful careers in one or more of the sectors: hospitals, rehabilitation centres, academic and research institutions, sports clubs, NGOs, and/ or in government.

PEO2: Physiotherapy Postgraduates will be academically prepared to become specialized and highly skilled physiotherapy professionals for contributing effectively to the growth of the healthcare profession and in the service of humankind.

PEO3: Postgraduates will engage in professional practices and activities to enhance their manual skills and stature, can provide innovative healthcare solutions, establish physiotherapy clinics or rehabilitation centres, and be successful in higher education in healthcare or hospital management if pursued.

#### **IV. Program Specific Outcomes (PSOs):**

**PSO1: Professional Excellence:** Exhibit expertise, advanced clinical proficiency, and empathetic patient care attitude across diverse subfields including musculoskeletal, neurological, Cardiorespiratory, and paediatric domains for better healthcare outcomes

**PSO2: Practice in Research:** Able to develop new rehabilitation technology, methodology or protocol by doing research in physiotherapy.

**PSO3: International Competency:** Demonstrate global professional competencies by attaining interdisciplinary knowledge through specialized certifications offered on international learning platforms.

#### **V. Program Outcome:**

**PO 1:Physiotherapeutic Knowledge:** Apply comprehensive physiotherapeutic understanding and specialized knowledge for analysing the functional aspects of the human body.

**PO 2:Problem Analysis and Modern Approaches:** Assess, analyse and detect complex human dysfunction using suitable diagnostic techniques, and design respective physiotherapeutic solutions applying modern treatment approaches concerning healthcare policies and practices.

**PO 3:Circumstantial Rehabilitation:** Implement customized practices and management strategies in varying circumstantial conditions for solving physiotherapeutic problems and better rehabilitative outcomes of clinical practice in the community.

**PO 4:Research-In-Practice:** Exhibit proficiency in utilizing high-quality evidence-based strategies that lead to excellence in professional practice.

**PO 5:Communication:** Communicate effectively with patients/ diverse healthcare teams to comprehend health issues and be able to write effective reports.

**PO 6:Professional Ethics:** Demonstrate commitment to ethical values adhering to the highest standard of integrity and accountability in the profession.

**PO 7:Teamwork and Leadership:** Function effectively as an individual or a member/ leader in diverse healthcare settings and teams.

**PO 8:Lifelong Learning:** Ability to work independently and consistently acquire expertise in the continually developing domain of physiotherapeutic treatment methods and technology, while remaining adaptable to the dynamic changes in healthcare within society.

**Total Credits to be Earned: 85**

#### **Career Prospects:**

Physiotherapy is delivered in a variety of settings which allow it to achieve its purpose. Prevention, health promotion, treatment/intervention, rehabilitation and rehabilitation take place in multiple settings that may include, but are not confined to, the following:

1. Community based rehabilitation programmes.
2. Community settings including primary health care centres, individual homes, and field settings.
3. Education and research centres.

4. Fitness clubs, health clubs, gymnasias and spas.
5. Hospices.
6. Hospitals.
7. Nursing homes.
8. Occupational health centres.
9. Out-patient clinics.
10. Physiotherapist private offices, practices, clinics.
11. Prisons.

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 40% or as prescribed by the programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Seem Exam – I (ISE-I) (Written Examination)*	30
2.	In-Seem Exam – II (ISE-II) (Written Examination)*	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*are compulsory*

**Note:** Total Internal assessment should be out of 40

### INSTRUCTION

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.
2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.
3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

## B. SEMESTER END EXAMINATION:

Time table for end semester examination is published at least 25 days prior to the start of Examination.

### I. Pre-Examination:

#### Eligibility Criteria for a student to appear in University Examinations:

The student shall only be allowed to appear in a University Examination, if:

- i) He/ She is a registered student of the University;
- ii) He/ She is of good conduct and character;
- iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

### II. Admit Card:

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds.

### III. Pattern of Question Papers:

The question paper shall follow the principles of Bloom's Taxonomy.  
Table

S. N.	Level	Questions /verbs for test
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify
4	Analyse	Classify, outline, categorize, analyse, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.
6	Create	Design, Formulate, Modify, Develop, integrate, etc.

**Note:** No course is to be evaluated on basis of **all 6 knowledge levels**.

The format of the question paper across all the program follow a unique pattern and the total marks is 60



**Table 1: Question paper pattern for End semester examination**

<b>Sl no</b>	<b>Question pattern</b>	<b>Total marks</b>
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

#### **V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

#### **VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Office-in-Charge of the centre may take appropriate decisions as per the rules and procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

#### **VII. Instruction to the Students:**

- (i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- (ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.

- (iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.
- (iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- (v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- (vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- (vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.
- (viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- (ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

### **VIII. Provision for an Amanuensis (writer):**

- (i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.
- (ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.
- (iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process.

### **C. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times CR$

#### **i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

## ii. Grade Point:

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

## iii. Letter Grade:

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

Letter Grade	Grade Points	Description
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

#### iv. Grade Point Average:

##### a. SGPA (Semester Grade Point Average)

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades 'O' to 'F' as given in Table 1.

$$\text{SGPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  registered Course and  $C_i$  is the Credit (weight) of that Course.

##### b. CGPA (Cumulative Grade Point Average)

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrolment in the Programme. In other words, taking into account all the Courses graded with 'O' to 'P' as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrolment.
- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  completed Course and  $C_i$  is the Credit (weight) of that Course.

$$\text{CGPA} = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

- (iii) The CGPA shall be convertible into equivalent percentage of marks using Equation  
Conversion of CGPA to percentage marks: = CGPA\*10

## **D. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### **ii. Grievance Readdress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.
- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite preform available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.

- (vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.
- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.
- (ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# INSTRUCTION TO TEACHERS AND STUDENTS

## (Teaching and Learning Methods)

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

### 1. Student-centric / Constructivist Approach:

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer and discuss in the successive class. This will help in the preparation for various competitive examination and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the

teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student-centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

**The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures	20%
Student-centric Approach, Students present and deliver lectures in the presence of Teacher and supervised by teacher	60%
Students visit fields or perform experiments or teachers perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

**Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned approaches and prepare a lesson plan for execution and maintain a file.



## Curriculum Framework

### Breakdown of Credits

<b>Sl. No</b>	<b>Category</b>	<b>Total number of Credits</b>
1	University Core(UC)	10
2	University Elective (UE)	10
3	Program Core(PC)	48
4	Program Elective (PE)	12
5	Faculty Elective (FE)	05
<b>Total number of credit</b>		<b>85</b>

### Breakdown by categories of courses

<b>Sl no</b>	<b>Category</b>	<b>Credits</b>	<b>%</b>
1	Physiotherapy	71	83.53%
2	Science	6	7.06 %
3	Engineering & computer sciences	1	1.1 8%
4	Humanities and social sciences	7	8.26 %
<b>Total</b>		<b>85</b>	<b>100%</b>

## SEMESTER WISE COURSE DISTRIBUTION

	S. N.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total
					L	T	P	S	R	O		IA*	SEE*	PE*	
<b>Semester I</b>	1.	<b>22MPTO111R</b>	Principles Of Physiotherapy Practice	PC-N/A-N/A	3	0	0	0	0	0	3	40	60	0	<b>100</b>
	2	<b>22MPTO112R</b>	Movement Science	PC-N/A-N/A	3	0	6	0	0	0	3+3=6	40	60	100	<b>200</b>
	3	<b>22UMPD111R</b>	Effective English	UE-AEC-SEC	0	0	2	0	0	0	1	0	0	100	<b>100</b>
	4	<b>22UMFS111R</b>	Fundamentals of Statistics	UC-N/A-N/A	2	0	2	0	0	0	3	40	60	100	<b>200</b>
	5	<b>22MPTO113R</b>	Mini Research (Review of literature-R1)	PC-N/A-N/A	0	0	0	4	8	0	2	0	0	100	<b>100</b>
	6	<b>22MOCE101R</b> <b>22MOCE102R</b> <b>22MOCE103R</b>	MOOCs-I*** <sup>1</sup> (Coursera)	FE	-	-	-	-	-	-	1	0	0	100	<b>100</b>
	<b>Total</b>										<b>16</b>	<b>120</b>	<b>180</b>	<b>500</b>	<b>800</b>
<b>Semester II</b>	1.	<b>22MPTO121R</b>	Exercise Physiology	PC-N/A-N/A	3	0	0	0	0	0	3	40	60	0	100
	2	<b>22MPTO122R</b>	Electro Physiology	PC-N/A-N/A	3	0	0	0	0	0	3	40	60	0	100
	3	<b>22MPTO123R</b>	Physical & Functional Diagnosis	PC-N/A-N/A	3	0	6	0	0	0	3+3=6	40	60	100	200
	4	<b>22MOCE104R2</b> <b>2MOCE105R</b>	MOOCs-II*** <sup>2</sup> (Coursera)	FE-N/A-N/A	-	-	-	-	-	-	2	0	0	100	100
	5	<b>22UMPD121R</b>	Communication Mastery (Communicative English & Soft Skills)	UE-AEC-SEC	0	0	4	0	0	0	2	0	0	100	100
	6	<b>22UHU105R</b>	Universal Human Value (UHV) + PROFESSIONAL ETHICS	UC-VAC-AECC	1	0	2	0	0	0	2	40	60	0	100
	7	<b>22MPTO101R</b>	Preventive Medicine (Generic /Open/ University Elective)	UE-N/A-N/A	2	0	0	0	0	0	2	40	60	0	100
	8	<b>22UMRM121R</b>	Research Methodology and Statistical Analysis	UC-N/A-N/A	1	0	0	4	0	0	2	40	60	0	100
	9	<b>22MPTO124R</b>	Pedagogy of Physiotherapy Education (Techno Professional Skill – I)	PC-AEC-AECC	0	0	4	0	0	0	2	0	0	100	100

	10	22MPTO125R	Mini Research (Research gap analysis- R2)	PC-N/A- N/A	0	0	0	4	16	0	3			0	0	100	100
	11	22UCDL103R	Computational systems and digital world(Digital Literacy)	UE	0	0	2	0	0	0	1			0	0	100	100
Total											28	240	360	600	1200		
Semester III	S. No.	Course Code	Course Title	Course Category	Engagement						Maximum Marks for						
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total		
	1.	22MPTO211R	Physiotherapeutics	PC-N/A- N/A	3	0	6	0	0	0	3+3= 6	40	60	100	200		
	2	22MPTO212R	<b>Elective:</b> Musculoskeletal Disorders and Sports	PE-N/A- N/A	3	0	6	0	0	0	3+3= 6**	40	60	100	200		
	3	22MPTO213R	<b>Elective:</b> Neurological And Psychosomatic Disorders	PE-N/A- N/A	3	0	6	0	0	0							
	4	22MPTO214R	<b>Elective:</b> Cardio-Respiratory Disorders	PE-N/A- N/A	3	0	6	0	0	0							
	5	22MPTO215R	<b>Elective:</b> Paediatrics	PE-N/A- N/A	3	0	6	0	0	0							
	6	22MPTOMC01 22MPTOMC02 22MPTOMC03	MOOCs-III*** <sup>3</sup> (Coursera)	FE-N/A- N/A	0	0	0	0	0	0	1		0	0	100	100	
	7	22UMPD211R	Corporate Proficiency (Communicative English & Soft Skills)	UE-AEC- SEC	0	0	4	0	0	0	2		0	0	100	100	
	8	22MPTOGE01	A Life of Happiness And Fulfilment (Generic/Open/University Elective) (Coursera)	UE-N/A- N/A	-	-	-	-	-	-	2		0	0	100	100	
	9	22UMRE214R	Research Ethics	UC-N/A- N/A	1	0	0	0	0	0	1		40	60	0	100	
	10	22MPTO216R	Physiotherapy In Health Management and Administration (Techno Professional Skill – II)	PC-AEC- AECC	0	0	4	0	0	0	2		0	0	100	100	
	11	22MPTO217R	Mini Research (Survey/experiments)-R3	UC-N/A- N/A	0	0	0	4	8	0	2		0	0	100	100	
Total											22	120	180	700	1000		
Semester IV	S. No.	Course Code	Course Title	Course Category	Engagement						Maximum Marks for						
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total		
	1	22MPTO221R	Elective:Musculoskeletal Disorders and Sports	PE-N/A- N/A	3	0	6	0	0	0	3+3= 6**	40	60	100	200		
2	22MPTO222R	Elective: Neurological And Psychosomatic	PE-N/A- N/A	3	0	6	0	0	0								

			Disorders													
3		22MPTO223R	Elective:Cardio-Respiratory Disorders	PE-N/A-N/A	3	0	6	0	0	0						
4		22MPTO224R	Elective:Paediatrics	PE-N/A-N/A	3	0	6	0	0	0						
5		22MPTO225R	R4-Dissertation	PC	-	-	20	4	8	-	12	0	0	100	100	
6		22MPTOMC04	MOOCs-IV*** <sup>4</sup>	FE				-	-	-		0	0	100	100	
		22MPTOMC05				-	-	-				1				
		22MPTOMC06														
		<b>Total</b>									19	40	60	300	400	

**\*IA: Internal Assessment, SEE: Semester End Examination, PE: Practical Examination**

**\*\* Program elective (PE): Students must take any one course**

**\*\*\*<sup>1</sup> MOOC-I**

1. Science of Exercise
2. ADHD
3. Healthy practices: nutrition, physical activity, and community and family participation

**\*\*\*<sup>2</sup> MOOC-II**

1. Designing your personal weight loss plan.
2. Scientific writing in health research

**\*\*\*<sup>3</sup> MOOC-III**

1. Introduction to genetics and evolution
2. Social psychology
3. The Arts and science of relationships: Understanding human needs

**\*\*\*<sup>4</sup> MOOC-IV**

1. Easing the burden of Obesity, diabetes, and cardiovascular diseases
2. Introduction to Forensic science.
3. Violence against Health care

SEMESTER – I									
Course Title	PRINCIPLES OF PHYSIOTHERAPY PRACTICE								
Course code	22MPTO111R	TOTAL CREDITS: 3	L	T	P	S	R	O/F	C
		TOTAL HOURS: 45	3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Physiotherapy								
Semester	1 <sup>st</sup> Semester								
Course Objectives (Minimum 3)	<p>1. At the end of the course, the candidate will acquire the knowledge of a Ethical Codes of Physiotherapy practice, Moral and Legal aspects of Physiotherapy practice.</p> <p>2. Introduce the students to the concepts related development of Physiotherapy Profession, History taking , assessment, tests, Patient communication, documentation of findings and treatment planning.</p> <p>3. Documentation of rehabilitation assessment and management using International Classification of Functioning Disability and Health, Standardized tests and scale used in various conditions.</p> <p>4. Practice different exercise therapy techniques and gain confidence in performing these skills before implementing the same on the patients so that high quality patient care is ensured.</p>								
CO1	Understand Ethical codes of Physio Therapy practice.								
CO2	Understand moral and legal aspects Constitutions and Function of the Indian Association of Physiotherapists								
CO3	Impart the knowledge with the undergraduate student								
CO4	Acquire the brief knowledge of role of W.H.O. and W.C.P.T.								
CO5	Acquire the managerial & management skills in planning, implementation, & administration in clinical practice (service / self-employment) & academic activities including the skill of Documentation & use of information technology in professional practice.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Development of Physiotherapy Profession.	5	Learn about history of physiotherapy profession, recent development of physiotherapy profession					1,2	
II	Ethical issues in practice of physiotherapy- a. Clinical, Research and Academics. b. Administration, legislation, rules and regulations governing physiotherapy practice- National & International (WCPT and IAP). c. Scope of Physiotherapy in Hospital, Community & Industry.	10	Learn about Clinical, Research, Administration, legislation and regulations governing physiotherapy practice.					1,2, 3,4	
III	History taking, assessment, tests, Patient communication, documentation of findings, treatment Organization and planning/execution for	10	Learn about Physiotherapyassessment, treatment planning, use of various tools and interventions.					1,2, 3,4	

	intervention.			
<b>IV</b>	Documentation of rehabilitation assessment and management using International Classification of Functioning Disability and Health (ICF)	<b>8</b>	Learn about classification of various model of ICF	1,2,3,4,5
<b>V</b>	Standardized tests and scales used in various types of cases for assessment and interpretation in Physiotherapy practice.	<b>12</b>	Learn about various Tests and Scales use in Physiotherapy Practice.	1,2,3,4,5,6

**Text Books:**

1. Physical therapy Research- Domholdt, W.B Saunders, Philadelphia. 1993
2. Public power & Administration – Wilenski, Hale & Iremonger, 1999

**Reference Books:**

1. Public Therapy administration & Management – Hickik Robert
2. Management Principles for physiotherapists – Nosse Lorry

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand Ethical codes of Physio Therapy practice.	<b>1,2,3,4,5,6,7,8,9</b>
<b>2</b>	Understand moral and legal aspects Constitutions and Function of the Indian Association of Physiotherapists	<b>1,2,3,4,5,6,7,8,9</b>
<b>3</b>	Impart the knowledge with the undergraduate student	<b>1,2,3,4,5,6,7,8,9</b>
<b>4</b>	Acquire the brief knowledge of role of W.H.O. and W.C.P.T.	<b>1,2,3,4,5,6,7,8,9</b>
<b>5</b>	Acquire the managerial & management skills in planning, implementation, & administration in clinical practice (service / self-employment) & academic activities including the skill of Documentation & use of information technology in professional practice.	<b>1,2,3,4,5,6,7,8,9</b>

**MAPPING TABLE**

<b>Course Name: PRINCIPLES OF PHYSIOTHERAPY PRACTICE</b>													
<b>Course Code: 22MPTO1 11R</b>	<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PS O1</b>	<b>PS O2</b>	<b>PSO 3</b>
	<b>CO1</b>	3	2	1	1	2	3	1	1	2	3	1	1
	<b>CO2</b>	1	1	1	1	2	2	1	1	1	2	1	1
	<b>CO3</b>	2	2	2	1	1	1	2	2	2	1	1	1
	<b>CO4</b>	2	2	1	3	1	1	2	2	2	1	1	1
	<b>CO5</b>	1	2	1	1	2	2	2	2	2	1	1	1
	<b>Average</b>	1.8	1.8	1.2	1.4	1.6	1.8	1.6	1.6	1.8	1.6	1	1
	<b>Count</b>	9	9	6	7	8	9	8	8	9	8	5	5

SEMESTER – I									
Course Title	MOVEMENT SCIENCE								
Course code	22MPTO112R	TOTAL CREDITS: 6	L	T	P	S	R	O/F	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Physiotherapy								
Semester	1 <sup>st</sup> Semester								
Course Objectives (Minimum 3)	1. Introduce the students to the concepts related to Biomechanics of tissues & structures of musculoskeletal system. 2. Normal & Applied Biomechanics, Biomechanics of Posture, Biomechanics of: Respiration, Circulation, Hand function, Gait.								
CO1	Acquire the updated knowledge of the Patho-mechanics of the human movement and apply the principles of Biomechanics in functional analysis of movement Ergonomic analysis / advice prosthesis /Orthosis.								
CO2	Plan out & train in the application of lower limb, upper prostheses, Spinal /lower / upper extremity Orthoses used as mobility aids								
CO3	Design the ergonomic alternations at the work place industry and to fabricate, temporary hand splints and functional splints for gait training.								
CO4	Acquire and apply the skill in disability evaluation and will be able to certify the same.								
CO5	Comprehend the subject at the undergraduate level Course Content Topic.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Biomechanics of tissues &amp; structures of musculoskeletal system:</b> a. Bone, Articular Cartilage, Tendons & Ligaments b. Peripheral Nerves & Spinal Nerve Roots, Skeletal Muscle	5	To learn about the biomechanics of bones, connective tissue, muscles etc.					1,2	
II	<b>Normal &amp; Applied Biomechanics of:</b> a. Spine b. Upper extremity c. Lower extremity	5	To learn about the normal & applied Biomechanics of Spine, Upper extremity & Lower extremity					1,2, 3,4	
III	<b>Biomechanics of Posture</b> Biomechanics of: a. Respiration, Circulation, Hand function Gait	10	To learn about the Biomechanics of Posture, respiration, hand function, Gait					1,2, 3,4	
IV	<b>Methods of Kinetics &amp; Kinematics investigation</b>	15	To learn about the Methods of Kinetics & Kinematics investigation					1,2, 3,4, 5	
V	Patient Positioning, Body Mechanics & Transfer Techniques Ergonomic Approach to lifting & handling, workplace & environment	10	To learn about the Ergonomic Approach, Patient Positioning, Body Mechanics & Transfer Techniques					1,2, 3,4, 5,6	
Practical	1. Students will be better prepared to assess and treat musculoskeletal and movement disorders. 2. Students can contribute to advancing rehabilitation techniques and technologies. 3. Skills in kinetics and kinematics investigation prepare students for careers in biomechanical research and development.	90	To learn about the Ergonomic Approach, Patient Positioning, Body Mechanics & Transfer Techniques					1,3, 4,6	



	<p>4. Knowledge of the biomechanics of the shoulder, elbow, wrist, and hand helps students understand the mechanics of upper limb movements.</p> <p>5. Students can apply this knowledge to design better rehabilitation protocols for patients recovering from upper extremity injuries.</p>			
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**TEXT BOOKS:**

1. Biomechanics and motor control of human movement by [David A. Winter](#).
2. Joint Structure and Function A Comprehensive Analysis (Kindle Edition) by [Pamela K. Levangie](#)

**REFERENCE BOOKS:**

Sustainable fitness: a practical guide to health, healing, and wellness by [Z. Altug](#).

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquire the updated knowledge of the Pathomechanics of the human movement and apply the principles of Biomechanics in functional analysis of movement Ergonomic analysis / advice prosthesis /Orthosis.	1,2,3,4,5,6,7,8,9
2	Plan out & train in the application of lower limb, upper prostheses, Spinal /lower / upper extremity Orthoses used as mobility aids	1,2,3,4,5,6,7,8,9
3	Design the ergonomic alternations at the work place industry and to fabricate, temporary hand splints and functional splints for gait training.	1,2,3,4,5,6,7,8,9
4	Acquire and apply the skill in disability evaluation and will be able to certify the same.	1,2,3,4,5,6,7,8,9
5	Comprehend the subject at the undergraduate level Course Content Topic.	1,2,3,4,5,6,7,8,9

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

**MAPPING TABLE**

	Course Name: Movement science													
Course Code: 22MPTO11 2R	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	
	CO1	3	2	2	2	1	1	2	2	2	3	2	1	
	CO2	2	2	2	2	1	1	2	2	2	2	2	1	
	CO3	2	2	2	1	1	1	2	2	2	2	1	1	
	CO4	1	2	2	3	1	1	2	2	2	2	1	1	
	CO5	3	2	2	2	1	1	2	2	2	1	1	1	
	Average	2.2	2	2	2	1	1	2	2	2	2	1.4	1	
	Count	11	10	10	10	5	5	10	10	10	10	7	5	

<b>COURSE TITLE</b>	<b>EFFECTIVE ENGLISH</b> (Communicative English & Soft Skills)								
<b>COURSE CODE</b>	22UMPD111R	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS:60P</b>							
			<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL						
<b>ANTI-REQUISITE</b>	NIL								
<b>PROGRAMMES</b>	Mater of Physiotherapy								
<b>SEMESTER</b>	Fall/I Semester of First Year of the Programme.								
<b>Semester</b>	<b>1<sup>st</sup> Semester</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>To encourage proficient interaction and interpersonal abilities.</li> <li>To surmount communication obstacles and elevate the caliber of interpersonal Engagements.</li> <li>To provide students with the expertise and insight required to craft persuasive and Efficient job application materials.</li> <li>To enable students to convey messages with assurance and effectiveness in Public environments.</li> <li>To boost students' lexicon and refine their mastery of the English language.</li> </ol>								
<b>CO1</b>	Cultivate self-assurance in speech through enhanced pronunciation.								
<b>CO2</b>	Enable to grasp the intricacies of the communication process and recognize potential Barriers.								
<b>CO3</b>	Acquire skills in delivering effective presentations								
<b>CO4</b>	Enable to craft resumes and gain insight into the realm of professional Networking.								
<b>CO5</b>	Understand the importance of nonverbal communication cues								
<b>CO6</b>	Broaden their lexicon and elevate their proficiency in the English language.								

**Text Books:**

- Wren,P.CandMartin,H.1995.*HighSchool English Grammar and Composition*, SChand Publishing.
- English Grammar in Use*, Raymond Murphy 4th edition,CUP.
  - Barrett,Grant.2016.*Perfect English Grammar:The Indispensible Guide to Excellent Writing and Speaking*,Zephyros Press.

**Reference Books:**

- 1.English Vocabulary in Use(Advanced),Michael McCarthy and Felicity, CUP.

2. Effective Communication and Soft Skills, Nitin Bhatnagar, Pearsons.

### **Other Learning Resources:**

- <https://www.classcentral.com/report/toefl-preparation/>
- <https://brightlinkprep.com/10-best-toefl-prep-books/>

### **Module1-Grammar**

- i. Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences
- ii. Types of Tenses
- iii. Common Errors
- iv. Synonyms
- v. Antonyms
- vi. Homonyms

### **Module2-ReadingSkills**

- i. Techniques of Effective Reading
- ii. Gathering ideas and information from a text The SQ3R Technique

Interpret the text

### **Module3-ListeningSkills**

- i. What is listening?
- ii. The Process of Listening
- iii. Factors that adversely affect Listening
- iv. Difference between Listening and Hearing,
- v. Purpose and Importance of Effective Listening
- vi. How to Improve Listening Process,

### **Module4-Conflict Management**

- i. Definition
- ii. Type of Conflict Management
- iii. Effects of Conflict Management
- iv. Methods to deal with Conflicts(Negative)

### **Module5-Time-ManagementSkills**

- i. Introduction To Time Management,
- ii. Purpose And Importance of Time Management,
- iii. Basic Tips to Maintain Time.

Activity: Problem solving activity: A situation will be given to the students and they will have to tell us how to handle the situation or solve the problem.

<b>COURSE TITLE</b>	<b>FUNDAMENTAL OF STATISTICS</b>								
<b>COURSE CODE</b>	22UMFS111R	<b>TOTAL CREDITS:3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS:30T+30P</b>	2	0	2	0	0	0	3
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL						
<b>ANTI-REQUISITE</b>	NIL								
<b>PROGRAMMES</b>	All PG Programme								
<b>SEMESTER</b>	First Semester								

### Unit-I

Statistical Methods: Definition and scope of Statistics, concepts of statistical population and sample. Data: quantitative and qualitative, attributes, variables, scales of measurement nominal, ordinal, interval and ratio.

### Unit-II

Presentation: tabular and graphical, including histogram and ogives. Measures of Central Tendency: mathematical and positional. Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation, skewness and kurtosis

### Unit-III

Bivariate data: Definition, scatter diagram, simple, partial and multiple correlation (3 variables only), rank correlation. Simple line regression, fitting of polynomials and exponential curves.

### Unit-IV

Random experiment: trial, sample point and sample space, event, Operations of Events, concepts of mutually exclusive and exhaustive events. Definition of probability: classical and relative frequency approach. Discrete probability space, Properties of probability, Independence of events, Conditional probability, total and compound probability rules, Normal probability Distribution, Binomial probability Distribution, Poisson Probability Distribution, Bayes' theorem and its applications.

### Unit-V

Testing of hypothesis, parametric test: t-test, z-test, chi-square test. Non-Parametric test: One sample Kolmogorov test, Wilcoxon Signed test, Mann-Whitney Test, Kruskal-Wallis test

SEMESTER – I									
<b>Course Title</b>	<b>Mini research(Review of literature-R1)</b>								
<b>Course code</b>	<b>22MPTO113R</b>	<b>TOTAL CREDITS:2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>8</b>	<b>0</b>	<b>2</b>
		<b>TOTAL HOURS:</b>							
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Program me</b>	<b>Master of Physiotherapy</b>								
<b>Semester</b>	<b>1<sup>st</sup> Semester</b>								
<b>Course Objectives (Minimum 3)</b>	1. To learn to review and assess scientific literature critically. 2. To write and present an overview of the relevant literature for a specific research topic.								
<b>CO1</b>	Identify the most relevant textbooks, reviews, papers and journals for their research topics.								
<b>CO2</b>	Understand how to critically read and assess research papers and reviews								
<b>CO3</b>	Understand the procedure of writing systematic literature review.								
<b>CO4</b>	Apply the understanding of a systematic literature review on their chosen topics.								
<b>CO5</b>	Gain familiarity with the current knowledge in your chosen field, as well as the boundaries and limitations of that field.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	Introduction to Literature Review/Scholarly Writing: both Indian & foreign, Chronological reporting Gap in Research on topic Literature, Need for Literature Review, Theoretical and Conceptual framework, of review of literature of the study. Web Search Sources of Review of	4	Construct foundational knowledge and techniques of scholarly writing chronologically					1,2	
<b>II</b>	and using Advanced Search Techniques for Research through internet.							1,2,3,4	
<b>III</b>	Referencing style: Referencing and various formats for reference Writing of books and research papers.	15	Capable of referencing various sources					1,2,3,4	

<b>IV</b>	Ethical considerations in research: Ethical considerations for conducting research and publication	14	Learn about the importance of ethical consideration in research writing	1,2,3,4
<b>V</b>	Practical training in Literature review: Selecting one of the major key concepts and variables from the topic of the research and writing review literature with different sources and its assessment by the Supervisor.	10	Able to select one of the major key concepts and variables from the chosen Research topic.	1,2,3,4

**Text Books:**

1. Fink, A. (2019). *Conducting research literature reviews: From the internet to paper*. Sage publications.

**Reference Books:**

1. Fink, A. (2019). *Conducting research literature reviews: From the internet to paper*. Sage publications.
2. Cooper, H. (1998). Cooper, Harris, *Synthesizing Research: A Guide for Literature Reviews*, Thousand Oaks, CA: Sage, 1998.
3. Hart, C. (2018). *Doing a literature review: Releasing the research imagination*.

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Identify the most relevant textbooks, reviews, papers and journals for their research topics.	1,2,3,4,5,6,7,8,9
2	Understand how to critically read and assess research papers and reviews	1,2,3,4,5,6,7,8,9
3	Understand the procedure of writing systematic literature review.	1,2,3,4,5,6,7,8,9
4	Apply the understanding of a systematic literature review on their chosen topics.	1,2,3,4,5,6,7,8,9
5	Gain familiarity with the current knowledge in your chosen field, as well as the boundaries and limitations of that field.	1,2,3,4,5,6,7,8,9

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

**MAPPING TABLE**

<b>Course Name:Mini Research(Review of literature-R1)</b>												
<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
<b>CO1</b>	3	2	2	2	1	1	2	2	2	3	2	1
<b>CO2</b>	3	3	2	2	2	1	2	2	2	3	2	1
<b>CO3</b>	2	2	2	1	1	1	1	1	2	2	3	1
<b>CO4</b>	2	2	2	2	1	1	2	2	2	2	3	1
<b>CO5</b>	3	2	2	2	1	1	2	2	2	3	2	1
<b>Average</b>	<b>2.6</b>	<b>2.2</b>	<b>2</b>	<b>1.8</b>	<b>1.2</b>	<b>1</b>	<b>1.8</b>	<b>1.8</b>	<b>2</b>	<b>2.6</b>	<b>2.4</b>	<b>1</b>
<b>Count</b>	<b>13</b>	<b>11</b>	<b>10</b>	<b>9</b>	<b>6</b>	<b>5</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>5</b>

<b>Subject Code</b>	<b>Subject Name</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>
22MPTO111R	PRINCIPLES OF PHYSIOTHERAPY PRACTICE	3	2	1	3	3	3	2	1	1
22MPTO112R	MOVEMENT SCIENCE	3	3	3	3	3	2	1	3	2
22UMPD111R	EFFECTIVE ENGLISH (Communicative English & Soft Skills)	1	1	1	3	3	3	3	3	2
22UMFS111R	Fundamentals of Statistics	3	3	3	3	2	3	2	2	2
22MPTO113R	Mini Research (Review of literature-R1)	3	3	2	2	2	2	3	3	2
22MOCE101R/22MOCE102R/22MOCE103R	MOOCs-I	1	2	1	2	2	3	3	1	2



SEMESTER – II									
<b>Course Title</b>	EXERCISE PHYSIOLOGY								
<b>Course code</b>	22MPTO121R	<b>TOTAL CREDITS: 3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS: 45T</b>	3	0	0	0	0	0	3
<b>Pre-requisite</b>	EXERCISE THERAPY & HUMAN PHYSIOLOGY	<b>CO-REQUISITE</b>	NIL						
<b>Programme</b>	Master of Physiotherapy								
<b>Semester</b>	2 <sup>nd</sup> Semester								
<b>Course Objectives (Minimum 3)</b>	<p>1. Introduce the students to the concepts related Sources of Energy, Physiology of Movement, Environmental influence on Performance, Special aids to performance and conditioning, Body consumption, nutrition and caloric balance, Considerations of age and sex in exercise and training.</p> <p>2. Exercise prescription for cardiovascular disease, Obesity and Diabetes, Fatigue assessment.</p>								
<b>CO1</b>	1. Acquire and apply the update knowledge of Physiology and Physical exercise & will be able to interpret the physiological effects of the vital parameters of simple laboratory tests, “Stress Test”								
<b>CO2</b>	2. Acquire and apply the skill of using Bicycle – Ergometer& Treadmill for the purpose of General Fitness & Exercise tolerance for Healthy persons.								
<b>CO3</b>	3. Plan out & train for general fitness & health promotion for children, pregnant/ lactating females, Obese & elderly subjects.								
<b>CO4</b>	4. Design exercise prescription to improve health and fitness for obese and diabetic person.								
<b>CO5</b>	5. Impart knowledge for training the undergraduate student.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	Sources of Energy, Energy Transfer and Energy Expenditure at rest and various physical activities.	9	To learn about the Sources of Energy, Energy Transfer and Energy Expenditure at rest and various physical activities.					1,2	
<b>II</b>	Physiology of Movement	9	To learn the Physiology of Movement					1,2, 3,4	
<b>III</b>	Responses and Adaptations of various systems to Exercise and training. Environmental influence on Performance.	9	To learn about the adaptations of various systems to Exercise and training. Environmental influence on Performance.					1,2, 3,4	
<b>IV</b>	Special aids to performance and conditioning. Body consumption, nutrition and caloric balance. Considerations of age and sex in exercise and training.	9	To learn about the Special aids to performance and conditioning. Body consumption, nutrition and caloric balance.					1,2, 3,4	
<b>V</b>	Exercise prescription for health and fitness with special emphasis to cardiovascular disease, Obesity and Diabetes. Fatigue assessment and scientific organization of work-rest regimes to control	9	To learn about the Exercise prescription for health and fitness with special emphasis to cardiovascular disease, Obesity and					1,2, 3,4, 5	

fatigue.		Diabetes.	
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**TEXT BOOKS:**

1. Advanced Exercise Physiology (English, Hardcover, Ehrman Jonathan K.)

**REFERENCE BOOKS:**

Exercise Physiology Paperback – 1 January 2016 by B Srilakshmi

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	1. Acquire and apply the update knowledge of Physiology and Physical exercise & will be able to interpret the physiological effects of the vital parameters of simple laboratory tests, “Stress Test”	1,2,3
2	2. Acquire and apply the skill of using Bicycle – Ergometry& Treadmill for the purpose of General Fitness & Exercise tolerance for Healthy persons.	1,2,3
3	3. Plan out & train for general fitness & health promotion for children, pregnant/ lactating females, Obese & elderly subjects.	1,2,3
4	4. Design exercise prescription to improve health and fitness for obese and diabetic person.	1,2,3
5	5. Impart knowledge for training the undergraduate student.	1,2

**MAPPING TABLE**

Course Name: EXERCISE PHYSIOLOGY													
Course Code: 22MPT01	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3
	CO1	3	2	2	1	2	1	2	2	2	2	2	1

<b>21R</b>	<b>CO2</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>2</b>
	<b>CO3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>
	<b>CO4</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>
	<b>CO5</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>
	<b>Average</b>	<b>1.6</b>	<b>1.8</b>	<b>1.8</b>	<b>1.8</b>	<b>1.8</b>	<b>1.6</b>	<b>2</b>	<b>2</b>	<b>1.6</b>	<b>2</b>	<b>1.6</b>	<b>1.6</b>
	<b>Count</b>	<b>8</b>	<b>9</b>	<b>9</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>10</b>	<b>8</b>	<b>8</b>

SEMESTER – II									
Course Title	ELECTRO PHYSIOLOGY								
Course code	22MPTO122R	TOTAL CREDITS: 3	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	ELECTRO THERAPY & HUMAN PHYSIOLOGY	CO-REQUISITE	NIL						
Programme	Master of Physiotherapy								
Semester	2 <sup>nd</sup> Semester								
Course Objectives (Minimum 3)	<p>1. Introduce the students to the concepts related Characteristics and components of Electro therapeutic stimulation systems, Instrumentation for neuromuscular electrical stimulation, Anatomy and physiology of peripheral nerve, muscle and neuromuscular junction, Electrical properties, Clinical Electro physiological testing.</p> <p>2. Acquire the updated knowledge of production / biophysics as well as the Physiological / therapeutics effects (at the cellular levels) of various electrical currents, Thermal agents, ultra sound &amp; electro – magnetic forces &amp; potential risk factors on prolonged exposure..</p>								
CO1	Interpret the E.M.G. and nerve conduction studies with appropriate clinical reasoning								
CO2	Gain expertise in the skill of using various electrical currents for the purpose of Electro diagnosis and able to interpret the same.								
CO3	Understand different approaches in re-education of paralytic cases, different degrees of nerve injuries and its clinical implication								
CO4	Acquire the sound knowledge of E.M.G. machine for the simple electro diagnosis of motor unit and methodology of sensory and Motor conduction, Reflex study.								
CO5	Impart the knowledge about the muscles plasticity in response to electrical stimulation								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Characteristics and components of Electro therapeutic stimulation systems Electro-physiological assessment devices.		8	To learn the techniques of assessment using various electro-physiological devices.				1,2	
II	Instrumentation for neuromuscular electrical stimulation.  Electrical stimulation and its effects on various systems.		12	To learn the Electrical stimulation and its effects.				1,2, 3,4	
III	Anatomy and physiology of peripheral nerve, muscle and neuromuscular junction.		10	To learn about the Anatomy and physiology of peripheral nerve, muscle and neuromuscular junction.				1,2, 3,4	
IV	Electrical properties of muscle and nerve.  Clinical Electro physiological testing.		14	To learn about the Clinical Electro physiological testing				1,2, 3,4	
V	Muscles plasticity in response to electrical stimulation.		6	To learn about the muscles plasticity in response to electrical stimulation				1,2, 3,4, 5	

**TEXT BOOKS:**

1. Clinical Electrophysiology - Robinson
2. Electrotherapy Explain – Low & Read
3. Electrotherapy – Sheila Kitchen

**REFERENCE BOOKS:**

1. Clinical Neurophysiology – U K Mishra
2. Electro Diagnosis in Diseases of Nerve and Muscle – Jun Kimura
3. Fundamental of Neurophysiology – R F Schmidtj

**OTHER LEARNING RESOURCES:**

1. Subject related Journals, websites, link etc.
2. Google scholar
3. PubMed

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Interpret the E.M.G. and nerve conduction studies with appropriate clinical reasoning	1,2,3,4,5,6,7,8,9
2	Gain expertise in the skill of using various electrical currents for the purpose of Electro diagnosis and able to interpret the same.	1,2,3,4,5,6,7,8,9
3	Understand different approaches in re-education of paralytic cases, different degrees of nerve injuries and its clinical implication	1,2,3,4,5,6,7,8,9
4	Acquire the sound knowledge of E.M.G. machine for the simple electro diagnosis of motor unit and methodology of sensory and Motor conduction, Reflex study.	1,2,3,4,5,6,7,8,9
5	Impart the knowledge about the muscles plasticity in response to electrical stimulation	1,2,3,4,5,6,7,8,9

**MAPPING TABLE**

	Course Name: ELECTROPHYSIOLOGY													
Course	CO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO

<b>Code: 22MPTO12 2R</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>1</b>	<b>2</b>	<b>3</b>
	<b>CO1</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>
	<b>CO2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>
	<b>CO3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>
	<b>CO4</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>
	<b>CO5</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
	<b>Average</b>	<b>2</b>	<b>1.8</b>	<b>1.8</b>	<b>1.8</b>	<b>1</b>	<b>1</b>	<b>1.8</b>	<b>1.8</b>	<b>1.8</b>	<b>2.6</b>	<b>1</b>	<b>1</b>
	<b>Count</b>	<b>10</b>	<b>9</b>	<b>9</b>	<b>9</b>	<b>5</b>	<b>5</b>	<b>9</b>	<b>9</b>	<b>9</b>	<b>13</b>	<b>5</b>	<b>5</b>

**SEMESTER – II**

<b>Course Title</b>	<b>PHYSICAL AND FUNCTIONAL DIAGNOSIS</b>								
<b>Course code</b>	22MPTO123R	<b>TOTAL CREDITS: 6</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
			3	0	6	0	0	0	6
		<b>TOTAL HOURS: 45T+90P</b>							
<b>Pre-requisite</b>	ANATOMY, PHYSIOLOGY, CLINICAL ORTHOAEDICS, CLINICAL NEUROLOGY, CLINICAL CARDIOPULMONAR Y, EXERCISE THERAPY AND ELECTRO THERAPY	<b>CO-REQUISITE</b>	NIL						
<b>Programme</b>	Master of Physiotherapy								
<b>Semester</b>	2 <sup>nd</sup> Semester								
<b>Course Objectives (Minimum 3)</b>	1. Understand the theoretical basis and principles of manipulative skills, neurotherapeutic skills and skills of cardiopulmonary care and resuscitation 2. Perform assessment of measures of body structures and functions related to tissue mechanics.								
<b>CO1</b>	Understand the use of appropriate tools or instruments of assessment for diagnosis in various diseases and disorders including musculoskeletal, neurological and cardio-vascular pulmonary conditions								
<b>CO2</b>	Understand the use of diagnosis for physiotherapy practice.								
<b>CO3</b>	Learn the applied aspect of the subject for physiotherapy practice.								
<b>CO4</b>	Perform assessment of measures of body structures and functions related to tissue mechanics.								
<b>CO5</b>	Apply skills of manual therapy musculoskeletal, neuro-therapeutics and cardiovascular and respiratory skills on models.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	Clinical examination in general and detection of movement dysfunction. Principles of pathological investigations and imaging techniques related to neuromuscular, skeletal and cardiopulmonary disorders with interpretation. Pulmonary function tests and Spirometer	<b>22</b>	By the completion of this topics the students will be able to examine and detect movement dysfunctions of all the disorders related to neurology, orthopaedics, cardiopulmonary.					1,2	
<b>II</b>	Developmental screening, motor learning – motor control assessment. Evaluation of aging. EMG and Biofeedback.	<b>27</b>	By the end the students will know how to evaluate the EMG and biofeedback and developmental screening					1,2, 3,4	
<b>III</b>	Anthropometric measurements. Physical disability evaluation and disability diagnosis. Physical fitness assessment by Range of motion, Muscle strength, endurance and skills, Body consumption, Fitness test for sports.	<b>28</b>	The students will be able to know and apply anthropometric measurements, diagnose the physical disability and assess the ROM, strength and endurance.					1,2, 3,4	
<b>IV</b>	• Evaluation Methods, Special tests and Scales used in Musculoskeletal, Neurological and Cardiopulmonary disorders.	<b>28</b>	By the end the students will be able to know the evaluation methods using the scales in musculoskeletal,					1,2, 3,4	

	• Exercise ECG testing and monitoring.		neurological and cardiopulmonary disorders.	
<b>V</b>	Biophysical measurements, physiotherapy modalities, techniques and approaches. Aids and appliances, adaptive functional devices to improve movement dysfunction. Gait analysis and diagnosis.	<b>30</b>	By the end the students will be able to measure the biophysical measurements using modalities and techniques. Aids and appliances to improve the movement dysfunction.	1,2, 3,4, 5,6
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Anthropometric data analysis for health risks.</li> <li>2. Demonstrate the Utilization of standardized scales and tools for assessing disabilities</li> <li>3. Students practice techniques for assessing cardiovascular and respiratory function, including spirometer and cardiac stress tests.</li> <li>4. Students learn to conduct and interpret exercise ECG tests, essential for assessing cardiac function during physical activity. Techniques for evaluating balance, mobility, and cognitive function in elderly patients are covered, preparing students for work in geriatric care.</li> </ol>	<b>84</b>	By the end the students will be able to measure the biophysical measurements using modalities and techniques. Aids and appliances to improve the movement dysfunction	1,2, 5,6

#### **TEXT BOOKS:**

1. Orthopaedic Physical Assessment, Magee DJ. 5th edition. Saunders
2. Muscles: Testing and Function, with Posture and Pain: 5th edition. Kendall FP; McCreary EK  
et al. Lippincott Williams and Wilkins
3. Practical Exercise Therapy: 3rd edition. Hollis M; Cook PF. Wiley-Blackwell

#### **REFERENCE BOOKS:**

1. Training in the Community for the people with disabilities. Goerdet et al. World Health Organization
2. Hand Rehabilitation- A practical Guide. 2nd edition. Clark GL. Churchill Livingstone
3. Physiotherapy for Respiratory and Cardiac Problems. Adults and Paediatrics. 3rd ed. Pryor JA, Webber BA. London: Churchill Livingstone, 2002.
4. Training in the Community for the people with disability – Hallender Padmini Mendes Hand Physical Rehabilitation. Assessment and Treatment: 5th Edition. Sullivan SO; Schmitz TJ. F.A. Davis Company
6. Daniels and Worthingham's Muscle Testing: Techniques of Manual Examination. 8th edition. Hislop H; Montgomery J. Saunders Publication
7. Hand Rehabilitation – Toubiana



8. Therapeutic Exercise Moving toward Function: 3rd edition. Carie MH; Brody LT. Lippincott Williams and Wilkins.

9. Therapeutic Exercise: 6th edition. Carolyn K; Kolby. Jaypee Brothers Medical Publisher.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the use of appropriate tools or instruments of assessment for diagnosis in various diseases and disorders including musculoskeletal, neurological and cardio-vascular pulmonary conditions	1,2,3,4,5,6,7,8,9
2	Understand the use of diagnosis for physiotherapy practice.	1,2,3,4,5,6,7,8,9
3	Learn the applied aspect of the subject for physiotherapy practice.	1,2,3,4,5,6,7,8,9
4	Perform assessment of measures of body structures and functions related to tissue mechanics.	1,2,3,4,5,6,7,8,9
5	Apply skills of manual therapy musculoskeletal, neuro-therapeutics and cardiovascular and respiratory skills on models.	1,2,3,4,5,6,7,8,9

**MAPPING TABLE**

Course Name: PHYSICAL AND FUNCTIONAL DIAGNOSIS													
Course Code:22MPT012 3R	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO3
	CO1	3	2	2	1	2	1	2	2	2	3	1	1
	CO2	1	3	2	1	3	1	2	2	2	1	3	2
	CO3	1	3	3	3	2	3	2	2	2	3	2	3
	CO4	1	2	2	1	2	1	2	2	2	1	1	1
	CO5	1	1	1	1	2	1	1	1	1	1	1	1
	Average	1.4	2.2	2	1.4	2.2	1.4	1.8	1.8	1.75	1.8	1.6	1.6
	Count	7	11	10	7	11	7	9	9	9	9	8	8

<b>COURSE TITLE</b>	<b>COMMUNICATION MASTERY (Communicative English &amp; Soft Skills)</b>								
<b>COURSE CODE</b>	<b>22UMPD121R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS:60P</b>						<b>/F</b>	
			<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	<b>22UMPD111R</b> <b>Effective English</b>	<b>CO-REQUISITE</b>	NIL						
<b>ANTI-REQUISITE</b>	NIL								
<b>PROGRAMMES</b>	Master of Business Administration/Master of Business Administration in Healthcare Management/Master of Business Administration(Industry Integrated)/ Master of Business Administration on Business Analytics/Master of Social Work/Master of Arts in Applied Psychology/Master of Science in Clinical Psychology/Master of Arts in Sociology/Master of Physiotherapy/Master of Medical Laboratory Technology/Master of Emergency and Critical Care/Master of Science in Biotechnology/Master of Science in Microbiology/Master of Science in Food Nutrition and Dietetics/Master of Science in Botany/Master of Science in Zoology								
<b>SEMESTER</b>	Fall/I or Winter/II Semester of First Year of the Programme								

### Course Objectives:

1. To familiarize students with the transformation of sentences and the appropriate use of prepositions.
2. To enhance the writing skills indifferent areas including CV and cover letter writing.
3. To convey meaning by reinforcing, substituting for, contradicting verbal communication.
4. Productivity and performance boosting activities for professional goal achievement.

### Course

### Outcomes:

1. Practice of grammar will polish their writing skills.
2. It will enhance their communication and interpretative skills.
3. Introduction to behavioural skills, thoughts, and emotions will enable them to behave in a conscious and productive way.
4. It will have a positive impact in their thought process and problem-solving skills.

### Course Description:

The purpose of this course is to Train the learners on Employability related communication to enhance the students' performance during their group discussions and Personal Interviews. The combination of traditional lectures, power point presentations with other active teaching methodologies, such as group discussions, cooperative group solving problems, analysis of video scenes and debates will make them ready for their professional career.

### Text Books:

**Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.**

- McDowell, GayleLaakmann.2008.Cracking the Coding Interview (Indian Edition).

### References:

- Communication Skills Training: A Practical Guide to Improving Your Social Intelligence, Presentation and Social Speaking, Ian Tuhovsky, 2019
- A Textbook for AECC English Communication: Interface, Dr.Kironmoy Chetia and Pranami Bania Breez Mohan Hazarika, January 2019.

### Other Learning Resources:

- <https://youtu.be/x60GHpQ8gJk>
- [https://youtu.be/Ke\\_oSN-BCaY](https://youtu.be/Ke_oSN-BCaY)
- <https://youtu.be/TDPDtrLxT-c>
- <https://www.classcentral.com/report/toefl-preparation/>

### Module1-Grammar

- Use of Prepositions
- Tag questions
- Idioms, Phrases and Clauses
- Simple, complex, compound sentences

### Module2-Grammar

- Active and Passive Voice
- Direct and Indirect Speech

### Module3-WritingSkills

- The Basics of Writing; avoid ambiguity and vagueness
- Paragraph Writing
- Precise Writing
- Letter Writing
- Resume, CV and Cover Letter

### Module4-Self-Management Skills

- SWOT Analysis
- Self – Regulation – Goal Setting
- Personal Hygiene

### Module5-Non-Verbal Communication- Sciences of Body Language

- What is Non-Verbal Communication & Body Language,
- Elements of Communication,
- Types of Body Language,
- Importance and Impact of Body Language,
- Types of Communication through Body Language,
- Introduction to Haptic, Introduction to Kinesics,

- vii. Introduction to Proxemics,
- viii. Body Language Do's and Don'ts, Doubt Clearing Session.

## Module6- Group Discussion (Theory)

- i. Importance,
- ii. Planning, Elements, and Skills assessed;
- iii. Effectively disagreeing,
- iv. Initiating,
- v. Summarizing and Attaining the Objective

<b>COURSE TITLE</b>	<b>UNIVERSAL HUMAN VALUES(UHV)+PROFESSIONAL ETHICS</b>								
<b>COURSE CODE</b>	<b>22UUHU105R</b>	<b>TOTAL CREDITS:2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS: 15T+30P</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL						
<b>ANTI-REQUISITE</b>	NIL								
<b>PROGRAMMES</b>	All UG and PG Programmes								
<b>SEMESTER</b>	Fall/I or Winter/II Semester of First Year of the Programme								

### Course Objectives

This introductory course input is intended

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature

Thus, this course is intended to provide a much needed orientation input in value education to the young enquiring minds.

### Course Methodology

1. The methodology of this course is exploration and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
2. It is free from any dogma or value prescriptions.
3. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.
4. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution.
5. This self-exploration also enables them to critically evaluate their pre- conditionings and present beliefs.

### Course Syllabus: Universal Human Values and Professional Ethics

- The whole course is divided into 5 modules.
- After every two lectures of one hour each, there is a 2 hour practice session.
- The teachers are oriented to the inputs through an eight to ten day workshop (Teachers' Orientation Program).
- The Teacher's Manual provides them the lecture outline. The outline has also been elaborated into presentations and provided in a DVD with this book to facilitate sharing.
- The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue. The process of dialogue is enriching for both, the teacher as well as the students.

The syllabus for the lectures is given below:

## UNIT1: Course Introduction-Need, Basic Guidelines, Content and Process for Value Education

1. Understanding the need, basic guidelines, content and process for Value Education
2. Self-Exploration–what is it?- its content and process; ‘Natural Acceptance ’and Experiential Validation- as the mechanism for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facilities-the basic requirements for fulfilment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

## UNIT2: Understanding Harmony in the Human Being- Harmony in Myself!

5. Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
6. Understanding the needs of ‘Self (‘I’) and ‘Body’- *Sukh* and *Suvidha*
7. Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)
8. Understanding the characteristics and activities of ‘I’ and harmony in ‘I’
9. Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail
10. Programs to ensure *Sanyam* and *Swasthya*-Practice Exercises and Case Studies will be taken up in Practice Sessions.

## UNIT3: Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship

1. Understanding Harmony in the family – the basic unit of human interaction
2. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfilment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship
3. Understanding the meaning of Vishwas; Difference between intention and competence
4. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship
5. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals
6. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!-Practice Exercises and Case Studies will be taken up in Practice Sessions.

## UNIT4: Understanding Harmony in the Nature and Existence- Whole existence as Co-existence

1. Understanding the harmony in the Nature
2. Inter-connectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature
3. Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space
4. Holistic perception of harmony at all levels of existence-Practice Exercises and Case Studies will be taken up in Practice Sessions.

## UNIT5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

- i. Natural acceptance of human values
- ii. Definitiveness of Ethical Human Conduct

- iii. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- iv. Competence in professional ethics:
  - Ability to utilize the professional competence for augmenting universal human order
  - Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
  - Ability to identify and develop appropriate technologies and management patterns for above production systems.
- v. Case studies of typical holistic technologies, management models and production systems
- vi. Strategy for transition from the present state to Universal Human Order:
  - At the level of individual: as socially and ecologically responsible engineers, technologists and managers
  - At the level of society: as mutually enriching institutions and organizations

## Guidelines and Content for Practice Sessions

### UNIT1: Course Introduction-Need, Basic Guidelines, Content and Process for Value Education

**PS 1:** Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcomings in your life? Observe and analyse them.

**Expected outcome:** the students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.

**PS 2:** Now-a-days, there is a lot of voice about many techno-genic maladies such as energy and natural resource depletion, environmental pollution, global warming ,ozone depletion, deforestation, soil degradation, etc.– all these seem to be man-made problems threatening the survival of life on Earth–What is the root cause of these maladies & what is the way out in your opinion?

On the other hand, there is rapidly growing danger because of nuclear proliferation, armsrace, terrorism, criminalization of politics ,large scale corruption, scams, breakdown of relationships, generation gap, depression & suicidal attempts, etc.–what do you think, is the root cause of these threats to human happiness and peace–what could be the way out in your opinion?

**Expected outcome:** the students start finding that technical education without study of human values can generate more problems than solutions. They also start feeling that lack of understanding of human values is the root cause of all problems and the sustained solution could emerge only through understanding of human values and value based living. Any solution brought out through fear, temptation or dogma will not be sustainable.

#### PS3:

i. Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of

ii. What is Naturally Acceptable to you in relationship-Feeling of respect or disrespect?

iii.What is Naturally Acceptable to you–to nurture or to exploit others? Is your living the same as your natural acceptance or different?

Iv.Out of the three basic requirements for fulfilment of your aspirations- right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time & effort you devote for reaching your daily routine.

#### Expected outcome:

- The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify right or wrong, and referring to any external source like text or instrument or any other person cannot enable them to verify with authenticity; it will only develop assumptions.
- The students are able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.
- The students are able to see that lack of right understanding leading to lack of relationship is the major cause of problems in their family and not the lack of physical facilities in most of the cases, while



they have given higher priority to earning of physical facilities in their life ignoring relationships and not being aware that right understanding is the most important requirement for any human being.

## UNIT2: Understanding Harmony in the Human Being- Harmony in Myself!

**PS 4:** List down all your desires. Observe whether the desire is related to Self (I) or Body. If it appears to be related to both, see which part of it is related to self (I) and which part is related to Body.

**Expected outcome:** the students are able to see that they can enlist their desires and the desires are not vague. Also they are able to relate their desires to 'I' and 'Body' distinctly. If any desire appears related to both, they are able to see that the feeling is related to I while the physical facility is related to the body. They are also able to see that 'I' and 'Body' are two realities, and most of their desires are related to 'I' and not body, while their efforts are mostly centred on the fulfilment of the needs of the body assuming that it will meet the needs of 'I' too.

### PS5:

- i. a. Observe that any physical facility you use, follows the given sequence with time :  
Necessary&tasteful→unnecessary&tasteful→unnecessary&tasteless→intolerable  
b. In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If naturally acceptable, you want it continuously and if not acceptable, you do not want it any moment!
- ii. Listdownallyouractivities.Observewhethertheactivityisof'I'orofBodyorwiththeparticipationofboth'I'andBody.
- iii. Observe the activities within 'I'. Identify the object of your attention for different moments (over a period of say 5 to 10 minutes) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

### Expected outcome:

1. The students are able to see that all physical facilities they use are required for a limited time in a limited quantity. Also they are able to see that in case of feelings, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable even for a single moment.
2. the students are able to see that activities like understanding, desire, thought and selection are the activities of 'I' only, the activities like breathing, palpitation of different parts of the body are fully the activities of the body with the acceptance of 'I' while the activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs etc. are such activities that require the participation of both 'I'and body.
3. The students become aware of their activities of 'I' and start finding their focus of attention at different moments. Also they are able to see that most of their desires are coming from outside (through preconditioning or sensation) and are not based on their natural acceptance.

### PS6:

1. Chalk out programs to ensure that you are responsible to your body- for the nurturing, protection and right utilisation of the body.
2. Find out the plants and shrubs growing in and around your campus. Find out their use for curing

different diseases.

**Expected outcome:** The students are able to list down activities related to proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing different diseases.

### UNIT3: Understanding Harmony in the Family and Society-Harmony in Human- Human Relationship

**PS7:** Form small groups in the class and in that group initiate dialogue and ask the eight questions related to trust. The eight questions are:

1a.Do I want to make myself happy? 2a.Do I want to make the other happy?  
3a.Does the other want to make him happy? 4a.Does the other want to make me happy?

*What is the answer?*

Intention(Natural Acceptance)

1b.Am I able to make myself always happy? 2b. Am I able to make the other always happy?  
3b.Is the other able to make him always happy ?4b.Is the other able to make me always happy?

*What is the answer?*

Competence

Let each student answer the questions for himself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate your intention & competence as well as the others' intention & competence.

**Expected outcome:** The students are able to see that the first four questions are related to our Natural Acceptance i.e. Intention and the next four to our Competence. They are able to note that the intention is always correct, only competence is lacking! We generally evaluate ourselves on the basis of our intention and others on the basis of their competence! We seldom look at our competence and others' intention as a result we conclude that I am a good person and other is a bad person.

#### PS8:

1. Observe on how many occasions you are respecting your related ones (by doing the right evaluation) and on how many occasions you are disrespecting by way of under- evaluation, over-evaluation or otherwise evaluation.
2. Also observe whether you're feeling of respect is based on treating the other as yourself or on differentiations based on body, physical facilities or beliefs.

**Expected outcome:** The students are able to see that respect is right evaluation, and only right evaluation leads to fulfilment in relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect), like gender biasness, generation gap, caste conflicts, class struggle, dominations through power play, communal violence, clash of isms, and so on so forth. All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for him and for others though he may have different body, physical facilities or beliefs.

#### PS9:

1. Write a note in the form of story, poem, skit, essay, narration, dialogue to educate a child. Evaluate it in a group.
2. Develop three chapters to introduce 'social science-its need, scope and content' in the primary education of children

**Expected outcome:** The students are able to use their creativity for educating children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

### Module4: Understanding Harmony in the Nature and Existence-Whole existence as Co-existence

**PS 10:** List down units (things) around you. Classify them in four orders. Observe and explain the mutual fulfilment of each unit with other orders.

**Expected outcome:** The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to other orders today and need to take appropriate steps to ensure right participation (in terms of nurturing, protection and right utilization) in the nature.

#### PS11:

1. Make a chart for the whole existence. List down different courses of studies and relate them to different units or levels in the existence.

2. Choose any one subject being taught today. Evaluate it and suggest suitable modifications to make it appropriate and holistic.

**Expected outcome:** The students feel confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are able to make out how these courses can be made appropriate and holistic.

## UNIT5: Implications of the above Holistic Understanding of Harmony at all Levels of Existence

**PS12:** Choose any two current problems of different kind in the society and suggest how they can be solved on the basis of natural acceptance of human values. Suggest steps you will take in present conditions.

**Expected outcome:** The students are able to present sustainable solutions to the problems in society and nature. They are also able to see that these solutions are practicable and draw road maps to achieve them.

### PS13:

1. Suggest ways in which you can use your knowledge of Technology/ Engineering/ Management for universal human order, from your family to the world family.
2. Suggest one format of humanistic constitution at the level of nation from your side.

**Expected outcome:** The students are able to grasp the right utilization of their knowledge in their streams of Technology/Engineering/ Management to ensure mutually enriching and recyclable productions systems.

**PS14:** The course is going to be over now. Evaluate your state before and after the course in terms of

- a. Thought
- b. Behaviour and
- c. Work
- d. Realization

Do you have any plan to participate in the transition of the society after graduating from the institute? Write a brief note on it.

**Expected outcome:** The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for a happy and prosperous society.

## Reference Material

The primary resource material for teaching this course consists of

- a. The textbook  
R.RGaur, RSangal, GPBagaria, A foundation course in Human Values and professional Ethics, Excelbooks, NewDelhi, 2010, ISBN978-8-174-46781-2
- b. The teacher's manual  
R.RGaur, RSangal, GPBagaria, A foundation course in Human Values and professional Ethics—TeachersManual, Excelbooks, NewDelhi, 2010

c. A set of DVDs containing

SEMESTER – II									
Course Title	PEDAGOGY OF PHYSIOTHERAPY EDUCATION (Techno Professional Skill –I)								
Course code	22MPTO124R	TOTAL CREDITS: 2	L	T	P	S	R	O/F	C
		TOTAL HOURS: 60P	0	0	4	0	0	0	2
Pre-requisite	NIL	CO-REQUISITE	NIL						
Programme	Master of Physiotherapy								
Semester	2 <sup>nd</sup> Semester								
Course Objectives (Minimum 3)	<p>1. To grasp the significance and dynamics of teaching and learning within the context of physiotherapy, enabling students to appreciate the essential components of effective teaching and learning processes.</p> <p>2. To develop the skills necessary to plan and execute effective teaching sessions specifically tailored to the field of physiotherapy, ensuring students can design engaging and impactful learning experiences for their future patients and peers...</p>								
CO1	Impart adequate knowledge and skill in Physiotherapy Pedagogy and learn ways of effectively teach.								
CO2	Understand recent new trends and issues regarding education. The students should be able understand the concepts of teaching and learning with curriculum formation, methods of teaching, and conduct educational seminars and microteachings using new trends in education								
CO3	Apply contemporary theories, learning and teaching in physiotherapy education through the planning, delivery and evaluation								
CO4	Develop holistic learning experiences which could be applied in the clinical practice.								
CO5	Articulate a detailed knowledge and understanding of contemporary socio cultural and national discourses influencing developments in clinical and research world.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Concept of Teaching and Learning</b> <ul style="list-style-type: none"> <li>● Meaning and scope of Educational Psychology.</li> <li>● Meaning and Relationship between teaching and learning.</li> <li>● Learning Theories.</li> <li>● Dynamics of Behaviour.</li> <li>● Individual differences.</li> </ul>		10	By the end of the of the unit students will be able to provide detailed information on basic knowledge about theories and behaviour dynamics				1,2	
II	<b>Methods and Techniques of Teaching</b> <ul style="list-style-type: none"> <li>● Lecture, Demonstration</li> <li>● Discussion, Seminar, Assignment, Project and Case Study.</li> </ul>		12	By the end of the of the unit students will gain proper knowledge on methods and procedure of teaching				1,2,3,4	
III	<b>Principles of Teaching</b> <ul style="list-style-type: none"> <li>● Bloom’s taxonomy of instructional objectives, writing instructional objectives in behavioural terms.</li> <li>● Unit planning and Lesson planning.</li> </ul> <b>Teaching Aids</b> <ul style="list-style-type: none"> <li>● Types of teaching aids</li> <li>● Principles of selection, preparation and use of audio-visual aids.</li> </ul>		15	By the end of the of the unit students will know about lesson planning and the concept of Bloom’s taxonomy and their implementation				1,2,3,4	
IV	<b>Guidance and counselling</b> <ul style="list-style-type: none"> <li>● Meaning &amp; concepts of guidance and counselling.</li> <li>● Principles</li> </ul> Guidance and counselling services of Students and Faculty members.		12	By the end of the of the unit students will know about principles of patient guidance and counselling of caregivers				1,2,3,4	

<b>V</b>	<b>Clinical Education</b> <ul style="list-style-type: none"> <li>● Awareness and guidance to the common people about health and diseases and available Professional Services.</li> <li>● Patient Education.</li> </ul> Education of the practitioners.	<b>11</b>	By the end of the of the unit students will have thorough knowledge about education of patient, health and disease and its professional services imparted	1,2,3,4,5,6
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- Video of Teachers' Orientation Program
- PPTs of Lectures and Practice Sessions
- Audio-visual material for use in the practice sessions

In addition, the following reference books maybe found useful for supplementary reading in connection with different parts of the course:

1. BLBajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow.Reprinted2008.
  2. PLDhar, RRGaur ,1990, *Science and Humanism*, Commonwealth Publishers'.
  3. SussanGeorge,1976,*How the Other Half Dies*,PenguinPress.Reprinted1986,1991
  4. IvanIllich,1974,*Energy&Equity*,TheTrinityPress,Worcester,and HarperCollins,USA
  5. DonellaH.Meadows, DennisL.Meadows, JorgenRanders, WilliamW.BehrensIII, 1972, limits to Growth, Club of Rome'sReport, and Universe Books.
- SubhasPalekar,2000,*How to practice Natural Farming*, Pracheen(Vaidik) KrishiTantra
6. Shodh, Amravati.
  7. A Nagraj, 1998,*JeevanVidyaekParichay*,Divya PathSansthan, Amarkantak.
  8. E.F.Schumacher,1973, *Small is Beautiful:a study of economics as if people mattered*, Blond& Briggs,Britain.
  9. A.N.Tripathy,2003, *Human Values*, New Age International Publishers.

### Relevant websites, movies and documentaries

1. Value Education websites,<http://uhv.ac.in>,<http://www.uptu.ac.in>
2. Story of Stuff,<http://www.storyofstuff.com>
3. Al Gore, *An Inconvenient Truth*, Paramount Classics,USA
4. Charlie Chaplin, *Modern Times*, United Artists,USA
5. IIT Delhi, *Modern Technology–the Untold Story*

### TEXT BOOKS:

1. Pedagogy Physiotherapy Education-Ram,C S
2. Innovative Tools for Health Education-Grechus,Marilym



3. Developing a Pedagogy of Teacher education: Understanding teaching and learning about teaching.

**REFERENCE BOOKS:**

1. Handbook of Educational Technology - Elington Henry, Kogan Page.
2. Handbook of Clinical Teaching - Watts Nancy, Churchill Livingstone.
3. Powerful Pedagogy: Self-Study of a Teacher Educators Practice (Self Study of Teaching and Teacher By [Robyn Brandenburg](#))
4. Physical Therapy Administration & Management - Hickok, Robert J, Williams & Wilkins.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Impart adequate knowledge and skill in Physiotherapy Pedagogy and learn ways of effectively teach.	1,2,3,4,5,6,7,8,9
2	Understand recent new trends and issues regarding education. The students should be able understand the concepts of teaching and learning with curriculum formation, methods of teaching, and conduct educational seminars and microteachings using new trends in education	1,2,3,4,5,6,7,8,9
3	Apply contemporary theories, learning and teaching in physiotherapy education through the planning, delivery and evaluation	1,2,3,4,5,6,7,8,9
4	Develop holistic learning experiences which could be applied in the clinical practice.	1,2,3,4,5,6,7,8,9
5	Articulate a detailed knowledge and understanding of contemporary socio cultural and national discourses influencing developments in clinical and research world.	1,2,3,4,5,6,7,8,9

**MAPPING TABLE**

	Course Name: Pedagogy of Physiotherapy Education												
Course Code: 22MPTO124	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO3

<b>R</b>	<b>CO1</b>	3	2	2	1	2	1	2	2	2	3	1	1
	<b>CO2</b>	1	3	2	1	3	1	2	2	2	1	3	2
	<b>CO3</b>	1	3	3	1	2	1	2	2	2	1	2	3
	<b>CO4</b>	1	2	2	1	2	1	2	2	2	1	1	1
	<b>CO5</b>	1	1	1	1	2	1	1	1	1	1	1	1
	<b>Average</b>	1.4	2.2	2	1	2.2	1	1.8	1.8	1.75	1.4	1.6	1.6
	<b>Count</b>	7	11	10	5	11	5	9	9	9	7	8	8

SEMESTER – II									
Course Title	MINI-RESEARCH (RESEARCH GAP ANALYSIS- R2)								
Course code	22MPTO125R	TOTAL CREDITS: 2	L	T	P	S	R	O/F	C
		TOTAL HOURS:	0	0	0	4	8	0	2
Pre-requisite	NIL	CO-REQUISITE	NIL						
Program me	Master of Physiotherapy								
Semester	2 <sup>nd</sup> Semester								
Course Objectives (Minimum 3)	To determine whether the objectives of review of literature gap analysis have been met, if not what steps can be taken accordingly.								
CO1	Create and implement a plan to bridge the gap								
CO2	Find the gap and evaluate solutions.								
CO3	Identify the ideal future state/action plan								
CO4	To analyse the current state/work of research								
CO5	To implement the strategies to meet the research gap under supervision.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	What is literature review?	4	Identify literary techniques and creative uses of language in literary texts. Adapt their texts to particular audiences and purposes.					1,2	
II	How to Begin the literature Review	15	Adapt their texts to particular audiences and purposes.					1,2,3,4	
III	How to write main body of literature review	14	The students will learn about the importance of ethical consideration in research writing					1,2,3,4	
IV	How to write conclusion of literature Review	10	The students will be able to select one of the major key concepts and variables from the chosen research topic.					1,2,3,4	
V	How to analyse gap in literature review.	5	The students will get practical exposure in writing research papers in proper APA format and styles.					1,2,3,4,5,6	

#### TEXT BOOKS:

1. Multiple Stressors: Literature Review and Gap Analysis (WERF Research Report Series) by S.M. Swanson.

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Create and implement a plan to bridge the gap	1,2,3,4,5,6,7,8,9

2	Find the gap and evaluate solutions.	1,2,3,4,5,6,7,8,9
3	Identify the ideal future state/action plan	1,2,3,4,5,6,7,8,9
4	To analyse the current state/work of research	1,2,3,4,5,6,7,8,9
5	To implement the strategies to meet the research gap under supervision.	1,2,3,4,5,6,7,8,9

### MAPPING TABLE

		Course Name: Mini Research												
Course Code: 22MPTO125 R	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO3	
	CO 1	1	3	3	1	2	1	2	2	2	3	3	2	
	CO 2	1	3	3	1	2	1	2	2	2	3	3	2	
	CO 3	1	3	3	1	2	1	2	2	2	3	3	2	
	CO 4	1	3	3	1	2	1	2	2	2	3	3	2	
	CO 5	1	3	3	1	2	1	2	2	2	3	3	2	
	Average	1	3	5	1	10	1	2	2	2	3	3	2	
	Count	5	15	15	5	10	5	10	10	10	15	15	10	

<b>COURSE TITLE</b>	<b>COMPUTATIONAL SYSTEMS AND DIGITAL WORLD (DIGITAL LITERACY)</b>								
<b>COURSE CODE</b>	22UCDL103R	<b>TOTAL CREDITS:1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
							<b>/F</b>		
		<b>TOTAL HOURS:30P</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	22UUDL102R Digital Proficiency	<b>CO-REQUISITE</b>	NIL						
<b>ANTI-REQUISITE</b>	NIL								
<b>PROGRAMMES</b>	Master of Physiotherapy								
<b>SEMESTER</b>	Fall/IorWinter/IISemesterofFirst YearoftheProgramme								

### Course Objectives:

1. Students will be able to understand the fundamentals of computer systems and Internet search along with advanced features of MS-Office.
2. Students will be able to learn data management, statistical analysis and visualization.
3. Students will be able to use social media and e-commerce portals, Digital Payments systems, and other utility software.

### Course Outcomes:

1. Students will have basic understanding of Computer Systems and Internet search.
2. Students will be able to solve data analysis, management and visualization issues using MS-Office products.
3. Students will be able to efficiently and ethically use Social Media and e-commerce sites.
4. Students will have introduction to various utility software used in research and information management.

### Course Description

This is a progressive computer course designed for students with little to no skills on computers and the Internet but aiming at advanced use of computers for their various needs. Through this Course, we introduce the fundamentals of computing systems, the Internet, Social Media, E-commerce, Digital Payments etc. and also reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, and the Internet. It also focuses on various utility software required for advanced information management and statistical data analysis & data visualization.

### Text Books:

1. Sinha Pradeep K. and Priti Sinha. *Computer Fundamentals: Concepts Systems & Applications*. 3rd ed. New Delhi: BPB Publications.
2. Goel, A., 2010. *Computer Fundamentals*, Pearson India.

### Reference Books:

1. Balaguruswamy, E., 2009. *Fundamentals of Computers*, Tata McGraw-Hill Education.

2. Balaguruswamy, 2014. E.FundOfComp&Programming (UpdatedEdSem.I, Au) TataMcGraw-HillEducation.
3. Lawson, C.2022.IntroductiontoSocialMedia, OklahomaStateUniversity.

**Other Learning Resources:**

1. <https://www.w3schools.com>
2. <https://edu.gcfglobal.org>
3. <https://www.tutorialspoint.com>
4. <https://www.javatpoint.com>

**Latest updates available in WWW. Course Contents:**

**Unit 1-Fundamentals of Computer Systems, Office Automation and Internet Search**

- i. Components of a Computer and their functions.
- ii. Office Automation using MS-Word, MS-Excel, and MS-PowerPoint.
- iii. Data management, Statistical Data Analysis and Data Visualization with MS-Excel.
- iv. Use of Functions, Graphs & Charts in MS-Excel.

**Unit 2-Internet & Cyber World**

- i. Introduction to Computer Networks, Internet and World Wide Web, Websites and Web portals.
- ii. Creation and use of Email Accounts.
- iii. Web browsing, Web Searching, Different aspects of Web Searching- Search Keywords, conditions and combinations.
- iv. Study of different Search Engines like Google, Microsoft Bing, Yahoo, Yandex, DuckDuckGo, Ask, cometc.
- v. Cyber Crimes, Cyber Laws and IT Act 2000, India.

**Unit 3-Introduction to Social Media and E-Commerce**

- i. Relevance of Social Media in present scenario. Posting different types of contents in Social Media.
- ii. Creating accounts and using some popular Social media portals and Apps like WhatsApp, Facebook, etc. Social Media Etiquettes & Crimes.
- iii. Definition of E-Commerce; E-Commerce versus traditional Commerce.
- iv. Case studies of popular E-Commerce portals like Amazon.
- v. E-commerce Etiquettes & Crimes.

**Unit 4-Digital Payments and Digital Transactions**

- i. Introduction to Digital Payment Systems.
- ii. Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Netbanking, UP I.
- iii. Digital payments Etiquettes & Crimes.

**Unit 5-Basic Accounting and Utility Software**

- i. Introduction to Basic accounting concepts, Introduction to an Accounting Software like Gnu Cash or Tally.
- ii. Introduction to Technical Document writing using LaTeX.
- iii. Introduction to Data Visualization software – Sigma, Google Charts, Tableau.

Course Code	Course Title	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
22MPTO121R	EXERCISE PHYSIOLOGY	3	3	3	3	2	2	2	3	3
22MPTO122R	ELECTRO PHYSIOLOGY	3	3	3	3	2	2	2	3	3
22MPTO123R	PHYSICAL & FUNCTIONAL DIAGNOSIS	3	3	3	3	3	2	2	2	2
22MOCE105R	MOOC/ONLINE	2	2	2	2	2	2	2	3	3
22UMPD121R	COMMUNICATION MASTERY (Communicative English & Soft Skills)	2	2	2	2	3	3	2	2	2
22UUHU105R	UNIVERSAL HUMAN VALUE (UHV) + PROFESSIONAL ETHICS	2	2	2	2	3	3	3	3	3
22MPTO101R	GENERIC/OPEN/UNIVERSITY	1	2	2	2	2	1	2	2	2
22UMRM121R	RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS	3	3	3	3	3	3	3	3	2
22MPTO124R	TECHNO PROFESSIONAL SKILL-1	3	3	3	3	3	3	2	2	2
22MPTO125R	MINI RESEARCH (RESEARCH GAP ANALYSIS-R2)	2	3	3	3	3	3	2	2	3
22UCDL103R	COMPUTATIONAL SYSTEMS AND DIGITAL WORLD (DIGITAL LITERACY)	2	1	1	2	3	2	1	2	1

SEMESTER – III									
Course Title	PHYSIO-THERAPEUTICS								
Course code	22MPTO211R	TOTAL CREDITS: 6	L	T	P	S	R	O/F	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	6
Pre-requisite	NIL Human Anatomy, Human Physiology, Exercises therapy, Electrotherapy	CO-REQUISITE	NIL						
Programme	Master of Physiotherapy								
Semester	3rd Semester								
Course Objectives (Minimum 3)	<p>1. Introduce the students to the concepts related Pain:Neurobiology, Use of Exercise therapy techniques, electrotherapy and application on various types of cases.</p> <p>2. Introduce the students to use Physiotherapy and other therapy methods Following Obstetric and Gynaecological Disorders.</p> <p>3. This paper shall focus on recent advances of the clinical conditions including its assessment and management with emphasis on Physiotherapy context, however due importance shall also be given for advances in Anatomy and Physiology.</p>								
CO1	Apply recent advances of the clinical conditions including its assessment and management with emphasis on Physiotherapy context, however due importance shall also be given for advances in Anatomy and Physiology.								
CO2	Apply exercise therapy techniques and application on various types of cases, Application of electrotherapy techniques on patients,								
CO3	Impart the knowledge on General Guidelines to be followed in Cardiac Rehabilitation, Pulmonary Rehabilitation.								
CO4	Acquainted with the Knowledge on General Guidelines to be followed in Burns Rehabilitation and Cancer Rehabilitation Protocol.								
CO5	Use Physiotherapy and other therapy methods Following Obstetric and Gynaecological Disorders.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	Pain ( neurobiology , various theories , modulation and management of pain), Use of Exercise therapy techniques and application on various types of cases, Application of electrotherapy techniques on patients, monitoring of dosages and winding up procedure, Ergonomic aspects of exercise on oxygen, energy consumption MET value of various exercises and activity	10	The students will have knowledge: <ul style="list-style-type: none"> <li>About Neurobiology of pain, pain management.</li> <li>To use exercises therapy technique, electrotherapy in different cases.</li> </ul>				1,2		
II	Maternal and child care in general physiotherapy, Physiotherapy Following Obstetric and Gynaecological Disorders, Yoga: Concept of Yogic Practices – Bandha, Dhyana. Asana: Definition, Scope and Limitations of Asanas – Classification of Asanas –Safety, Measures and Precautions while performing Asanas, Pranayama: Meaning – Different Phases in Pranayama Practice Safety Measures and	15	The students will have knowledge: <ul style="list-style-type: none"> <li>Maternal and child care.</li> <li>The concept of Yogic Practices.</li> </ul>				1,2, 3,4		



	Precautions. Meaning & benefits of Bandha – Different Bandhas. Meaning of Mudra – Types of Mudra, Practicing methods and benefits of Kriyas – Meaning – Types of Kriyas; Neti; Dhauthi. Meaning & concept of Meditation – Yogic practices and physical exercise. Yoga Practices and Other Systems of Exercises – Asanas Vs. Muscular Exercises – Pranayama Vs. Deep, Breathing Exercises – Importance of Nerve Culture in Yoga - Yoga and Competition –Yoga and Modern Education.			
<b>III</b>	Cardiopulmonary medications and their effect on activity performance, Exercise planning and prescription, Effect of aerobic, anaerobic as well as Isometric and Isokinetic exercises on cardiac function, CPR, monitoring systems and defibrillators.	10	The students will have knowledge: <ul style="list-style-type: none"> <li>● Exercise planning and prescription.</li> <li>● Effect of aerobic, anaerobic as well as Isometric and Isokinetic exercises on cardiac function.</li> </ul>	1,2,3,4
<b>IV</b>	Artificial respirators, General Guidelines to be followed in Cardiac Rehabilitation, Pulmonary Rehabilitation, Burns Rehabilitation and Cancer Rehabilitation Protocol.	5	The students will have knowledge: <ul style="list-style-type: none"> <li>● About Artificial respirators.</li> <li>● Cardiac Rehabilitation, Pulmonary Rehabilitation, Burns Rehabilitation and Cancer Rehabilitation Protocol.</li> </ul>	1,2,3,4
<b>V</b>	Massage, Mobilization and Manipulation, Manual therapy – different schools of thought Principles of Neurological approaches, Facilitation and inhibition techniques	5	The students will have knowledge: <ul style="list-style-type: none"> <li>● About Massage, Mobilization, Manual therapy.</li> <li>● Neurological approaches, Facilitation and inhibition techniques.</li> </ul>	1,2,3,4,5,6
<b>Practical</b>	Evaluate and analyses the physiological aspects of physical rehabilitation. Clinical decision and plan for effective treatment. Identify and recognize the importance of monitoring vital signs. Plan strategies for management of various musculoskeletal, neurological, cardio pulmonary problems and in various medical and surgical conditions.	90	Student will develop strategies for managing various musculoskeletal, neurological, and cardiopulmonary problems, as well as addressing different medical and surgical conditions. This comprehensive approach aims to enhance the efficacy of rehabilitation programs, ensuring holistic patient care and improved health outcomes.	

### TEXT BOOKS:

1. Cash's Textbook for physiotherapist in Neurological disorders-Jaypee bros.
2. Proprioceptive Neuron muscular Facilitation – by Herman Karat.
3. Practical Physical Therapy – Margaret Hollis.

**REFERENCE BOOKS:**

4. Therapeutic exercise – by O'Sullivan.
5. “Right in the middle” – by Patricia Davis.
6. Stroke rehabilitation – by Margaret Johnson.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Apply recent advances of the clinical conditions including its assessment and management with emphasis on Physiotherapy context, however due importance shall also be given for advances in Anatomy and Physiology.	1,2,3,4,5,6,7,8,9
2	Apply exercise therapy techniques and application on various types of cases, Application of electrotherapy techniques on patients,	1,2,3,4,5,6,7,8,9
3	Impart the knowledge on General Guidelines to be followed in Cardiac Rehabilitation, Pulmonary Rehabilitation.	1,2,3,4,5,6,7,8,9
4	Acquainted with the Knowledge on General Guidelines to be followed in Burns Rehabilitation and Cancer Rehabilitation Protocol.	1,2,3,4,5,6,7,8,9
5	Use Physiotherapy and other therapy methods Following Obstetric and Gynaecological Disorders.	1,2,3,4,5,6,7,8,9

**MAPPING TABLE**

<b>Course Name: PHYSIOTHERAPEUTICS</b>													
<b>Course Code:</b>	<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>

<b>22MPTO 211R</b>	CO1	3	2	1	2	3	2	2	3	3	2	2	2
	CO2	2	2	2	2	2	2	2	1	2	3	2	3
	CO3	1	2	2	1	3	1	2	2	2	2	3	2
	CO4	1	1	2	2	1	3	2	2	3	1	2	1
	CO5	1	2	1	1	2	2	2	1	2	2	1	2
	<b>Average</b>	1.6	1.8	1.8	1.6	2.2	2	2	1.8	2.4	2	2	2
	<b>Count</b>	8	9	8	8	11	10	10	9	12	10	10	10

SEMESTER – III									
Course Title	ELECTIVE : MUSCULOSKELETAL DISORDERS AND SPORTS								
Course code	22MPTO212R	TOTAL CREDITS: 6	L	T	P	S	R	O/F	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	6
Pre-requisite	ANATOMY, CLINICAL ORTHOPAEDICS AND TRAUMATOLOGY, PHYSIOTHERAPY IN ORTHOPAEDICS AND TRAUMATOLOGY	CO-REQUISITE	NIL						
Program me	Master of Physiotherapy								
Semester	3rd Semester								
Course Objectives (Minimum 3)	<p>1. Will be able to identify, discuss and analyse the musculoskeletal dysfunction in terms of biomechanical, kinesiological and biophysical basis.</p> <p>2. Will use the anatomical rationale for clinical tests used in differential diagnosis.</p>								
CO1	Perform an appropriate subjective and physical examination, with development of suitable analytical skills to evaluate data obtained.								
CO2	Recognize the implication of dysfunction on the Neuro- Musculoskeletal system and the student's clinical decision making.								
CO3	Choose the scale, outcome measures and asses the progression.								
CO4	Develop clinical reasoning that incorporates theoretical concept with evidence-based practice in the field of musculoskeletal physiotherapy.								
CO5	Co-relate the Biomechanical, Kinesiological and Biophysical basis with the provisional diagnosis, routine radiological & Electro-physiological investigations and arrive at appropriate functional diagnosis with clinical reasoning.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<p>Applied anatomy with emphasis on Biomechanics &amp; Kinesiology of Human motion and Work Physiology.</p> <p>Clinical assessment and rationale of Laboratory investigations along with differential diagnoses.</p> <p>Clinical Symptomatology, Pathophysiology and Pathomechanics of musculoskeletal conditions.</p>	5	Students will be able to apply the anatomical and biomechanical knowledge to do the clinical assessment and the investigations.					1,2	
II	<p>Physiotherapy management following fractures, dislocations and their complications, Amputations, cumulative trauma disorders and Burns.</p> <p>Physiotherapy management in degenerative disorders and allied conditions.</p> <p>Physiotherapy in post operative management of metabolic, hormonal, neoplastic and infective conditions of bones and joints.</p> <p>Physiotherapy following arthroplasty, implants and soft tissue repairs.</p>	10	At the end the students will be able to plan the physiotherapeutic management for different disorders and the surgical methods in orthopaedics.					1,2, 3,4	
III	Pre & post-operative physiotherapy in tendon transfer. Electrical stimulation and biofeedback	10	The students will be able to rule out the pre and post-operative					1,2, 3,4	

	<p>procedures.</p> <p>Kinetic and kinematics analysis for various functional activities.</p> <p>Functional assessment (Hand function, Gait, Posture A.D.L; occupational work).</p>		<p>physiotherapeutic management, functional assessment of hand function , gait, posture , ADLs</p>	
<b>IV</b>	<p>Hand Rehabilitation.</p> <p>Assessment of locomotor impairments, disabilities and disability evaluation.</p>	<b>5</b>	<p>Able to understand the hand rehabilitation and the assessment of locomotor impairments and disabilities evaluation.</p>	1,2,3,4,5,6
<b>V</b>	<p>Physiotherapy management of locomotor disorder, principles of medical and surgical aspects, sports psychology and retraining.</p> <p>Neurological complications of locomotor disorders.</p>	<b>15</b>	<p>The students will be able to plan the physiotherapy management of locomotor disorder its principles and surgical aspects, sports psychology and retraining.</p>	1,2,3,4,5,6
<b>Practical</b>	<p>Techniques for rehabilitation, managing complications, and ensuring optimal recovery.</p> <p>Strategies for managing amputations and repetitive strain injuries, including pain management and functional training.</p> <p>Management techniques for conditions like osteoarthritis and related disorders.</p> <p>Methods for evaluating hand function, gait, posture, ADLs, and occupational tasks.</p> <p>Assessment and management of locomotor disabilities, including medical, surgical, and sports psychology aspects.</p> <p>Rehabilitation protocols following joint replacements, implants, and soft tissue surgeries.</p>	<b>90</b>	<p>These practical skills will equip students with comprehensive knowledge and hands-on experience in various aspects of physiotherapy, ensuring they are well-prepared to manage a wide range of conditions effectively.</p>	

#### **TEXT BOOKS:**

1. Jack H Wilmore , David L Costill : Physiology of Sports & Exercise 6<sup>th</sup> Ed
2. Apley & Soloman : Apley's System of Orthopedics & Fracture 1998/ 9<sup>th</sup> Ed
3. Norikin, Cynthia C White, D Joyce : Measurement of Joint Motion 5<sup>th</sup> ed
4. Margaret, Nordin : Basic Biomechanics of the Musculoskeletal System 2001/ 3<sup>rd</sup> Ed
5. Jonathan K. Ehrman, Paul M. Gordon: Clinical Exercise Physiology 3<sup>rd</sup> ed

#### **REFERENCE BOOKS:**

1. Physiotherapy in Orthopaedics -Fiona Coutts
2. Peggy A. Houghlum , Dolores B. Bertoti : Brainstorm's: Clinical Kinesiology 1998/6th Ed
3. Stephen L Demeter , Gunnar B J Anderson, george b j smith : Disability Evaluation 1996
4. David H Perrin : Athletic Taping & Bracing 3<sup>rd</sup> ed
5. Craik, Rebecall : Gait's Analysis 1994/ 1st Ed
6. Gabriel Stux Bruce Pomeranz : Basics of Acupuncture 3rd revised and enlarged edition

#### **OTHER LEARNING RESOURCES:**

7.

- 1. Physical Therapy (APTA, America)
- 2. Physiotherapy (CSP London)
- 3. American Journal Of Physical Medicine And Rehabilitation.
- 4. Physiotherapy (Canada)
- 5. Physiotherapy Theory And Practice.
- 6. Australian Journal Of Physiotherapy
- 7. Journal Of Indian Association Of Physiotherapy
- 8. Clinical Kinesiology
- 9. Journal Of Biomechanics
- 10. American Journal Of Sports Exercises.
- 11. Pediatric Physical Therapy.
- 12. Journal Of Rehabilitation Research And Development.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Perform an appropriate subjective and physical examination, with development of suitable analytical skills to evaluate data obtained.	1,2,3,4,5,6,7,8,9
2	Recognize the implication of dysfunction on the Neuro- Musculoskeletal system and the student's clinical decision making.	1,2,3,4,5,6,7,8,9
3	Choose the scale, out come measures and asses the progression.	1,2,3,4,5,6,7,8,9
4	Develop clinical reasoning that incorporates theoretical concept with evidence-based practice in the field of musculoskeletal physiotherapy.	1,2,3,4,5,6,7,8,9
5	Co-relate the Biomechanical, Kinesiological and Biophysical basis with the provisional diagnosis, routine radiological & Electro-physiological investigations and arrive at appropriate functional diagnosis with clinical reasoning.	1,2,3,4,5,6,7,8,9

**MAPPING TABLE**

	<b>Course Name: ELECTIVE :MUSCULOSKELETAL DISORDERS AND SPORTS</b>		
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Course Code: 22MPTO 212R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO 3
	CO1	3	1	2	1	2	2	2	2	1	3	2	1
	CO2	2	3	1	2	1	2	1	2	1	2	1	1
	CO3	3	2	2	2	2	2	1	2	2	3	0	2
	CO4	1	1	2	3	1	1	2	2	2	3	2	1
	CO5	2	2	2	1	2	3	2	2	1	3	1	2
	Average	2.2	1.8	1.8	1.8	1.6	2	1.6	2	1.8	2.8	1.2	1.4
	Count	11	9	9	9	8	10	8	10	7	14	6	7

SEMESTER – III									
Course Title	ELECTIVE: NEUROLOGICAL AND PSYCHOSOMATIC DISORDERS								
Course code	22MPTO213R	TOTAL CREDITS: 6	L	T	P	S	R	O/F	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	6
Pre-requisite	Neuroanatomy,Physiology,Clinical Neurology &Neurosurgery Neurological Conditions	CO-REQUISITE	NIL						
Program me	Master of Physiotherapy								
Semester	3rd Semester								
Course Objectives (Minimum 3)	<p>1. Reliable to rationalise the treatment approach according to the management needed (Medical/Surgical and to apply appropriate techniques.</p> <p>2. Compare the effect and efficacy of various approaches/techniques for research purposes.</p> <p>3.Students should be able to demonstrate awareness of the use and interpretation of common tests used in diagnosing neurologic disease and apply the principles underlying a systematic approach to the management of common neurologic diseases (including the recognition and management of situations that are potential emergencies</p>								
CO1	Apply the scale, out come measures and asses the progression.								
CO2	Apply recent technique/ approaches to treat & train patients with Neurological deficit in children, adults & Geriatrics.								
CO3	Impart knowledge for training the under graduate students.								
CO4	Apply the principles of application of different methods of electro diagnosis, radiology and interpret them in neurological conditions								
CO5	Analyze the concepts of clinical conditions, neurological assessment, various outcome measures, Autonomic dysfunction assessment and paediatric assessment and diagnosis in the physiotherapy management based on Evidence Based Practice for neurological disorders.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Anatomy and Physiology of Nervous System, Normal sequential behavioural and Physiological changes throughout the developmental arc, Neurophysiology of balance, coordination and locomotion, Clinical symptomatology and Pathophysiology of the neurological disorders, Principles of clinical neuron diagnosis and investigation, Electro diagnosis:	10	The student will be able to learn about the anatomy and physiology of the Nervous system and other pathophysiology of neurological disorders					1,2,3	
II	Neurophysiology of Nerve conduction studies and Electromyography, Instrumentation of Electrical stimulator, EMG, SFEMG, NCS (Nerve Conduction Studies), Electrical study of reflexes ( H-reflex, Axon reflex, F- response, Blink reflex, Jaw jerk, Tonic Vibration Reflex), Repetitive nerve stimulation, Remembering,understanding,,applying,analyzing,evaluating,creating Evoked potentials	15	To learn and explore about the neurophysiology of nerve conduction studies and its application and interpretation in various physiotherapy treatment					1,2,3,4	



	(SSEP, MEP, BAERA, and VER), Interpretation of neurophysiologic responses in Neuropathy, myopathy and neuromuscular disorders, Medical and Physiotherapy management following Cerebrovascular accidents			
<b>III</b>	Various Evaluation Scales and Assessment methods used in neurological rehabilitation, Evaluation of A.N.S dysfunction with reference to psycho-physiological testing. Biofeedback Training Neuron-psychological functions. Perception testing and training, Traumatic Brain Injury. ( ICU management, Coma stimulation, Restoration of motor control, Rehabilitation and community integration)	<b>10</b>	To learn and gather knowledge about the evaluation scales and other assessment methods related to rehabilitation	1,2, 3,4
<b>IV</b>	Theories of motor control and theories of motor learning, its application in physiotherapy. Common facilitator and inhibitory techniques. Treatment approaches in neurological rehabilitation: Bobath, NDT, SI, Brunnstrom, Roods, PNF, Vojta, MRP, MFR.	<b>10</b>	To understand the concepts, theories and approaches related to neurological treatment	1,2, 3,4, 5,6
<b>V</b>	Musculoskeletal treatment concept applied to neurology: Adverse neural tissue tension tests in upper limb and lower limb. Traumatic spinal cord injuries. ( ICU management, Coma stimulation, Restoration of motor control, Rehabilitation and community integration) Physical therapy management of demyelinating, inflammatory, infectious, degenerative and metabolic diseases of the nervous system, Pathophysiology and Management of tonal abnormalities ( Spasticity, Rigidity, Hypotonia, and Dystonia)	<b>10</b>	To understand the concepts of physical therapy treatment related to various neurological disorders	1,2, 3,4, 5,6
<b>Practical</b>	Following are the topics to be included Review of General assessment, Assessment of Tone, flexibility, tightness Assessment of Higher mental functions Neurodevelopment assessment, Pain assessment, Sensory assessment, Motor Control assessment, Postural assessment, Balance and. Coordination assessment, Reflex Testing, Clinical Gait assessment Functional assessment, Uses and application of neurological approaches and special test.	<b>90</b>	These outcomes will ensure students are well-equipped with the skills necessary for comprehensive patient evaluation and effective physiotherapy management.	

### **TEXT BOOKS:**

1. Human neuroanatomy – Carpenter M.B, Williams & Wilkins, Baltimore, 1983
2. Physical therapy Assessment in Early Infancy – Wilhelm Churchill Livingstone, New York, 1993
3. Elements of paediatric physiotherapy- Eckerley P, Churchill Livingstone, Edingburgh, 1993
4. The Growth chart – WHO, Geneva, 1986
5. Orthotics in neurological rehabilitation – Aisen, Demos Publication, New York 1992
6. Manual of nerve condition velocity techniques – De Lisa, Raven press, New York, 1982
7. Physical rehabilitation: assessment and treatment – O’Sullivan, F.A Davis, Philadelphia 1994.
8. Neuro-rehabilitation – Farber, W.B Saunders, Philadelphia 1982
9. Gaits analysis – Perry J., Black Thorofare, New Jersey, 199
10. The neural basis of motor control – Black I, Churchill Livingstone, London-1987

### **REFERENCE BOOKS:**

1. Physical therapy management of Parkinson’s disease – Turnbull Gerode , Churchill,
2. Abnormal postural reflex activity caused by Brain lesions – Bobath b. Aspen publications, Rockville, 1897.
3. Disorders of voluntary muscle- Eigel, Churchill, Livingstone, Edingburgh 1988.
4. A Clinician’s view of neuro muscle disorder – Brook M.H Williams and Wilkins, Baltimore 1986.
5. Proprioception, neuro muscular facilitation techniques – Knot M. and Voss, Harper and Row, New York 1972 2nd edition.
6. Stroke rehabilitation – Laidler, Capman and Hall, London 1994.
7. Motor relearning programme for stroke – Carr, Aspen publication, Rock ville, 1987.
8. Adult hemiplegia: evaluation and treatment – Bobath B, Heinmann, London 1988.
9. Paraplegia and tetraplegia – Brombley, Churchill, Livingstone, Edingburgh 1991
10. Child with spina Bifida – Anderson E.M. and Spain B., Methun, London 1977.

### **OTHER LEARNING RESOURCES:**

#### **REFERENCE JOURNAL**

1. Physical Therapy (APTA, America)
2. Physiotherapy (CSP London)
3. American Journal Of Physical Medicine And Rehabilitation.
4. Physiotherapy (Canada)
5. Physiotherapy Theory And Practice.
6. Australian Journal Of Physiotherapy
7. Journal Of Indian Association Of Physiotherapy
8. Clinical Kinesiology
9. Journal Of Biomechanics
10. American Journal Of Sports Exercises.
11. Pediatric Physical Therapy.
12. Journal Of Neurologic Physical Therapy.
13. Journal Of Rehabilitation Research And Development.
14. Journal of Cardio Pulmonary Rehabilitation.
15. Archives Of Physical Medicine And Rehabilitation.

### **RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping
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SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply the scale, outcome measures and assess the progression.	1,2,3,4,5,6,7,8,9
2	Apply recent technique/ approaches to treat & train patients with Neurological deficit in children, adults & Geriatrics.	1,2,3,4,5,6,7,8,9
3	Impart knowledge for training the under graduate students.	1,2,3,4,5,6,7,8,9
4	Apply the principles of application of different methods of electro diagnosis, radiology and interpret them in neurological conditions	1,2,3,4,5,6,7,8,9
5	Analyze the concepts of clinical conditions, neurological assessment, various outcome measures, Autonomic dysfunction assessment and pediatric assessment and diagnosis in the physiotherapy management based on Evidence Based Practice for neurological disorders.	1,2,3,4,5,6,7,8,9

#### MAPPING TABLE

		Course Name: ELECTIVE :NEUROLOGICAL AND PSYCHOSOMATIC DISORDERS												
Course Code: 22MPTO 213R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P O9	PS O1	PS O2	PSO3	
	CO1	3	2	1	1	1	1	5	1	1	3	2	1	
	CO2	1	3	1	1	1	1	1	2	2	3	1	1	
	CO3	1	1	3	1	1	1	1	1	1	1	1	1	
	CO4	1	1	1	3	1	1	3	1	3	1	2	1	
	CO5	1	1	1	1	3	1	1	1	1	1	1	1	
	Average	1.4	1.6	1.4	1.4	1.4	1	2.2	1.2	1.6	1.8	1.4	1	
	Count	7	8	7	7	7	5	11	6	8	9	7	5	

SEMESTER – III									
<b>Course Title</b>	<b>ELECTIVE (CARDIO-RESPIRATORY DISORDERS)</b>								
<b>Course code</b>	<b>22MPTO214R</b>	<b>TOTAL CREDITS: 6</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS: 45T+90P</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>
<b>Pre-requisite</b>	Neuroanatomy,Physiology	<b>CO-REQUISITE</b>	NIL						
<b>Programme</b>	<b>Master of Physiotherapy</b>								
<b>Semester</b>	<b>3rd Semester</b>								
<b>Course Objectives (Minimum 3)</b>	<p>1. Introduce the students to the concepts related Anatomy and physiology of cardio-vascular and respiratory, Systems, Biomechanics of respiration, Intrauterine development of cardio pulmonary system, aand difference between the adult and pediatric, cardio pulmonary system</p> <p>2. At the end of session, a student has to demonstrate soft skills in assessment and management of various cardio respiratory disorders.</p>								
<b>CO1</b>	Identify, discuss & analyze cardio-vascular & pulmonary dysfunction, based on Patho-physiological principles, & arrive at the appropriate functional diagnosis								
<b>CO2</b>	Acquire knowledge of rationale of basic investigative approaches in the medical system, surgical intervention regimes related to cardio-vascular & pulmonary impairment.								
<b>CO3</b>	Acquire the skill of evaluation & interpretation of functional capacity, using simple exercise tolerance tests, such as 6 minutes walk test, symptom limited test.								
<b>CO4</b>	Select strategies for cure, care & prevention; adopt restorative & rehabilitative measures for maximum possible functional independence of a patient at home, work place & in community.								
<b>CO5</b>	Execute the effective Physio Therapeutic measures [with appropriate clinical reasoning] with special emphasis to Breathing retraining, nebulization, humidification, bronchial hygiene, General mobilization, & Exercise conditioning.								
<b>Unit -No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	Anatomy and physiology of cardio-vascular and respiratory systems. Biomechanics of respiration, Intrauterine development of cardio pulmonary system and difference between the adult and paediatric Cardio pulmonary system.	<b>5</b>	To explore, learn and approach of anatomy, physiology and Biomechanics in relation to cardiovascular and pulmonary disorders.					1,2,3	
<b>II</b>	Epidemiology, Symptomatology and pathophysiology of the cardio-respiratory disorders. Clinical assessment, rationale of laboratory investigations and Differential diagnosis, Evaluation of respiratory dysfunctions, Lung function tests–volumetric, Analysis of blood gases, X-ray chest. Evaluation cardiac dysfunction.[ECG, exercise ECG testing,Holter monitoring etc, Echo-cardiogram, X-Ray, Imaging techniques]	<b>10</b>	To explore and learnin dept knowledge about epidemiology,symptomology, pathology and it's clinical implications to assessment and diagnosing of cardiovascular and pulmonary disorders.					1,2,3,4	

<b>III</b>	Evaluation of peripheral vascular disorders: clinical, Blood flow studies, temperature plethysmography. A.N.S dysfunction testing. Risk factors and preventive measures in cardio respiratory conditions Cardio-respiratory emergencies and management principles – medication, Critical care, indications of surgical intervention, Stabilization of vital functions defibrillation.	<b>10</b>	To understand and application of clinical assessment tools like ECG, Chest X ray, ABG analysis etc utilised in cardiopulmonary and vascular disorders.	1,2,3,4
<b>IV</b>	Intensive care unit–Concept and set-up, equipment for advanced methods of resuscitation, Monitoring and patient management: Artificial airways, ventilators pulse–oxymetry etc Oxygen therapy	<b>10</b>	1. Acquire Knowledge about concepts, principles, drugs, surgical procedures and risk factors of cardio respiratory Emergencies. 2. To learn in-depth knowledge and application of various basic and fundamental methods of monitoring, Resuscitation in ICU set up.	1,2,3,4,5,6
<b>V</b>	Cardio-pulmonary resuscitation Respiratory physiotherapy techniques–Techniques to improve lung volume; techniques reduce the work of breathing and techniques to clear secretions	<b>10</b>	1. To understand clinical application of oxygen therapy in management of cardiopulmonary disorders. 2. To learn and application of cardiopulmonary resuscitation 3. To understand and application of various bronchial hygiene techniques in relieving symptoms like breathless, accumulations of secretions, decreased lung expansion etc. in Cardiopulmonary disorders	1,2,3,4,5,6
<b>Practical</b>	<p>Proficiency in evaluating respiratory dysfunction using lung function tests, blood gas analysis, and chest X-rays.</p> <p>Techniques for assessing cardiac function through ECG, exercise testing, Holter monitoring, echocardiograms, and imaging.</p> <p>Knowledge of critical care procedures, indications for surgical intervention, and stabilization of vital functions, including defibrillation.</p> <p>Competence in managing artificial airways, ventilators, and pulse oximetry.</p> <p>Techniques to improve lung volume, reduce work of breathing, and clear secretions.</p>	<b>90</b>		

**TEXT BOOKS:**

1. Disease & Drug Consult: Respiratory Disorders by Lippincott, Wolters Kluwer | Lippincott Williams & Wilkins.

2. Chest Physical Therapy by Dona Fon Felter

**REFERENCE BOOKS:**Cardiorespiratory Physiotherapy Adults And Paediatrics 5Th Edition by Eleanor Main and Linda Denehy, ELSEVIER.

**OTHER LEARNING RESOURCES: E-lectures, Seminars, Journals, Webinars**

1. Physical Therapy (APTA, America)
2. Physiotherapy (CSP, London)
3. American Journal of Physical Medicine & Rehabilitation
4. Physiotherapy (Canada)
5. Australian Journal Of Physiotherapy
6. Journal of Indian Association of Physiotherapy

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify, discuss & analyze cardio-vascular & pulmonary dysfunction, based on Patho-physiological principles, & arrive at the appropriate functional diagnosis	1,2,3,4,5,6,7,8,9
2	Acquire knowledge of rationale of basic investigative approaches in the medical system, surgical intervention regimes related to cardio-vascular & pulmonary impairment.	1,2,3,4,5,6,7,8,9
3	Acquire the skill of evaluation & interpretation of functional capacity, using simple exercise tolerance tests, such as 6 minutes walk test, symptom limited test.	1,2,3,4,5,6,7,8,9
4	Select strategies for cure, care & prevention; adopt restorative & rehabilitative measures for maximum possible functional independence of a patient at home, work place & in community.	1,2,3,4,5,6,7,8,9
5	Execute the effective Physio Therapeutic measures [with appropriate clinical reasoning] with special emphasis to Breathing retraining, nebulization, humidification, bronchial	1,2,3,4,5,6,7,8,9

hygiene, General mobilization, & Exercise conditioning.	
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### MAPPING TABLE

	Course Name: ELECTIVE :CARDIO-RESPIRAORY DISORDERS													
Course Code: 22MPTO 214R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO 3	
	CO1	3	1	3	1	1	2	2	2	2	3	1	2	
	CO2	2	3	1	2	1	2	1	2	1	2	2	1	
	CO3	2	2	3	2	2	2	2	2	1	3	1	2	
	CO4	2	1	2	1	1	2	2	2	1	3	2	1	
	CO5	2	2	2	1	2	2	2	2	2	3	2	1	
	Average	2.2	1.8	2.2	1.4	1.4	2	1.8	2	1.4	2.8	1.2	1.2	
	Count	11	9	11	7	7	10	9	10	7	14	8	7	

SEMESTER – III									
Course Title	ELECTIVE: PAEDIATRICS								
Course code	22MPTO215R	TOTAL CREDITS: 6	L	T	P	S	R	O/F	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	6
Pre-requisite	Neuroanatomy,Physiology	CO-REQUISITE	NIL						
Program me	Master of Physiotherapy								
Semester	3rd Semester								
Course Objectives (Minimum 3)	<p>1. To introduce the students to the concepts of normal motor growth and development, emphasis on reflex maturation.</p> <p>2. To introduction the students to various systems of the body</p> <p>3. To introduce to the students should have thorough knowledge about, developmental screening, principles of laboratory investigations, Growth and development, assessment of progressive locomotor disorders.</p>								
CO1	Acquainted the students to be able asses and diagnose all possible findings on the patient to plan a Rehabilitation programme.								
CO2	Plan out the documentation of patients with scale, outcome measures, electro diagnostic procedures and asses the progression.								
CO3	Carryout the recent technique/ approaches to treat & train children with Neurological, Orthopaedic & Cardio respiratory deficit, and be able to impart knowledge for training the under graduate students								
CO4	Describe the importance to rehabilitate high risk infants								
CO5	Acquainted the students to be able asses and diagnose all possible findings on the patient to plan a Rehabilitation programme.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Normal motor development (development during Prenatal Infancy, and childhood) Reflex maturation. Developmental assessment and diagnosis.	5	By the end of the of the unit students will be able to provide detailed information on normal motor development, reflex development, Assessment and diagnosis				1,2,3		
II	Developmental screening using various scales. Genetic basis of paediatric disorders. Embryology & genetic counselling. Cardio-respiratory assessment of neonate and infant and related Paediatric disorder	10	By the end of the of the unit students will gain proper knowledge on screening, genetics and cardio-respiratory assessment				1,2,3,4		
III	Principles of laboratory investigations for differential diagnosis. Clinical symptomatology and patho-physiology of locomotor and cardio pulmonary disorders.	5	By the end of the of the unit students will know about the differential diagnosis and symptoms and pathophysiology of cardiopulmonary disorders				1,2,3,4		
IV	Growth and development of a child and its disorders Maturation, Pathophysiological and recovery processing the CNS.	10	By the end of the of the unit students will know about the standard growth and development of children, giving emphasis on the CNS				1,2,3,4,5,6		



<b>V</b>	Assessment of progressive locomotor disorders– Neuropathic and Myopathic. Early intervention- high risk babies, Neonatal care and management	<b>15</b>	By the end of the of the unit students will have thorough knowledge regarding the assessment and management of neuropathic and myopathic conditions , also giving emphasis on high risk babies	1,2, 3,4, 5,6
<b>Practical</b>	Understanding the stages of motor development from prenatal infancy to childhood. Identifying and assessing reflex development and maturation. Skills in diagnosing developmental milestones and delays. Proficiency in using various scales for developmental screening. Evaluating and diagnosing neuropathic and myopathic locomotor disorders. Strategies for early intervention and management of high-risk babies and neonatal care.	<b>90</b>	These practical skills will enable students to effectively assess and manage developmental issues, ensuring early and accurate intervention for better health outcomes.	

### **TEXT BOOKS:**

1. Physical therapy Research- Domholdt, W.B Saunders, Philadelphia. 1993
2. Human neuroanatomy – Carpenter M.B, Williams & Wilkins, Baltimore, 1983
3. Physical therapy Assessment in Early Infancy –Wilhelm Churchill Liningstone, New York, 1993
4. Physical therapy for children – Campbell Suzann K, W.B Saunders, Philadelphia 1994
5. Physical management of Multiple Handicapped – Freser, William & Wilkins, Baltimore.
6. Elements of paediatric physiotherapy- Eckerley P, Churchill Liningstone, Edingburgh, 1993
7. Physiotherapy in pediatrics – Shepherd R. Heinmann, London, 1980 2 nd edition
8. The Growth chart – WHO, Geneva, 1986

### **REFERENCE BOOKS:**

1. Orthotics in neurological rehabilitation – Aisen, Demos Publication, New York 1992
2. Electrodiagnosis in diseases of nerve and muscle – Kimura J, F.A Davis, Philadelphia.
3. Physical rehabilitation: assessment and treatment – O’Sullivan, F.A Davis, Philadelphia 1994.
4. The neural basis of motor control – Black I, Churchill Livingstone, London-1987
5. Motor relearning programme for stroke – Carr, Aspen publication, Rock ville, 1987.
6. Child with spina Bifida – Anderson E.M. and Spain B., Methun, London 1977.
7. A manual of neonatal intensive care – Robert N.R.C, Edward Arnold, London 1986
8. Measurement in physical therapy – Churchill, Livingstone, London 1988.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquainted the students to be able assess and diagnose all possible findings on the patient to plan a Rehabilitation programme.	1,2,3,4,5,6,7,8,9
2	Plan out the documentation of patients with scale, outcome measures, electro diagnostic procedures and assess the progression.	1,2,3,4,5,6,7,8,9
3	Carry out the recent technique/ approaches to treat & train children with Neurological, Orthopaedic & Cardio respiratory deficit, and be able to impart knowledge for training the under graduate students	1,2,3,4,5,6,7,8,9
4	Describe the importance to rehabilitate high risk infants	1,2,3,4,5,6,7,8,9
5	Acquainted the students to be able asses and diagnose all possible findings on the patient to plan a Rehabilitation programme.	1,2,3,4,5,6,7,8,9

### MAPPING TABLE

Course Name: ELECTIVE :PAEDIATRICS														
Course Code: 22MPTO 215R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO 1	PSO 2	PSO 3	
	CO1	3	1	2	1	2	2	2	2	2	1	3	2	1
	CO2	2	3	1	2	1	2	1	2	1	2	2	1	1
	CO3	3	2	2	2	2	2	2	1	2	2	3	0	2
	CO4	1	1	2	3	1	1	2	2	2	2	3	2	1
	CO5	2	2	2	1	2	3	2	2	2	1	3	1	2
	Average	2.2	1.8	1.8	1.8	1.6	2	1.6	2	1.8	2.8	1.2	1.4	
	Count	11	9	9	9	8	10	8	10	7	14	6	7	

<b>COURSE TITLE</b>	<b>CORPORATE PROFICIENCY (Communicative English &amp; Soft Skills)</b>								
<b>COURSE CODE</b>	<b>22UMPD211R</b>	<b>TOTAL CREDITS:2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS:60P</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	22UMPD121R Communication Mastery	<b>CO-REQUISITE</b>	NIL						
<b>ANTI-REQUISITE</b>	NIL								
<b>PROGRAMMES</b>	Master of Business Administration/Master of Business Administration in Healthcare Management/Master of Business Administration (Industry Integrated)/ Master of Business Administration on Business Analytics/Master of Social Work/Master of Arts in Applied Psychology/Master of Science in Clinical Psychology/Master of Arts in Sociology/Master of Physiotherapy/Master of Medical Laboratory Technology/Master of Emergency and Critical Care/Master of Science in Biotechnology/ Master of Science in Microbiology/ Master of Science in Food Nutrition and Dietetics/Master of Science in Botany/ Master of Science in Zoology								
<b>SEMESTER</b>	Fall/I or Winter/II Semester of Second Year of the Programme								

### **Course Objectives:**

1. To acquaint students with the various tool so fan effective presentation.
2. To acquire the speaking skill instruct, influence, engage, educate, or appease the listeners.
3. To increase proficiency, present ability and quality of resume and provide guidance for self-promotion and self-evaluation in social media.
4. To prepare and train the students for the campus drives& walking interviews.

### **Course Outcomes:**

1. It will prepare the learners to speak with greater control and char is main front of others.
2. It will have a positive impact in their thought process and problem-solving skills.
3. It will arm the students with all the necessary tools and skill sets to prepare professional resume. They will learn to high light and assess themselves in social media.
4. It will impart in them techniques to solve critical problems in an interview, develop strategies to crack interviews, improve their communication skills, and boost their confidence.

### **Course Description**

The purpose of this course is to make students confident in presenting themselves and be industry ready. Preparation and managing their Dossier along with Resume building activities will help them to be more Industry ready. Various Training sessions on Employability related communication will uplift the students 'performance during their group discussions and Personal Interviews.

### **Text Books:**

3. Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent

- Writing and Speaking, Zephyros Press.  
4. McDowell, Gayle Laakmann. 2008. Cracking the Coding Interview (Indian Edition).

### Reference Books:

1. Garg, Manoj Kr. (2018) *English Communication: Theory and Practice*

### Other Learning Resources:

1. <https://brightlinkprep.com/10-best-toefl-prep-books/>  
2. <https://files.eric.ed.gov/fulltext/EJ1132742.pdf>

## Module 1 - Presentation Skills

1. Introduction
2. Essential characteristics of a good presentation
3. Preparation of a good presentation

## Module 2 - Public Skills

1. Understanding and Overcoming Fear of Public Speaking,
2. Confidence and Control,
3. Physiology and Stress-Control/Process,
4. Tips for Presentations and Public Speaking,
5. Tips for Using Visual Aids in Presentations,
6. Process for Preparing and Creating Presentations,
7. Delivering Presentations Successfully,
8. Doubt Clearing and Summary of Main Points
9. Fear of Public Speaking

## Module 3 -

### Practical session on Resume, Curriculum Vitae, Writing cover letter & LinkedIn Profile

1. Preparation, submission & screening of Resume.
2. Practical session on cover letter screening session
3. Creating a pro file on LinkedIn
4. How to utilize it

## Module 4 - Leadership & Management Skills

1. Concepts of Leadership,
2. Leadership Styles,
3. Manager VS Leader,
4. How to be an Effective Leader,
5. Mock/Practice Session,
6. Doubt Clearing Session.

## Module 5 - Research Paper - Writing Skills

1. How to write a research paper
2. Key point in Research Work

## Module 6 - Interview Skills & Dresscode Ethics

1. Types of the interview - telephonic, virtual & face to face
2. Online interview, personal interview,
3. Panel interview,

4. Group interview,
5. JAM session,
6. Types of interview questions-traditional/common interview questions,
7. Case interview questions,
8. General Strategies for answering questions,
9. Marketing your skills and experiences,
10. Preparation before the interview,
11. How to dress up for an interview,
12. How to maintain eye contact and positive body language,
13. How to be presentable,
14. Interview dos and don'ts,
15. Introduction to Dress Code Ethics,
16. Purpose and Importance
17. How to Make 'FIRST IMPRESSION'
18. What to Wear During Interviews or Any other Formal Meetings– Male & Female

### Module7- Mock Interview

1. Practical Mock Interview,
2. Feedback-Receiving Feedback,
3. Giving Feedback,
4. Advantages of Effective Feedback, How to deal with negative feedback.

<b>COURSE TITLE</b>	<b>Research Ethics</b>									
<b>COURSE CODE</b>	<b>22UMRE214R</b>	<b>TOTALCREDITS:1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>	
		<b>TOTALHOURS:15T</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	Nil									
<b>ANTI-REQUISITE</b>	Nil									
<b>PROGRAMMES</b>	All PG Programme									
<b>SEMESTER</b>	Second Year, Fall Semester									

**Course Objectives:** This course aims to lay a foundation for empirical research and make students aware of relevant guidelines, policies, and codes relating to ethical research, as well as to provide, via a study of ethical theories, concepts.

**Course Outcomes:**

- To be able to describe and apply theories and methods in ethics and research ethics
- To acquire an overview of important issues in research ethics, like responsibility for research, ethical vetting, and scientific misconduct.
- To acquire skills of presenting arguments and results of ethical inquiries.
- To be able to Identify the concepts and procedures of sampling, data collection, analysis and reporting

**Course Description:** The course will cover general concerns in research ethics as well as research ethics issues that may be specific to the candidate's own research. The general topics covered in the form of lectures are: Academic integrity including plagiarism, self-plagiarism. Research data and result bias, manipulation, and fabrication.

**Text Books:**

- Bird, A(2006).Philosophy of Science. Rutledge.
- Macintyre, Alasdair(1967)A Short History of Ethics. London.
- Indian National Science Academy(INSA),Ethics in Science Education, Research and Governance(2019)

**Reference Books:**

- National Academy of Science, National Academy of Engineering and Institute of Medicine(2009). On Being a Scientist: A Guide of Responsible Conduct in Research: Third Edition, National academics Press
- GeorgeR, (2011).Sociological Theory,Rawat Publication, NewDelhi India.
- GeorgeR,(2019). Post Modern Social Theory, Rawat Publication, New Delhi, India.

**Other Learning Resources:**

**Course Contents:**

**Unit1-ETHICS:**Introduction to the course and each other; an introduction to moral theory. Ethics: definition, moral philosophy, nature of moral judgements and reactions. Research regulation; self-regulation; research ethics. Honesty, candor, compromise and integrity. Data ownership and

stewardship; conflicts of interest; collaboration. Human and Non-Human subjects. Research and researchers in society.(3Lecture)

**Unit2-SCIENTIFIC CONDUCT**-Ethics with respect to science and research.Intellectual honesty and research integrity. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP). Redundant publications: duplicate and overlapping publications, salamislicing. Selective reporting and misrepresentation of data. (5Lecture)

**Unit3-PUBLICATION ETHICS**- Publication ethics: definition, introduction and importance. Best practices/standards setting initiatives and guidelines: COPE, WAME, etc. Conflicts of interest. Publication misconduct: definition, concept, problems that lead to unethical behaviour andvice versa, types.Violation of publication ethics, authorship and contributor ship. Identification of publication misconduct, complaints and appeals. Predatory publishers and journals.(7Lecture)

**Unit4- OPEN ACCESS PUBLISHING**-Open access publications and initiatives. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies. Software tool to identify predatory publications developed by SPPU. Journal finder / journal suggestion toolsviz. JANE, Elsevier Journal Finder, Springer Journal Suggester,etc.(4Lecture)

**Unit5-PUBLICATION MISCONDUCT**Group Discussions; Subject specific ethical issues, FFP, authorship. Conflicts of interest. Complaints and appeals: examples and fraud from India and abroad. Software tools; Use of plagiarism software like Turn tin, Urkund and other open source offtware tools.(4Lecture)

**Unit6-DATABASES AND RESEARCH METRICS**-Databases:Indexing databases. Citation databases: Web of Science, Scopus, etc. Research Metrics: Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score. Metrics: h-index, g index, I 10 index, altmetrics.(7Lecture).

SEMESTER – III									
Course Title	<b>TECHNO PROFESSIONAL SKILL – II(PHYSIOTHERAPY IN HEALTH MANAGEMENT AND ADMINISTRATION)</b>								
Course code	22MPTO216R	TOTAL CREDITS: 2	L	T	P	S	R	O/F	C
		TOTAL HOURS: 60P	0	0	4	0	0	0	2
Pre-requisite	NIL	CO-REQUISITE	NIL						
Program me	Master of Physiotherapy								
Semester	3rd Semester								
Course Objectives (Minimum 3)	<p>1.To understand the fundamental principles of physiotherapy management, including administration and practice, enabling students to apply this knowledge as informed professionals in the field.</p> <p>2. To develop an understanding of legal and ethical issues relevant to physiotherapy practice, equipping students with the necessary knowledge to practice ethically and within the bounds of the law.</p>								
CO1	Acquainted adequate knowledge and skill in physiotherapy, clinic and department management.								
CO2	Apply creatively and effectively whilst upholding professional standards and relationships with a range of stakeholders (including clients, colleagues, careers, families, employers, insurers and others whose presence impacts on the patient/client, and other treatment providers and team members) with different understandings, perspectives and priorities influencing physiotherapy practice.								
CO3	Recognize the role of Physiotherapy in the context of the health needs of the community and National priorities in the health sector.								
CO4	Impart adequate knowledge of ethics and demonstrate ethical behaviour in practice.								
CO5	Gain the basic management knowledge and skills essential for effective functioning and to be conversant with planning organization, work scheduling, cost & control of quality in relation to Physiotherapy services and care.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	<b>Introduction</b> Functions of management Evolution of management through scientific management Theory-Classical Theory, System Approach, Contingency Approach. Functions of management. Management process – planning, organization, direction, controlling(Decision- making) Quantitative methods of management: relevance of statistical and/ or techniques in management	<b>10</b>	By the end of the of the unit students will be able to provide detailed information on basic knowledge about functioning of management and its decision making					1,2,3	
<b>II</b>	<b>Personal Management</b> Staffing Recruitment selection. Performance analysis and appraisal Job satisfaction Discipline.	<b>12</b>	By the end of the of the unit students will gain proper knowledge on methods and procedure of teaching staffing pattern and job satisfaction					1,2,3,4	
<b>III</b>	<b>Marketing and Total Quality Management</b> Marketing Research production planning, pricing, channels of distribution, promotions, consumerbehaviour, and licenser. Basis of quality management, quality assurance program in hospitals. Medical audit and international quality system.	<b>15</b>	By the end of the of the unit students will know about marketing and its importance in quality management					1,2,3,4	
<b>IV</b>	<b>Administration :Hospital as an Organization:</b> Introduction: Branches of administration,	<b>12</b>	By the end of the of the unit students will know about organization and					1,2,3,4,	



	Nature and scope of administration, How to be an effective administrator, Planning hospital administration as part of a balanced health care program. Personal policies – Communication & Contact, administration principles based on goal & functions at large hospital / domiciliary set up / private clinical / academic institution. Hospital administration: Organization, Staffing, Information, Communication, Coordination, Cost of services, Monitoring and evaluation. Financial issues including budget and income generation.		administration of a hospital and its policies and budgeting along with its importance in staff competence	5,6
<b>V</b>	<b>Administration and Organization of physiotherapy department</b> Principles of hospital administration and its applications to physiotherapy. Organization of physiotherapy department: Planning, Space, Manpower, Other basic resources. • The implications and confirmation to the rules of professional conduct. Material management: Pharmacy, Hospital waste disposal. Quality assurance: Hospital acquired infection, Quality assurance through record review and medical audit. Public relations in hospital and human resource management... Current Issues.	<b>11</b>	By the end of the of the unit students will have thorough knowledge about the importance of designing physiotherapy department in hospital and its multiple aspects in quality patient care including ethical issues	1,2,3,4,5,6

#### TEXT BOOKS:

- 1) Physical Therapy Administration & Management by Hickik Robert J
- 2) Management in Physical Therapy Practices by Catherine G.
- 3) Principles of Hospital Administration and Planning-Sakharkar,B M.
- 4) Opportunities in Hospital & Health Care Administration- Bhardwaj ,Pradeep.

#### REFERENCE BOOKS:

- 1) Hospital Administration & Management :A Comprehensive Guide- Gupta,Jaydeep Das.
- 2) The Hospital Administration- George,MA.
- 3) Hospital administration and human resource management by R.C.Goyal, 4th edition.

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquainted adequate knowledge and skill in physiotherapy, clinic and department management.	1,2,3,5,6,7,8,9
2	Apply creatively and effectively whilst upholding professional standards and relationships with a range of stakeholders (including clients,	1,2,3,5,6,7,8,9

	colleagues, careers, families, employers, insurers and others whose presence impacts on the patient/client, and other treatment providers and team members) with different understandings, perspectives and priorities influencing physiotherapy practice.	
3	Recognize the role of Physiotherapy in the context of the health needs of the community and National priorities in the health sector.	1,2,3,5,6,7,8,9
4	Impart adequate knowledge of ethics and demonstrate ethical behaviour in practice.	2,4,5,6,7,8,9
5	Gain the basic management knowledge and skills essential for effective functioning and to be conversant with planning organization, work scheduling, cost & control of quality in relation to Physiotherapy services and care.	1,2,3,5,6,7,8,9

### MAPPING TABLE

Course Name: TECHNO PROFESSIONAL SKILL - II (Physiotherapy in Health Management and administration)													
Course Code:22MPT O216R	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PS O1	PS O2	PSO3
CO 1	3	2	1	0	1	1	2	2	3	3	2	1	
CO 2	1	3	1	0	2	1	3	3	2	3	1	2	
CO 3	1	2	3	0	2	2	1	1	1	1	1	2	
CO 4	0	2	0	3	0	1	2	2	1	3	2	1	
CO 5	2	1	1	0	3	2	1	1	2	2	1	3	
Average	1.4	2	1.2	0.6	1.6	1.4	1.8	1.8	1.8	2.4	1.4	1.8	
Count	7	10	6	3	8	7	9	9	9	12	7	9	

SEMESTER – III									
<b>Course Title</b>	MINI-RESEARCH (SURVEY/EXPERIMENTS- R3)								
<b>Course code</b>	22MPTO217R	<b>TOTAL CREDITS: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	0	0	0	4	8	0	2
<b>Pre-requisite</b>	NIL	<b>CO-REQUISITE</b>	NIL						
<b>Program me</b>	Master of Physiotherapy								
<b>Semester</b>	3rd Semester								
<b>Course Objectives (Minimum 3)</b>	To have a basic knowledge and understanding of surveys and experiments and its clinical implications in clinical practice.								
<b>CO1</b>	Enable Students a thorough understanding of how survey /experiments can provide useful causal inferences.								
<b>CO2</b>	knowledge of how to design and analyze simple and complex experiments/ surveys								
<b>CO3</b>	Ability to evaluate experimental research / surveys and apply these methods in their own research.								
<b>CO4</b>	Enable students the basic knowledge and understanding in undertaking surveys and experiments into their clinical practice								
<b>CO5</b>	Enables the students to develop new skills and strategies in designing their survey/ Experiments which can be implemented in patient care.								
<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	What is literature review?	4	Identify literary techniques and creative uses of language in literary texts.					1,2	
<b>II</b>	How to Begin the literature Review	15	.Adapt their texts to particular audiences and purposes.					1,2	
<b>III</b>	How to write main body of literature review	14	The students will learn about the importance of ethical consideration in research writing					1,2	
<b>IV</b>	How to write conclusion of literature Review	10	The students will be able to select one of the major key concepts and variables from the chosen research topic.					1,2, 3	
<b>V</b>	How to analyse gap in literature review.	5	The students will get practical exposure in writing research papers in proper APA format and styles.					1,2, 3,4	

**TEXT BOOKS:**

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Enable Students a thorough understanding of how survey /experiments can provide useful causal inferences.	1,2,3,9
2	knowledge of how to design and analyze simple and complex experiments/ surveys	1,2,3,9
3	Ability to evaluate experimental research / surveys and apply these methods in their own research.	1,2,3,9
4	Enable students the basic knowledge and understanding in undertaking surveys and experiments into their clinical practice	1,2,3,9
5	Enables the students to develop new skills and strategies in designing their survey/ Experiments which can be implemented in patient care.	1,2,3,9

**MAPPING TABLE**

<b>Course Code:</b> <b>22MPTO217</b> <b>R</b>	<b>Course Name: MINIRESEARCH</b>											<b>PSO 2</b>	<b>PSO3</b>
	<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PSO 1</b>		
CO1	1	2	2	2	0	0	0	0	3	3	2	1	
CO2	1	3	2	2	0	0	0	0	3	3	2	1	
CO3	1	2	3	2	0	0	0	0	3	3	2	1	
CO4	1	1	1	3	0	0	0	0	3	2	1	1	
CO5	1	1	1	3	0	0	0	0	3	2	2	1	
<b>Average</b>	1	1.8	1.8	2.4	0	0	0	0	3	2.6	1.8	1	
<b>Count</b>	5	9	9	12	0	0	0	0	15	13	9	5	

Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
22MPTO211R	PHYSIOTHERAPEUTICS	3	3	2	2	2	2	2	3	3
22MPTO212R	ELECTIVE :MUSCULOSKELETAL DISORDERS AND SPORTS	3	3	3	2	2	3	2	3	3
22MPTO213R	ELECTIVE :NEUROLOGICAL AND PSYCHOSOMATIC DISORDERS	3	3	3	3	2	3	3	3	3
22MPTO214R	ELECTIVE :CARDIO-RESPIRATORY DISORDERS	3	3	3	3	3	2	2	2	3
22MPTO215R	ELECTIVE :PAEDIATRICS	3	3	3	3	3	2	2	2	3
22MPTOMC01/02/03	Moocs	3	3	3	3	3	2	2	3	1
22MPTO201R	GENERIC/OPEN/UNIVERSITY ELECTIVE	2	2	2	2	2	2	2	2	2
22UMPD211R	CORPORATE PROFICIENCY (Communicative English & Soft Skills)	2	2	2	2	3	3	3	3	2
22UMRE214R	Research Ethics	3	3	3	3	3	2	3	3	2
22MPTO216R	TECHNOLOGICAL PROFESSIONAL SKILL - II	3	2	2	2	2	2	2	2	1
22MPTO217R	Mini Research (Survey/experiments-R3)	3	3	3	3	2	2	2	3	1

SEMESTER – IV									
Course Title	ELECTIVE : MUSCULOSKELETAL DISORDERS AND SPORTS								
Course code	22MPT0221R	TOTAL CREDITS: 6	L	T	P	S	R	O	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	3+3= 6
Pre-requisite	ANATOMY, CLINICAL ORTHOPAEDICS AND TRAUMATOLOGY, PHYSIOTHERAPY IN ORTHOPAEDICS AND TRAUMATOLOGY, ELECTIVE I: MUSCULOSKELETAL DISORDERS AND SPORTS	CO-REQUISITE	NIL						
Program me	Master of Physiotherapy								
Semester	4th Semester								
Course Objectives (Minimum 3)	1. Will be able to identify, discuss and analyse the musculoskeletal dysfunction in terms of biomechanical, kinesiological and biophysical basis. 2. Will use the anatomical rationale for clinical tests used in differential diagnosis.								
CO1	Acquainted the ability to perform an appropriate subjective and physical examination, with development of suitable analytical skills to evaluate data obtained.								
CO2	Develop clinical reasoning that incorporates theoretical concept with evidence-based practice in the field of musculoskeletal physiotherapy.								
CO3	Acquainted the implication of dysfunction on the Neuro- Musculoskeletal system and the student's clinical decision making.								
CO4	Evaluate patients with scale, out come measures and asses the progression.								
CO5	Gained the knowledge about the use recent Technique/ approaches to treat & train patients with musculo-skeletal deficit in children, adults & geriatrics.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Analysis and classification of sports and sports specific injuries and its management.  Management of sport injuries, sports fitness.  Principles of Injury Prevention.  Medico legal issues in sports, Sports Psychology, Sports Nutrition and Sports pharmacology.	10	Students will be able to know and apply the analysis and classify the sports injuries. Principles of injury prevention and medico legal issues.				1,2		
II	Rehabilitation of paediatric musculoskeletal disorders.  Orthopaedic implants-designs, materials, indications, post-operative assessment and training.  External aids, appliances, adaptive self-help devices; prescription, biomechanical compatibility, Check-out and training.	5	They will be able to understand the implants use din orthopaedic surgery and about the external aids and how to prescribe them.				1,2,3		
III	Manual therapy: soft tissue manipulations and	15	The students will be able to apply the techniques of manual therapy, the				1,2,3,4		

	<p>mobilization, neural mobilization, acupressure.(Cyriax, Maitland, Butler, McKenzie, Kaltenborn, Mulligan)</p> <p>Pilates-school of thought, Chiropractic school of thought, Osteopathic school of thought.</p> <p>Myofascial Release technique and Muscle Energy technique.</p> <p>Joint manipulation – peripheral joints and vertebral joints.</p>		school of thoughts and the technique of myofascial release.	
<b>IV</b>	<p>Neuromuscular Taping Techniques.</p> <p>Electro diagnosis: Electromyography and evoked potential studies.</p>	<b>5</b>	They will be able to know the neuromuscular taping techniques and the electrodiagnosis	1,2, 3,4
<b>V</b>	<p>Community based rehabilitation in musculoskeletal disorders.</p> <p>Recent Advances in Musculoskeletal Disorders and Sports Physiotherapy.</p>	<b>10</b>	The students will be able to know the recent advances in the field of surgery and community based rehabilitation.	1,2, 3,4, 5,6
<b>Practical</b>	<p>Techniques for rehabilitation, managing complications, and ensuring optimal recovery. Strategies for managing amputations and repetitive strain injuries, including pain management and functional training. Management techniques for conditions like osteoarthritis and related disorders. Methods for evaluating hand function, gait, posture, ADLs, and occupational tasks. Assessment and management of locomotor disabilities, including medical, surgical, and sports psychology aspects. Rehabilitation protocols following joint replacements, implants, and soft tissue surgeries.</p>	<b>90</b>	These practical skills will equip students with comprehensive knowledge and hands-on experience in various aspects of physiotherapy, ensuring they are well-prepared to manage a wide range of conditions effectively	

### TEXT BOOKS:

1. Jack H Wilmore , David L Costill : Physiology of Sports & Exercise 6rd Ed
2. Apley & Soloman : Apley’s System of Orthopedics & Fracture 1998/ 9th Ed
3. Norkin, Cynthia C White, D Joyce : Measurement of Joint Motion 5th ed
4. Margaret, Nordin : Basic Biomechanics of the Musculoskeletal System 2001/ 3rd Ed
5. Jonathan K. Ehrman, Paul M. Gordon: Clinical Exercise Physiology 3rd ed

### REFERENCE BOOKS:

1. Physiotherapy in Orthopaedics -Fiona Coutts
2. Peggy A. Houglum , Dolores B. Bertoti : Brainstorm’s: Clinical Kinesiology 1998/6th Ed
3. Stephen L Demeter , Gunnar B J Anderson, George b j smith : Disability Evaluation 1996

4. David H Perrin : Athletic Taping & Bracing 3rd ed
5. Craik, Rebecall : Gait's Analysis 1994/ 1st Ed
6. Gabriel Stux Bruce Pomeranz : Basics of Acupuncture 3rd revised and enlarged edition

**OTHER LEARNING RESOURCES:**

1. Physical Therapy (APTA, America)
2. Physiotherapy (CSP London)
3. American Journal Of Physical Medicine And Rehabilitation.
4. Physiotherapy (Canada)
5. Physiotherapy Theory And Practice.
6. Australian Journal Of Physiotherapy
7. Journal Of Indian Association Of Physiotherapy
8. Clinical Kinesiology
9. Journal Of Biomechanics
10. American Journal Of Sports Exercises.
11. Pediatric Physical Therapy.
12. Journal Of Rehabilitation Research And Development.
13. Journal of Cardio Pulmonary Rehabilitation.
14. Archives Of Physical Medicine And Rehabilitation.
15. Journal Of Pediatric Orthopedics.
16. Clinical Rehabilitation.
17. Spine.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Aquinted the ability to perform an appropriate	<b>1,2,3,4,5,6,7,8,9</b>



	subjective and physical examination, with development of suitable analytical skills to evaluate data obtained.	
2	Develop clinical reasoning that incorporates theoretical concept with evidence-based practice in the field of musculoskeletal physiotherapy.	1,2,3,4,5,6,7,8,9
3	Acquainted the implication of dysfunction on the Neuro- Musculoskeletal system and the student's clinical decision making.	1,2,3,4,5,6,7,8,9
4	Evaluate patients with scale, out come measures and asses the progression.	1,2,3,4,5,6,7,8,9
5	Gained the knowledge about the use recent Technique/ approaches to treat & train patients with musculo-skeletal deficit in children, adults & geriatrics.	1,2,3,4,5,6,7,8,9

### MAPPING TABLE

	<b>Course Name: ELECTIVE:MUSCULOSKELETAL DISORDERS AND SPORTS</b>													
<b>Course Code: 22MPTO221 R</b>	<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	
	CO1	3	2	1	2	3	2	2	3	3	2	2	2	
	CO2	2	3	2	2	2	2	2	1	2	3	2	3	
	CO3	2	2	3	1	3	1	2	2	2	2	3	2	
	CO4	1	1	2	2	1	3	2	2	3	1	2	1	
	CO5	1	2	1	1	2	2	2	1	2	2	1	2	
	<b>Average</b>	1.8	2	1.8	1.6	2.2	2	2	1.8	2.4	2	2	2	
	<b>Count</b>	9	10	9	8	11	10	10	9	12	10	10	10	

SEMESTER – IV									
Course Title	ELECTIVE: NEUROLOGICAL AND PSYCHOSOMATIC DISORDERS								
Course code	22MPTO222R	TOTAL CREDITS: 6	L	T	P	S	R	O	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	3+3= 6
Pre-requisite	Neuroanatomy,Physiology,Clinical Neurology &Neurosurgery Neurological Conditions	CO-REQUISITE	NIL						
Programme	Master of Physiotherapy								
Semester	4th Semester								
Course Objectives (Minimum 3)	1. To introduce students to the concepts related to the management of various neurological conditions and the rehabilitation following disorders of special senses, speech, language, and perception. 2. To provide an understanding of the assessment of fitness and exercise prescription for special neurological conditions.								
CO1	Apprehend the Knowledge regarding various advanced electro diagnosis and its applicability to various paediatric and adult neurological conditions								
CO2	Identify the essential components of task and perform a task analysis in neurological conditions								
CO3	Evaluate a client with Neurological condition with detailed knowledge regarding approaches for various adult neurological assessment and management.								
CO4	Apply knowledge of assistive technology applicable to various neurological conditions as a mean of prevention and management								
CO5	Perform evaluation of disability, legislation & social care applicable to various neurological conditions as a mean of prevention and management.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Physical therapy management of Motor neuron diseases, neuromuscular junction disorders, Brain tumour, and Neurocutaneous disorders. Associated functional disturbances of higher functions and their testing and training, Learning skills, A.D.L and functional activities. Aids and appliances in neurological disorders. Prescriptions, testing and training	5	The student will be able to learn about the exercise prescriptions and appliances and aids required in the physiotherapy management of various neurological disorders					1,2	
II	Diseases of spinal cord, peripheral nerves and cranial nerves, Physiotherapy management for neuromuscular disorders. Bladder and Bowel dysfunction and its rehabilitation, Application of Functional electrical stimulation and Bio-feedback in neurological rehabilitation.	10	To learn and explore about the physiotherapy management of various neurological diseases and its advanced approaches					1,2,3	
III	Paediatric neurology (Cerebral Palsy, Developmental disorders, Neuropsychiatric disorders, Cerebral&Craniovertebral anomalies & metabolic disorders of nervous system). Assessment and management of various neurological gaits, Community based rehabilitation for neurological dysfunction. Disability evaluation and management.	15	To learn and gather knowledge about the assessment and management of paediatric neurological cases and abnormal gait					1,2,3,4	
IV	Cognitive disorders and its rehabilitation, Oromotor rehabilitation, Vestibular disorders and its rehabilitation, Rehabilitation following disorders of Special Senses, Speech. Language and Perception.	5	To understand the concepts, theories and rehabilitation approaches related to cognitive, vestibular and other special senses					1,2,3,4	

<b>V</b>	Basic knowledge of drugs used for neurological conditions, Assessment of fitness and exercise prescription for special neurological population – Stroke, Paraplegia, TBI, Multiple Sclerosis, MND, Parkinsonism, & Ataxia, Recent Advances in Neurological Rehabilitation.	<b>15</b>	To understand the concepts of drugs and exercise required in physical therapy treatment related to various neurological disorders	1,2,3,4,5,6
<b>Practical</b>	Following are the topics to be included Review of General assessment , Pain assessment ,sensory and motor assessment , Assessment of Tone, flexibility, tightness, Muscle Length Testing ,Postural assessment, Limb length measurement, Balance assessment , Coordination assessment, Reflex Testing , Cranial nerve testing. Nerve Tension testing ,EMG/ NCV report reading &analysis, Clinical Gait assessment ,Functional assessment ,Environmental assessment	<b>90</b>	To Develop skills in patient history taking, observation, and physical examination, Learn to differentiate between types of pain (nociceptive, neuropathic, and referred pain), Develop ability to assess the impact of pain on function and quality of life.	

### Text Books:

1. Human neuroanatomical – Carpenter M.B, Williams & Wilkins, Baltimore, 1983
2. Physical therapy Assessment in Early Infancy –Wilhelm Churchill Livingstone, New York, 1993
3. Elements of paediatric physiotherapy- Eckerley P, Churchill Livingstone, Edingburgh, 1993
4. The Growth chart – WHO, Geneva, 1986
5. Orthotics in neurological rehabilitation – Aisen, Demos Publication, New York 1992
6. Manual of nerve condition velocity techniques – De Lisa, Raven press, New York, 1982
7. Physical rehabilitation: assessment and treatment – O’Sullivan, F.A Davis, Philadelphia 1994.
8. Neuro-rehabilitation – Farber, W.B Saunders, Philadelphia 1982
9. Gaits analysis – Perry J., Black Thorofare, New Jersey, 199

### Reference Books:

1. The neural basis of motor control – Black I, Churchill Livingstone, London-1987
2. Physical therapy management of Parkinson’s disease – Turnbull Gerode , Churchill,
3. Abnormal postural reflex activity caused by Brain lesions – Bobath b. Aspen publications, Rockville, 1897.
4. Disorders of voluntary muscle- Eagel, Churchill, Livingstone, Edingburgh 1988.
5. A Clinician’s view of neuro muscle disorder – Brook M.H Williams and Wilkins, Baltimore 1986.
6. Proprioception, neuro muscular facilitation techniques – Knot M. and Voss, Harper and Row, New York 1972 2nd edition.
7. Stroke rehabilitation – Laidler, Capman and Hall, London 1994.

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Apprehend the Knowledge regarding various advanced electro diagnosis and its applicability to various pediatric and adult neurological conditions	1,2,3,4,5,6,7,8,9

2	Identify the essential components of task and perform a task analysis in neurological conditions	1,2,3,4,5,6,7,8,9
3	Evaluate a client with Neurological condition with detailed knowledge regarding approaches for various adult neurological assessment and management.	1,2,3,4,5,6,7,8,9
4	Apply knowledge of assistive technology applicable to various neurological conditions as a mean of prevention and management	1,2,3,4,5,6,7,8,9
5	Perform evaluation of disability, legislation & social care applicable to various neurological conditions as a mean of prevention and management.	1,2,3,4,5,6,7,8,9

Course Name: ELECTIVE:NEUROLOGICAL AND PSYCHOSOMATIC DISORDERS													
Course Code: 22MPTO222 R	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PSO 1	PSO 2	PSO3
	CO1	3	2	2	1	1	1	2	2	2	3	2	1
	CO2	2	3	2	1	2	1	2	2	2	2	1	0
	CO3	1	2	3	2	1	1	2	2	3	3	1	2
	CO4	2	1	1	3	1	1	2	2	2	2	1	0
	CO5	1	1	1	1	3	2	1	1	1	2	1	0
	Average	1.8	1.8	1.8	1.6	1.6	1.2	1.8	1.8	2	2.4	1.2	0.6
	Count	8	9	9	8	8	6	9	9	10	12	6	3

SEMESTER – IV									
Course Title	ELECTIVE (CARDIO-RESPIRATORY DISORDERS)								
Course code	22MPT0223R	TOTAL CREDITS: 6	L	T	P	S	R	O	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	3+3= 6
Pre-requisite	Anatomy,Physiology	CO-REQUISITE	NIL						
Program me	Master of Physiotherapy								
Semester	4th Semester								
Course Objectives (Minimum 3)	1. To introduce the students to the concepts related Cardiopulmonary system, Anatomical & physiological differences, Physiotherapy techniques, Drug Therapy. 2. To impart the students to the concepts related Investigations and tests of Cardiopulmonary system. 3. To make the students understand about the concepts related general health conditions.								
CO1	Acquainted the students to be able to learn about the applications and execution of different physiotherapy management following general medical and surgical conditions and in ICU. To gain knowledge about Poisoning drug overdose and drowning and also to learn about respiratory pharmacology.								
CO2	Categorise physiotherapy management of peripheral vascular disorders and also will gain knowledge about exercise testing exercise planning and prescription.								
CO3	Acquainted the student to learn about physiotherapy management in Obstructive and restrictive lung disorders. Will also learn about cardiac and pulmonary rehabilitation. The student will also learned about physiotherapy management following congenital and acquired heart diseases.								
CO4	Choose different physiotherapy modalities for wound healing. Will also gain knowledge to prescribe exercises for health promotion and fitness for special populations- DM, Obesity, IHD, COPD, HTN								
CO5	Plan out applications and execution of different physiotherapy management in CBR to improve cardiovascular and respiratory disorders.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Physiotherapy management for common conditions in the ICU  Poisoning, Drug overdose, and Drowning.  Physiotherapy management following general Medical & Surgical conditions  Respiratory Pharmacology		5	To learn about the applications and execution of different physiotherapy management following general medical and surgical conditions and in ICU. To gain knowledge about Poisoning drug overdose and drowning and also to learn about respiratory pharmacology.				1,2	
II	Physiotherapy management of peripheral vascular disorders Exercise testing, planning and prescription: aerobic and anaerobic exercise training.		5	Be able to learn physiotherapy management of peripheral vascular disorders and also will gain knowledge about exercise testing exercise planning and prescription.				1,2,3	
III	Physiotherapy management in Obstructive and restrictive lung disorders Pulmonary Rehabilitation Physiotherapy management following congenital and acquired heart diseases Cardiac rehabilitation – Conservative and post-operative management.		15	Will gain knowledge in physiotherapy management in Obstructive and restrictive lung disorders. Will also learn about cardiac and pulmonary rehabilitation. Will also learned about physiotherapy management following congenital and acquired heart diseases.				1,2,3,4	
IV	Physiotherapy modalities used for wound healing Exercise Prescription for health promotion and fitness for special populations- DM, Obesity, IHD, COPD, HTN		10	Will gain knowledge in using different physiotherapy modalities for wound healing. Will also gain knowledge to prescribe exercises for				1,2,3,4	

			health promotion and fitness for special populations- DM, Obesity, IHD, COPD, HTN	
<b>V</b>	C.B.R in Cardio-vascular and respiratory conditions.  Recent advances in Cardio respiratory physiotherapy.	<b>10</b>	To Learn the applications and execution of different physiotherapy management in CBR to improve cardiovascular and respiratory disorders.	1,2, 3,4, 5,6

**Text Books:**

- a. Disease & Drug Consult: Respiratory Disorders by Lippincott, Wolters Kluwer | Lippincott Williams & Wilkins.

**Reference Books:**

1. Cardiorespiratory Physiotherapy Adults And Paediatrics 5Th Edition by Eleanor Main and Linda Denehy, ELSEVIER.

**OTHER LEARNING RESOURCES: E-lectures, Seminars, Journals, Webinars**

1. Clinical Kinesiology
2. Journal of Biomechanics
3. Pediatric Physical Therapy
4. Journal of Rehabilitation Research & Development
5. European journal of physiotherapy
6. Subject related journals, website links etc.
7. Topic related to the subject in Google scholar, Pudmed, etc
8. Topic related to the subject in YouTube

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Acquainted the students to be able to learn about the applications and execution of different physiotherapy management following general medical and surgical conditions and in ICU. To gain knowledge about Poisoning drug overdose and drawing and also to learn about respiratory pharmacology.	12,3,4,5,6,7,8,9
2	Categorise physiotherapy management of peripheral vascular disorders and also will gain knowledge about exercise testing exercise planning and prescription.	12,3,4,5,6,7,8,9
3	Acquainted the student to learn about physiotherapy management in Obstructive and restrictive lung disorders. Will also learn about cardiac and pulmonary rehabilitation. The student will also learned about physiotherapy management following congenital and acquired heart diseases.	12,3,4,5,6,7,8,9
4	Choose different physiotherapy modalities for wound healing. Will also gain knowledge to prescribe exercises for health promotion and fitness for special populations- DM, Obesity, IHD, COPD, HTN	12,3,4,5,6,7,8,9
5	Plan out applications and execution of different physiotherapy management in CBR to improve cardiovascular and respiratory disorders.	12,3,4,5,6,7,8,9

### MAPPING TABLE

Course Code:22MPT O223R	Course Name: ELECTIVE:CARDIO-RESPIRAORY DISORDERS										P O 9	PSO 1	PSO 2	PSO 3
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8					
	CO1	3	1	2	1	2	2	2	2	2				
CO2	2	3	1	2	1	2	1	2	2	2	1	3	1	

	CO3	3	2	2	2	2	2	1	2	3	0	2	1
	CO4	1	1	2	3	1	1	2	2	3	2	1	2
	CO5	2	2	2	1	2	3	2	2	3	1	2	2
	<b>Average</b>	2.2	1.8	1.8	1.8	1.6	2	1.6	2	2.8	1.2	1.8	1.6
	<b>Count</b>	11	9	9	9	8	10	8	10	14	6	9	8



SEMESTER – IV									
Course Title	ELECTIVE: PAEDIATRICS								
Course code	22MPTO224R	TOTAL CREDITS: 6	L	T	P	S	R	O	C
		TOTAL HOURS: 45T+90P	3	0	6	0	0	0	3+3=6
Pre-requisite	Neuroanatomy,Physiology,ELECTIVE: PAEDIATRICS	CO-REQUISITE	NIL						
Program me	Master of Physiotherapy								
Semester	4th Semester								
Course Objectives (Minimum 3)	1.To introduce the students to the concepts of different rehabilitation approaches 2. To introduce the students to the management of congenital locomotor disorders including the prosthetic and orthotic management. 3. To introduce the students to the analysis of fitness and exercise prescription for special paediatric populations, Disorders of perception, Paediatric surgeries, Sports and fitness in paediatrics,								
CO1	Asses and diagnose all possible findings on the patient to plan a Rehabilitation programme.								
CO2	Plan out the documentation of patients with scale, outcome measures, electro diagnostic procedures and asses the progression.								
CO3	Apply recent technique/ approaches to treat & train children with Neurological, Orthopaedic & Cardio respiratory deficit, and be able to impart knowledge for training the under graduate students								
CO4	Describe the importance to rehabilitate the community based children.								
CO5	Rephrase the need of fitness in paediatric population								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Management of congenital locomotor disorders including the prosthetic and orthotic management. Analysis of fitness and exercise prescription for special paediatric populations–cerebral palsy, downs syndrome, polio, muscular dystrophy, Juvenile diabetes and obesity.	10	By the end of the of the unit students will be able to provide detailed information on management of congenital disorders and exercise prescription for special population					1,2	
II	Management of neuro paediatric patients Motor learning- theory and techniques Disorders of perception and sensory integration.	10	By the end of the of the unit students will gain proper knowledge on screening, perception disorders, motor learning techniques, giving emphasis on rehabilitating neuro patients					1,2,3	
III	Integrated approach in management of paediatric disorders. Paediatric surgeries and its post-operative management.	15	By the end of the of the unit students will know about the different rehabilitative approaches for management					1,2,3,4	
IV	Adaptive equipment for physically challenged children. Physical therapy in public schools. Sports and fitness in paediatrics.	5	By the end of the of the unit students will know about the standard assistive, adaptive equipment's for special					1,2,3,4	

			children, importance of physiotherapy in school, followed by necessity of fitness and sports in paediatric population	
V	CBR in paediatric conditions. Recent Advances in Paediatric Physiotherapy	5	By the end of the of the unit students will have thorough knowledge community based rehabilitation in various paediatric conditions, also giving importance to recent advances in the field of physiotherapy	1,2,3,4,5,6
<b>Practical</b>	Understanding the stages of motor development from prenatal infancy to childhood. Identifying and assessing reflex development and maturation. Skills in diagnosing developmental milestones and delays. Proficiency in using various scales for developmental screening.  Evaluating and diagnosing neuropathic and myopathic locomotor disorders. Strategies for early intervention and management of high-risk babies and neonatal care.	90	These practical skills will enable students to effectively assess and manage developmental issues, ensuring early and accurate intervention for better health outcomes.	

**TEXT BOOKS:**

1. Physical therapy Research- Domholdt, W.B Saunders, Philadelphia. 1993
2. Human neuroanatomy – Carpenter M.B, Williams & Wilkins, Baltimore, 1983
3. Physical therapy Assessment in Early Infancy –Wilhelm Churchill Liningstone, New York, 1993
4. Physical therapy for children – Campbell Suzann K, W.B Saunders, Philadelphia 1994
5. Physical management of Multiple Handicapped – Freser, William & Wilkins, Baltimore.
6. Elements of paediatric physiotherapy- Eckerley P, Churchill Liningstone, Edingburgh, 1993
7. Physiotherapy in pediatrics – Shepherd R. Heinmann, London, 1980 2 nd edition
8. The Growth chart – WHO, Geneva, 1986

**REFERENCE BOOKS:**

1. Orthotics in neurological rehabilitation – Aisen, Demos Publication, New York 1992
2. Electro-diagnosis in diseases of nerve and muscle – Kimura J, F.A Davis, Philadelphia.
3. Physical rehabilitation: assessment and treatment – O’Sullivan, F.A Davis, Philadelphia 1994.
4. The neural basis of motor control – Black I, Churchill Livingstone, London-1987
5. Motor relearning programme for stroke – Carr, Aspen publication, Rock ville, 1987.
6. Child with spina Bifida – Anderson E.M. and Spain B., Methun, London 1977.
7. A manual of neonatal intensive care – Robert N.R.C, Edward Arnold, London 1986
8. Measurement in physical therapy – Churchill, Livingstone, London 1988.

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Asses and diagnose all possible findings on the patient to plan a Rehabilitation programme.	1,2,3,4,5,6,7,8,9
2	Plan out the documentation of patients with scale, outcome measures, electro diagnostic procedures and asses the progression.	1,2,3,4,5,6,7,8,9
3	Apply recent technique/ approaches to treat & train children with Neurological, Orthopaedic & Cardio respiratory deficit, and be able to impart knowledge for training the under graduate students	1,2,3,4,5,6,7,8,9
4	Describe the importance to rehabilitate the community based children.	1,2,3,4,5,6,7,8,9
5	Rephrase the need of fitness in paediatric population	1,2,3,4,5,6,7,8,9

### MAPPING TABLE

Course Name: ELECTIVE:PAEDIATRICS													
Course Code: 22MPTO224 R	CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PSO 1	PSO 2	PSO3
	CO1	3	2	2	1	1	1	2	2	2	3	2	1

	CO2	2	3	2	1	2	1	2	2	2	2	1	0
	CO3	1	2	3	2	1	1	2	2	3	3	1	2
	CO4	2	1	1	3	1	1	2	2	2	2	1	0
	CO5	1	1	1	1	3	2	1	1	1	2	1	0
	Average	1.8	1.8	1.8	1.6	1.6	1.2	1.8	1.8	2	2.4	1.2	0.6
	Count	9	9	9	8	8	6	9	9	10	12	6	3

SEMESTER – IV														
Course Title	DISSERTATION (RESEARCH/DATA ANALYSIS/DOCUMENTATION-R4)													
Course code	22MPTO225R	TOTAL CREDITS: 6					L	T	P	S	R	O	C	
		TOTAL HOURS: 45T+90P					3	0	6	0	0	0	3+3=6	
Pre-requisite	Nil	CO-REQUISITE					Nil							
Programme	Master of Physiotherapy													
Semester	4th Semester													
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>Students should be able to develop a research project and conduct the dissertation writing independently in physiotherapy.</li> <li>Avoid collection of data that are not strictly necessary for understanding and solving the problem at hand.</li> <li>Engage in systematic discovery and critical review of appropriate and relevant information sources and organize the study in clearly defined components or phases</li> </ol>													
CO1	Impart the Knowledge of the most advanced research in the candidate's specialization area (Track) of Computer Science or Information Security, respectively													
CO2	Explain academic theory and the preparation of high-quality research pertinent to the field of study													
CO3	Choose appropriate research methods and techniques suitable for the candidate's research field													
CO4	Simplify current state of the art in the individual research area, and the ability to appropriately employ methods and existing research results in the development of new knowledge, theories and presentation of research in the individual research area													
CO5	Development of thesis will generally arise from the preparation of the peer review publication during the programme as to ensure that student is conversant with and in his or her area of specialization at the forefront of research in their field.													

### COURSE DESCRIPTION:

This course serves as an introductory course in the dissertation methodology writing process. The focus of the course is the further development of the student's dissertation proposal towards their partial/full fulfillment of their MPT degree program

### TEXT BOOKS:

A Practical Guide to Dissertation and

Thesis Writing

Mark Stephan Felix and Ian Smith

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Impart the Knowledge of the most advanced research in the candidate’s specialization area (Track) of Computer Science or Information Security, respectively	1,2,3,4,5,6,7,8,9
2	Explain academic theory and the preparation of high-quality research pertinent to the field of study	1,2,3,4,5,6,7,8,9
3	Choose appropriate research methods and techniques suitable for the candidate’s research field	1,2,3,4,5,6,7,8,9
4	Simplify current state of the art in the individual research area, and the ability to appropriately employ methods and existing research results in the development of new knowledge, theories and presentation of research in the individual research area	1,2,3,4,5,6,7,8,9
5	Development of thesis will generally arise from the preparation of the peer review publication during the programme as to ensure that student is conversant with and in his or her area of specialization at the forefront of research in their field.	1,2,3,4,5,6,7,8,9

**MAPPING TABLE**

Course Code:22MPTO 225R	Course Name: DISSERTATION (Research/data analysis/documentation-R4)											PSO 1	PSO2	PSO3
	CO	C O	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9			
CO1	2	1	2	1	2	2	1	3	2	3	0	3	1	
CO2	3	2	1	2	1	2	1	2	2	2	0	3	1	
CO3	2	3	2	1	2	2	1	3	2	3	0	3	1	
CO4	1	1	3	1	3	2	1	2	2	2	0	3	1	
CO5	1	1	1	3	1	1	2	1	1	1	0	3	1	
Average	1.8	1.6	1.8	1.6	1.8	1.8	1.2	2.2	1.8	2.2	0	3	1	
Count	9	8	9	8	9	9	6	11	9	11	0	15	5	

Course code	Course title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
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22MPTO221R	ELECTIVE:MUSC ULOSKELETAL DISORDERS AND SPORTS	3	3	3	3	3	3	3	2	2
22MPTO222R	ELECTIVE:NEUR OLOGICAL AND PSYCHOSOMATI C DISORDERS	3	3	3	3	3	3	3	2	2
22MPTO223R	ELECTIVE:CARDI O-RESPIRAORY DISORDERS	3	3	3	3	3	3	3	2	2
22MPTO224R	ELECTIVE:PAEDI ATRICS	3	3	3	3	3	3	3	2	2
22MPTO225R	DISSERTATION (Research/data analysis/documentat ion-R4)	3	3	3	3	3	3	3	2	2
22MPTOMC04/05/06	MOOC	3	3	3	3	3	3	3	2	2

### **INSTRUCTIONS TO ELECTIVE/ GE/ MOOCS/ PORJECTS/ VALUE ADDED/ OTHER COURSES**

1. The students shall have to register for the courses they wish to pursue under the supervision of the programme coordinator/ mentor.
2. Discipline specific elective/professional electives/Interdisciplinary electives/ Specialization Elective Courses are to be selected by the students before the start of the respective semesters and register under the supervision of Programme Coordinators/Mentors.
3. The Generic Elective/Open Elective/ Interdisciplinary Elective courses have to be chosen by the students and register under the supervision of Programme Coordinators/Mentors.
4. Projects are to be undertaken by the students as prescribed by the programme and a Dissertation/Project Report has to be submitted to the Department and a copy of the same has to be submitted to the Central Library.
5. Before the submission of the Dissertation/Project Report to any of the Department, the students shall have to produce a Plagiarism certificate through the respective supervisors where up to 30% plagiarism shall be considered for UG and 20% for PG.
6. Prescribed value added courses in each of the semester or as applicable has to be undergone by students in a programme as a non-credit course but one has to pass the examination to qualify the semester.

7. Summer Training/internship, Seminar, Minor Project, field work, etc. has to be undertaken by the students as prescribed by the programme and respective reports are to be submitted to the Programme Coordinator through the respective course teacher.

8. MOOCs courses are to be opted by the students as prescribed by the programme under the supervision of Programme Coordinators/Mentors.







# Assam down town University

## Curriculum and Syllabus

### Bachelor of Critical and Intensive Care Unit Technology

OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

FACULTY OF PARAMEDICAL  
SCIENCES

July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022



*Chairperson  
Board of Studies*



*Member Secretary  
Academic Council*



## ***Vision***

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## ***Missions***

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community.

# Programme Details

## Programme Overview:

The Bachelor of Critical and Intensive Care Technology is a three-year program focused on training students to manage critically ill patients in ICU settings. The curriculum covers disease processes, patient monitoring, ICU procedures, medication management, and technical skills with specialized equipment. Students gain hands-on experience through clinical rotations in ICUs, learning to perform essential tasks like intubation, ventilation, and resuscitation. Upon completion, graduates are prepared for careers as Critical Care Technologists in hospitals, emergency departments, and critical care transport services, providing vital support in managing life-threatening conditions.

## Specific Features of the Curriculum

The curriculum provides skill enhancement and value-added courses along with the core papers.

### I. Eligibility Criteria:

Minimum 45% in 10+2 with English, Biology & Chemistry. 5% relaxation for SC/ST, EWS, and Specially abled candidates.

### II. Program Educational Objectives (PEOs):

**PEO-1:** Graduates will be well prepared for successful careers in healthcare settings both government and private sector in areas like critical care units (NICU, PICU & ICU) and emergency departments.

**PEO-2:** The graduates will be engaged in professional activities to enhance their own stature and simultaneously contribute to the profession and society at large.

**PEO-3:** Graduates will be successful in higher education in inter-disciplines of intensive care technology if pursued.

### III. Program Specific Outcomes (PSOs):

**PSO1: Research and Reasoning:** Identify, formulate, review literature, and analyze complex Biotechnological problems reaching substantial conclusions using logical and critical thinking, and scientific principles.

**PSO2: Professional Efficiency:** Apply comprehensive knowledge to perform life-saving procedures in emergency and critical care settings.

**PSO3: International competency:** Demonstrate global competency to excel in the profession through international interdisciplinary certification courses.

#### **IV. Program Outcome:**

**PO1: Human Health Knowledge:** Apply the knowledge of human anatomy, physiology, biochemistry, nutrition science, drug intervention and pathophysiology of the diseases.

**PO2: Patient Care:** Demonstrate hospital practices in ICU settings including critical care procedures and sterile practices for intensive care of critically ill patients.

**PO3: Procedures and Techniques:** Demonstrate efficiency in handling emergencies using life-saving techniques and able to prepare the patients for general medical procedures.

**PO4: Equipment Proficiency:** Operate modern patient monitoring systems and devices including ventilators and defibrillators etc.

**PO5: Professional and Ethical Practices:** Prepare and maintain patient information, and apply ethical principles in the profession.

**PO6: Teamwork:** Perform efficiently as a member or leader in diverse teams/multidisciplinary settings.

**PO7: Communication:** Use effective communication within the healthcare team rendering seamless collaboration and timely sharing of critical information.

**PO8: Sustainable and Lifelong Learning:** Able to engage in independent and lifelong learning in the broadest sense to benefit the environment and humankind.

**V. Total Credits to be Earned:** 123.

#### **VI.**

#### **VII. Career Prospects:**

Graduates of the **Bachelor of Critical and Intensive Care Technology** program have strong career prospects in healthcare. They can work as Critical Care Technologists in intensive care units (ICUs), emergency departments, and critical care transport services. Their expertise in managing critically ill patients, using advanced monitoring equipment, and performing specialized procedures makes them valuable in hospitals and specialized healthcare settings. Additionally, they can pursue roles in critical care research, education, or equipment management, or advance their careers by specializing further in areas like neonatal or cardiac critical care.

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 40% or as prescribed by the programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Sem Exam – I (ISE-I) (Written Examination) *	30
2.	In-Sem Exam – II (ISE-II) (Written Examination) *	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*are compulsory*

**Note:** Total Internal assessment should be out of 40

### INSTRUCTION

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.
2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.
3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

## **B. SEMESTER END EXAMINATION:**

Time table for end semester examination is published at least 25 days prior to the start of Examination.

### **I. Pre-Examination:**

#### **Eligibility Criteria for a student to appear in University Examinations:**

The student shall only be allowed to appear in a University Examination, if:

- i) He/ She is a registered student of the University;
- ii) He/ She is of good conduct and character;
- iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

### **II. Admit Card:**

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds.

### **III. Pattern of Question Papers:**

The question paper shall follow the principles of Bloom's Taxonomy.  
Table

<b>S. N.</b>	<b>Level</b>	<b>Questions /verbs for test</b>
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify
4	Analyze	Classify, outline, categorize, analyze, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.
6	Create	Design, Formulate, Modify, Develop, integrate, etc.

**Note:** No course is to be evaluated on basis of **all 6 knowledge levels**.

The format of the question paper across all the program follow a unique pattern and the total marks is 60

**Table 1: Question paper pattern for End semester examination**

<b>Sl no</b>	<b>Question pattern</b>	<b>Total marks</b>
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

#### **V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

#### **VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Office-in-Charge of the center may take appropriate decisions as per the rules and procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

#### **VII. Instruction to the Students:**

- (i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.



- (ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- (iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.
- (iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- (v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- (vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- (vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.
- (viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- (ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

### **VIII. Provision for an Amanuensis (writer):**

- (i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.
- (ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.

- (iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process.

### **C. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times CR$

#### **i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

#### **ii. Grade Point:**

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

#### **iii. Letter Grade:**

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

Letter Grade	Grade Points	Description
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

**iv. Grade Point Average:**

**a. SGPA (Semester Grade Point Average)**

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades ‘O’ to ‘F’ as given in Table 1.

$$SGPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  registered Course and  $C_i$  is the Credit (weight) of that Course.

**b. CGPA (Cumulative Grade Point Average)**

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully

completed so far starting from the enrollment in the Programme. In other words, taking into account all the Courses graded with ‘O’ to ‘P’ as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrollment.

- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i$ th completed Course and  $C_i$  is the Credit (weight) of that Course.

$$CGPA = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

- (iii) The CGPA shall be convertible into equivalent percentage of marks using Equation Conversion of CGPA to percentage marks: = CGPA \* 10

## **D. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### **ii. Grievance Readdress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.

- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite proforma available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.
- (vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.
- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.
- (ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# INSTRUCTION TO TEACHERS AND STUDENTS

## (Teaching and Learning Methods)

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

### 1. Student- centric / Constructivist Approach:

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer and

discuss in the successive class. This will help in the preparation for various competitive examination and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student- centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

### **The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures	20%
Student-centric Approach, Students present and deliver lectures in the presence of teacher and supervised by teacher	60%
Students visit fields or perform experiments or teachers perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

### **Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned approaches and prepare a lesson plan for execution and maintain a file.

## Curriculum Framework: Breakdown of Credits (for 2022-23 Syllabus)

<b>Sl. No</b>	<b>Category</b>	<b>Total number of Credits</b>
1	University Core(UC)	15
2	University Elective (UE)	5
3	Program Core(PC)	96
4	Program Elective (PE)	2
5	Faculty Elective (FE)	5
<b>Total number of credit</b>		<b>123</b>

### Breakdown by categories of courses

<b>Sl no</b>	<b>Category</b>	<b>Credits</b>	<b>%</b>
1	Paramedical Sciences	<b>110</b>	89.43%
2	Science	4	3.25%
3	Engineering	1	0.82%
4	Commerce and Management	8	6.5%
<b>Total</b>		<b>123</b>	<b>100%</b>



## SEMESTER WISE COURSE DISTRIBUTION

	S. N.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total
					L	T	P	S	R	O		IA*	SEE*	PE*	
<b>Semester I</b>	1.	22BCIC111R	Anatomy I	PC	3	0	4	0	0	0	5	40	60	100	200
	2	22BCIC112R	Physiology I	PC	3	0	4	0	0	0	5	40	60	100	200
	3	22BCIC113R	Biochemistry I	PC	3	0	2	0	0	0	4	40	60	100	200
	4	22BCIC114R	Hdpc I	PC	2	0	0	0	0	0	2	40	60	0	100
	5	22UBPD112R	Elementary English	UE	0	0	4	0	0	0	2	00	0	100	100
	6	22UBEC111	Extra-curricular (Non -CGPA)	UC	0	0	0	4	0	0	1	100	0	0	100
	<b>Total</b>										<b>19</b>				<b>900</b>
<b>Semester II</b>	S. No.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total
					L	T	P	S	R	O		IA*	SEE*	PE*	
	1.	22BCIC121R	Anatomy II	PC	3	0	2	0	0	0	4	40	60	100	200
	2	22BCIC122R	Physiology II	PC	3	0	2	0	0	0	4	40	60	100	200
	3	22BCIC123R	Biochemistry II	PC	3	0	2	0	0	0	4	40	60	100	200
	4	22BCIC124R	Hdpc II	PC	2	0	0	0	0	0	2	40	60	0	100
	5	22BCIC125R	Techno Professional Skills	PC	0	0	2	0	0	0	1	00	00	100	100
	7	22UBCC121	Co-Curricular (Non -CGPA)	UC	0	0	0	4	0	0	1	100	0	0	100
	8	22UBEC121	Extra-Curricular (Non -CGPA)	UC	0	0	0	4	0	0	1	100	0	0	100
	9	22UBPD122R	Implicit English(Communicative English&Soft Skills (Cict)	PC	0	0	2	0	0	0	1	00	0	100	100
	10	22UCDL102R	Digital Proficiency	UE	0	0	4	0	0	0	2	0	0	100	100
	11	22UUHV104R	Uhv+Professional Ethics	UE	1	0	2	0	0	0	1	40	60	0	100
	12	MOBCICR123	(MOOCS)Scientific Writing In Health Research	UC	1	0	0	0	0	0	1	0	0	100	100
<b>Total</b>										<b>22</b>				<b>1400</b>	

S. No.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total
				L	T	P	S	R	O		IA*	SEE*	PE*	
1.	22BCIC211R	Pathology	PC	3	0	0	0	0	0	3	40	60	00	100
2	22BCIC212R	Pharmacology-I	PC	2	2	0	0	0	0	2	40	60	00	100
3	22BCIC213R	Nutrition	PC	2	2	0	0	0	0	2	40	60	00	100
4	22BCIC214R	Airway Management And Respiratory Emergencies	PC	2	0	2	0	0	0	3	40	60	100	200
5	22BCIC215R	Systemic Examination Of The Patient(TPS)	PC	0	0	2	0	0	0	1	00	00	100	100
6	22BCICGE01	Generic Elective (Air Pollution – A Global Threat To Our Health)	UE	1	0	0	0	0	0	1	00	00	100	100
7	22BCICMO01	Moocs (Urbanisation And Health Promoting Sustainable Solution)		1	0	0	0	0	0	1	00	00	100	100
8	22UBCC211	Co-Curricular (Non -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
9	22UBEC211	Extra-curricular (Non -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
10	22UBPD211R	Executive English	UC	0	0	2	0	0	0	1	0	0	100	100
11	22UULS211R	Basic Acclimatizing Skills	PC	0	0	2	0	0	0	1	0	0	100	100
<b>Total</b>										<b>21</b>				<b>1100</b>

S. N.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total
				L	T	P	S	R	O		IA*	SEE*	PE*	
1.	22BCIC221R	Microbiology	PC	2	0	0	0	0	0	2	40	60	00	100
2	22BCIC222R	Patient Assessment, Venous Access And Drug Administration	PC	3	0	4	0	0	0	5	40	60	100	200
3	22BCIC223R	Medical And Surgical Emergency And Intensive Care	PC	3	0	0	0	0	0	3	40	60	00	100
4	22BCIC224R	Ventilation And Intensive Care I	PC	3	0	0	0	0	0	3	0	0	100	100
5	22BCIC225R	Trauma Emergency (Tps)	PC	0	0	2	0	0	0	1	0	0	100	100
6	22BCICGE21	Generic Elective(Politits And Economics Of International Energy)	FE	2	0	0	0	0	0	2	0	0	100	100
7	22BCICMO21	MOOCs( Executive Data Science	FE	1	0	0	0	0	0	1	0	0	0	100

			Specialization)												
8	22UBCC221	Co-Curricular (Non -CGPA)	UC	0	0	0	4	0	0	1	00	0	100	100	
9	22UBEC221	Extra-Curricular (Non -CGPA)	UC	0	0	0	4	0	0	1	00	0	100	100	
10	22UBES201R	Environmental Science (EVS)	UC	2	0	0	0	0	0	2	40	60	0	100	
11	22UBPD221R	Enhanced Professional Skills	UC	0	0	2	0	0	0	1	00	00	100	100	
12	22UUFL223R	Personal Financial Planning	UC	0	0	2	0	0	0	2	40	60	0	100	
13	22UULS222R	Basic Life Saving Skills	UC	0	0	2	0	0	0	1	0	0	100	100	
														1400	
<b>Total</b>										<b>24</b>				<b>1400</b>	
<b>Semester V</b>	<b>S. N.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>						<b>C</b>	<b>Maximum Marks for</b>			
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>		<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	<b>Total</b>
	1.	22BCIC311R	Medical And Surgical Emergency & Intensive Care I	PC	4	0	0	0	0	0	4	40	60	00	100
	2	22BCIC312R	Ventilation & Intensive Care II	PC	4	0	4	0	0	0	6	40	60	100	200
	3	22BCIC313R	Dialysis	PC	4	0	0	0	0	0	4	40	60	00	100
	4	22BCIC315R	Techno-professional skill (Basic Care Of Patient)	PC	0	0	2	0	0	0	1	00	00	100	100
	5	22BCIC316R	Biomedical waste	DE	1	0	0	0	0	0	1	0	0	0	100
	6	22UBCC311	CO-Curricular	UC	0	0	0	4	0	0	1	0	0	100	100
	7	22BCICMO31	MOOCs	FE	1	0	0	0	0	0	1	0	0	100	100
<b>Total</b>										<b>18</b>				<b>900</b>	
<b>Semester VI</b>	<b>S. N.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>						<b>C</b>	<b>Maximum Marks for</b>			
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>		<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	<b>Total</b>
	1.	22BCIC321R	Trauma Emergency And Intensive Care	PC	4	0	4	0	0	0	6	40	60	100	200
	2	22BCIC322R	Pediatric Emergencies, Neonatal Emergencies And Intensive Care	PC	4	0	4	0	0	0	6	40	60	100	200
	3.	22BCIC323R	Research Project	PC	0	0	0	0	36		6	0	0	100	100
4	22BCIC322R	MOOCs-IV	FE	1	0	0	0	0	0	1	0	0	100	100	
<b>Total</b>										<b>19</b>				<b>600</b>	

**\*IA: Internal Assessment, SEE: Semester End Examination, PE: Practical Examination**

SEMESTER – I									
Course Title	Anatomy I								
Course code	22BCIC111R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	F I semester of first year of the programme								
Course Objectives	1. To learn about the anatomical position, gross and microscopic structure of the organs and skeleton in the human body. 2. To provide a strong anatomical foundation about the human body 3. To assist students in developing a better grasp of the anatomical structure and relationships in various body regions								
CO1	Understand basic anatomical terms and positions.								
CO2	Develop fundamental knowledge on the musculoskeletal system.								
CO3	Discuss the components and functions of organs in the thoracic cavity.								
CO4	Explain the different structures and components of the digestive system.								
CO5	Understand and classify the human body tissues.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>INTRODUCTION TO ANATOMICAL TERMS:</b> Organization of human body, Anatomical positions, axis and plans, common anatomical terminology		7	Describe, illustrate and explain the different anatomical positions and terms.				1,2	
II	<b>MUSCULO – SKELETAL SYSTEM:</b> <b>Bones:</b> Classification & types according to morphology & development structure and functions, description of bones of human body, blood supply of bones. <b>Cartilage:</b> Description. <b>Joints:</b> Definition, classification, structure and movements. <b>Muscles:</b> Types and structure of Muscles, name of the muscles of the body with some important muscle's attachments.		10	Describe, illustrate and classify the musculoskeletal system along with their functions.				1,2	
III	<b>THORAX:</b> Mediastinum – division and contents, Structure of heart and blood vessels, Full description of Respiratory tract and lungs, Para nasal sinuses.		10	Describe, illustrate and explain the structure of organs inside the thoracic cavity.				1,2,3	
IV	<b>DIGESTIVE SYSTEM:</b> Structure of Gastro Intestinal tract and accessory organs of digestion		8	Describe, illustrate and explain the structure and composition of the digestive system.				1,2,3	
V	<b>TISSUE:</b> Classification and description of the basic tissues of the body. <b>Histology:</b> Epithelium, compact bone muscles, connective tissue, nervous tissue		10	Describe, classify and explain the tissues of the body.				1,2	

	artery, vein and lymphatic tissue			
<b>Practical</b>	1. Study of anatomical planes and positions. 2. Study of Skelton and bones of human body. (Skull, Vertebrae, Ribs and bone of upper limb)	<b>60</b>		3,4, 5

### TEXT BOOKS:

T1: Allison Wynn Grant, Anne Waugh, and Kathleen J. W. Wilson 'Ross and Wilson Anatomy and Physiology', Elsevier, Amsterdam, Netherlands, 13 th Edition (2020)

T2: Richard Drake, A. Wayne Vogl, Adam Mitchell, 'Gray's Anatomy for Students', Elsevier, Amsterdam, Netherlands, 4 th Edition (2019).

### REFERENCE BOOKS:

R1: BD CHAURASIAS., 'HUMAN ANATOMY' CBS publisher, New Delhi, 8 th Edition (2017)..

R2: Inderbir Singh. 'Anatomy and Physiology' CBS Publisher, Newdelhi 2 nd Edition (2004)

R3: Frederic Martini, Judi Nath, Robert Tallitsch, 'Human Anatomy', pearson Publisher, USA, 1 st edition( 2017).

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Understand basic anatomical terms and positions.	1,3,4,8
<b>2</b>	Develop fundamental knowledge on the musculoskeletal system.	1,3,4,8
<b>3</b>	Discuss the components and functions of organs in the thoracic cavity.	1,3,4,8
<b>4</b>	Explain the different structures and components of the digestive system.	1,3,4,8
<b>5</b>	Understand and classify the human body tissues.	1,3,4,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BEDM111R</b>	Anatomy I	3		2	2				2

SEMESTER – I									
Course Title	Physiology I								
Course code	22BCIC112R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 45T+60P	3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	1. To comprehend how tissues, organelles, cells, and the organ system are put together and function. 2. To provide a thorough understanding of all physiological systems in the human body 3. To examine intricate topics such as blood composition, hormonal control mechanisms, and physiological adaptations to environmental factors								
CO1	Develop fundamental knowledge on the components of cells and tissue structure.								
CO2	Describe the different composition and functions of the blood.								
CO3	Understand the process of the digestive system along with the organs involved and their significance.								
CO4	Explain the mechanism of the respiratory system.								
CO5	Understand the cardiovascular system along with the human circulatory system.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>GENERAL PHYSIOLOGY:</b> Organization of human body, cell structure and organelle, Tissues and functions.	7	Describe, illustrate and explain the functions of cells and tissues in the human body.				1,2		
II	<b>BLOOD:</b> Blood volume and body fluids, Composition and functions of blood, Structure and formation and function of RBC, WBC and platelets, Haemoglobin, Plasma, blood coagulation, Blood groups.	10	Describe, illustrate and explain the composition of body fluids and blood along with their functions.				1,2		
III	<b>DIGESTIVE SYSTEM:</b> General introduction, organizational plan of digestive system, Movement of G.I. Tract and functions of various components, Composition, functions and regulation of salivary, gastric, pancreatic, intestinal and biliary secretion, Functions of liver, gallbladder and pancreas, Digestion and absorption of carbohydrate, protein and	10	Describe, illustrate and explain the functions and mechanism of the digestive system.				1,2		
IV	<b>RESPIRATORY SYSTEM:</b> General organization, Mechanics of respiration, Regulation of respiration, Gaseous exchange in lunge and tissues, Pulmonary ventilation,	8	Describe, illustrate and explain the mechanism of the human respiratory system.				1,2		

	volumes and capacities. Effect of exercise on respiration, hypoxia			
<b>V</b>	<b>CARDIOVASCULAR SYSTEM:</b> General organization, structure and properties of cardiac muscles, Cardiac output, cardiac cycle, conducting system of heart, heart sounds, regulation of H.R., pulse, blood pressure and its regulation, Systemic circulation, pulmonary circulation and coronary circulation, ECG, cardio respiratory changes during exercise.	<b>10</b>	Describe, illustrate and explain the functions and mechanism of the cardiovascular system.	1,2
<b>Practical</b>	1. Study of compound Microscope. 2.Arterial pulse 3.Measurement of blood pressure 4.Hemoglobin 5.Blood group	<b>60</b>		2,3, 4,5

### TEXT BOOKS:

T1 K Sembulingam , Prema Sembulingam , Essentials of Medical Physiology , Jaypee Publication , Sixth Edition

T2 Anne Waugh, Allison Grant ‘Ross and Wilson Anatomy and Physiology’ 10<sup>th</sup> Edition (2008)

T3 Ross and Wilson Anatomy and Physiology in Health and Illness 13<sup>th</sup> Edition

### REFERENCE BOOKS:

R1 Inderbir Singh, A text book of Anatomy and Physiology

R2 Gyton, A text Book of Physiology

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge on the components of cells and tissue structure.	1,3,4,8
2	Describe the different composition and functions of the blood.	1,3,4,8
3	Understand the process of the digestive system along with the organs involved and their significance.	1,3,4,8
4	Explain the mechanism of the respiratory system.	1,3,4,8
5	Understand the cardiovascular system along with the human circulatory system.	1,3,4,8



## MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
<b>22BEDM112R</b>	Physiology I	3		2	3				2

SEMESTER – I									
Course Title	Biochemistry I								
Course code	22BCIC113R	Total credits:4 Total hours: 45T+30P	L	T	P	S	R	O/F	C
			3	0	2	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	1. To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites 2. To understand the energy flow in the form on ATP in the human body and cells. 3. To give a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids								
CO1	Explain the sources, functions and metabolism process of Carbohydrates.								
CO2	Identify various classification of amino-acids and recognize the significance of Protein.								
CO3	Describe the significance, classification and functions of lipids.								
CO4	Comprehend the structure and functions of Nucleic Acids.								
CO5	Explain the fundamentals and importance of acid, base and buffers.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>CARBOHYDRATES:</b> Definition and classification of carbohydrates, Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) and their sources, Biological significance of Carbohydrate	7	Define, classify and describe the sources and types of carbohydrates along with their functions in the body.				1,2		
II	<b>PROTEINS:</b> Definition of Proteins along with the Biological Significance, Amino acids and its classification, Essential and non-essential amino acids	10	Define, classify and explain the mechanism of proteins along with their functions in the body.				1,2		
III	<b>LIPIDS:</b> Definition and classification of lipids, Classification of Fatty Acids, Examples and functions of some common lipids(Phospholipids, Glycolipids, Steroids)	10	Define and classify types of lipids along with their functions in the body.				1,2		
IV	<b>NICLEIC ACIDS:</b> Basic idea of the structure of DNA and RNA Function of DNA and RNA	8	Describe, illustrate and explain the basic structure and functions of nucleic acids in the body.				1,2		
V	<b>ACID-BASE BUFFERS:</b> Basic idea of acids, bases, Ph, buffer.	10	Define, explain and describe acid-base buffers.				1,2		

	Acid base balance			
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. 1. To identification and demonstration of biochemistry laboratory glassware's and apparatus.</li> <li>2. To identification and demonstration of biochemistry laboratory instruments (Principle and Applications)</li> <li>3. Qualitative test for carbohydrates: <ul style="list-style-type: none"> <li>• To perform Molisch's test for determination of sugar in an unknown sample.</li> <li>• To perform Fehling's test for determination of reducing and non-reducing sugar in an unknown sample.</li> </ul> </li> </ol> <p>To perform Benedict's test for determination of reducing and non-reducing sugar in an unknown sample</p>	<b>30</b>	Demonstrate and explain the identification and use of biochemistry laboratory glassware, apparatus, qualitative tests such as Molisch's, Fehling's, and Benedict's to accurately determine the presence of sugars and classify them as reducing or non-reducing in unknown samples..	2,3, 4,5

### TEXT BOOKS:

T1 "Biochemistry" by U Satyanaryana and U Chakrapani

T2 "Text book of Biochemistry for medical students" by DM Vasudevan (Author), Sreekumari S (Author), Kannan Vaidyanathan (Author), 7<sup>th</sup> Edition

### REFERENCE BOOKS:

R1 "Lehninger Principles of Biochemistry" by David L Nelson and Michael M Cox, Eighth Edition| ©2021 David L.

R2 "Biochemistry" by Lubert Stryer, Jeremy M Berg, WH Freeman, 9th ed. 2019

R3 "An Introduction to Practical Biochemistry" by David E Metzler. McGraw Hill Education, 3<sup>rd</sup> Ed

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain the sources, functions and metabolism process of Carbohydrates.	<b>1,4,8</b>
<b>2</b>	Identify various classification of amino-acids and recognize the significance of Protein.	<b>1,4,8</b>
<b>3</b>	Describe the significance, classification and functions of lipids.	<b>1,4,8</b>
<b>4</b>	Comprehend the structure and functions of Nucleic Acids.	<b>1,4,8</b>
<b>5</b>	Explain the fundamentals and importance of acid, base and buffers.	<b>1,4,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>22BEDM11 3R</b>	<b>Biochemistry I</b>	3			2				2

SEMESTER – I									
Course Title	HDPC I								
Course code	22BCIC114R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	I semester of first year of the programme								
Course Objectives	1. To impart the knowledge in patient in a holistic approach for the overall wellbeing of the patient. 2. To impart a comprehensive knowledge on medical ethics and the quality and functions of medical professionals. 3. To provide a gross knowledge on the legal hazardous of medical profession.								
CO1	Discuss different functions, process of record keeping, reporting and essential components of hospital management.								
CO2	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.								
CO3	Understand and implement safety measures and hygiene in patient care.								
CO4	Describe different body positions and the mechanism and management of fever.								
CO5	Identify various sites to measure pulse, blood pressure and assess respiration.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Hospital &amp; Records &amp; Reports:</b> Introduction, Functions of Hospitals, Classification of Hospitals, Organization of Hospitals, Department of Hospitals, Management of Hospitals, Different services in a Hospital, Definition, Different types of records, Values & Objectives, Maintenance of records, Principle of good record writing, Difference of records & reports.	5	Describe, illustrate and explain the different types of record and reports maintained in the hospital.				1,2		
II	<b>First Aid &amp; Safety in the Laboratory :</b> <ul style="list-style-type: none"> <li>● Introduction</li> <li>● Aims &amp; objectives of first aid</li> <li>● Priorities of first aid</li> <li>● Golden rules of first aid</li> <li>● Qualities &amp; responsibilities of first aider</li> <li>● Simple first aid measures in selected conditions like –               <ul style="list-style-type: none"> <li>▪ Food poisoning</li> <li>▪ Snake bite</li> <li>▪ Scorpion bite</li> <li>▪ Dog bite</li> <li>▪ Foreign bodies in various organs</li> </ul> </li> </ul>	7	Explain the objectives of first aid and demonstrate the management of various medical emergencies.				1,2		

	<ul style="list-style-type: none"> <li>▪ Burns &amp; scalda</li> <li>▪ Haemorrhage</li> <li>● Common laboratory accidents from</li> <li>● Physical injuries</li> <li>● Electrical shock</li> <li>● Chemical injury</li> <li>● Bleeding</li> <li>● Burn</li> <li>● Eye accidents</li> </ul> <p>Biological hazards.</p>			
<b>III</b>	<p><b>Artificial respiration &amp; Hygiene, Care of Patient, Basic care needs of patients:</b></p> <p>Different methods</p> <ul style="list-style-type: none"> <li>● Personal Hygiene</li> <li>● Maintenance of Hygiene</li> <li>● Maintaining therapeutic environment</li> <li>● Safety factors for patients such as</li> <li>● Safety from mechanical injury</li> <li>● Safety from thermal &amp; chemical injury</li> <li>● Safety from radiation &amp; bacteriological injury</li> </ul> <p>Safety from allergens.</p>	<b>6</b>	Describe, illustrate and explain the significance of maintaining safety and hygiene in patient care.	1,2
<b>IV</b>	<p><b>Body temperature &amp; Comfort measures for patients:</b></p> <ul style="list-style-type: none"> <li>● Supine position</li> <li>● Prone Position</li> <li>● Cardiac position</li> <li>● Lateral Position</li> <li>● Fowlers position <ul style="list-style-type: none"> <li>● Maintenance of body temperature</li> <li>● Factors influencing body temperature</li> <li>● Different types of fever</li> <li>● Stages of rigor</li> <li>● Management of pyrexia</li> <li>● Maintenance of body temperature</li> <li>● Factors influencing body temperature</li> <li>● Different types of fever</li> <li>● Stages of rigor</li> </ul> </li> </ul> <p>Management of pyrexia</p>	<b>6</b>	Describe, define and explain the different positions of the body along with the management of temperature for patients.	1,2
<b>V</b>	<p><b>Pulse &amp; Blood Pressure &amp; Respiration:</b></p> <ul style="list-style-type: none"> <li>● Common pulse sites</li> </ul>	<b>6</b>	Describe, explain and demonstrate the assessment of pulse and respiration along with the factors	2,3,4,5

	<ul style="list-style-type: none"> <li>● Factors influencing pulse rate</li> <li>● Characteristics of Pulse</li> <li>● Abnormal pulses</li> <li>● Reading of pulse</li> <li>● Definition</li> <li>● Factors influencing B.P.</li> <li>● Abnormalities of B.P.</li> <li>● Recording of B.P.</li> <li>● Regulation of respiration</li> <li>● Factors causing variations in respiration</li> <li>● Abnormal respirations</li> </ul> <p>Reading of respiratory rate.</p>		affecting them.	
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Discuss different functions, process of record keeping, reporting and essential components of hospital management.	1,2,3,4,7,8
2	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	2,3,4
3	Understand and implement safety measures and hygiene in patient care.	1,6,8
4	Describe different body positions and the mechanism and management of fever.	1,2,3,4,6
5	Identify various sites to measure pulse, blood pressure and assess respiration.	1,2,3,4

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
22BEDM11 4R	HDPC I	3	3	3	2		2	2	2

SEMESTER – I									
Course Title	Elementary English								
Course code	22UBPD112R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 60P	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	I semester of first year of the programme								
Course Objectives	1. To introduce the students to the basics of English grammar and their application. 2. To enhance communication skills through listening and speaking exercises. 3. To learn and understand the importance of pronunciation of words.								
CO1	Speak confidently and articulate ideas clearly with correct pronunciation.								
CO2	Expand their vocabulary and use synonyms and antonyms appropriately.								
CO3	Apply grammatical rules to construct grammatically correct sentences and paragraphs.								
CO4	Identify different types of communication and strategies to overcome communication barriers.								
CO5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Grammar</b> i. Parts of Speech ii. Articles iii. Affirmative and Negative Sentences		7	Identify ,explain and classify different parts of speech in sentences, and their roles and functions				1,2	
II	<b>Grammar</b> i. Determiners ii. Sentence Construction from jumbled words Types of Sentences(Assertive, Imperative etc.		10	Differentiate between assertive, imperative, and analyze their functions and structures.				1,2	
III	<b>Building vocabulary</b> i. Synonyms ii. Antonyms		15	Identify, analyze and apply the synonyms for given words and their contextual meanings, to enhance language fluency and expression				1,2	
IV	<b>Speaking skills</b> i. Introduction and greetings ii. Pronunciation iii. Asking and offering information		15	Demonstrate effective techniques for introducing themselves and greeting others in diverse contexts				1,2	



SEMESTER – I				
	iv.	Video Recording for self-analysis		
<b>V</b>		Communication skills i. Introduction to Communication, ii. Importance of Communication Skills, iii. Purpose of Communication, iv. Types of Communication, v. Barriers to Communication, vi. How to improve/tips to improve Communication skills	<b>18</b>	Identify different types and purposes of communication, analyze barriers, and propose strategies for improving communication in personal and professional contexts.
				1,2

### TEXT BOOKS:

1. Wren&Martin.(2017).*HighSchoolEnglishGrammarandComposition*.S.ChandPublishing.
2. Pal, Rajendra. Suri, Premlata(2022).*English Grammar & Composition*. Sultan Chandan Sons Publishing.
3. Debnath,Adhir.(2018).*ATextbookofEnglishGrammarandComposition*.BinaLibrary

### REFERENCE BOOKS:

1. Mitra,Barun.(2016)*PersonalityDevelopmentandSoftSkills2/E*,OxfordUniversityPress
2. Murphy, Raymond.,(2012) *English Grammar in Use Book with Answers: A Self-Study and Practice Book for Intermediate Learners of English*, Cambridge University Press

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Speak confidently and articulate ideas clearly with correct pronunciation.	6,7,8
2	Expand their vocabulary and use synonyms and antonyms appropriately.	6,7,8
3	Apply grammatical rules to construct grammatically correct sentences and paragraphs.	6,7,8
4	Identify different types of communication and strategies to overcome communication barriers.	6,7,8
5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.	6,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBPD112R</b>	Elementary English						2	3	

Course Title	CO-CURRICULAR									
Course code	22UBCC311	Total credits: 1	L	T	P	S	R	O/F	C	
		Total hours: 60S	0	0	0	4	0	0	1	
Pre-requisite	Nil	Co-requisite	Nil							
Programme	Bachelor of Science in Critical and Intensive Care Technology									
Semester	Fall/ V semester of third year of the programme									
Course Objectives	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.									
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy									
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests									
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.									
CO4	Explore new platform to learn from invited experts in their respective fields.									
CO5	Evaluate overall growth alongside academic development.									
Unit-No.	Content	Contact Hour	Learning Outcome						KL	
I	1. AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.  2. These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.  3. Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.  4. The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.  5. The student members of the club are trained represent AdtU in various inter University student and national level competitions.  6. Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the	60	Develop skills and confidence to participate in different activities organized by the institution.						1,2, 3,4, 5& 6	

	respective fields.			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy	5,6,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests	5,6,7,8
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	5,6,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,6,7,8
5	Evaluate overall growth alongside academic development.	5,6,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UBEC111	Extra-Curricular					2	2	2	

SEMESTER – 2									
Course Title	Anatomy II								
Course code	22BCIC121R	Total credits: 4 Total hours: 45T+30P	L	T	P	S	R	O/F	C
			3	0	2	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	II semester of first year of the programme								
Course Objectives	1.To study the basic anatomical structure of human body 2. To provide a comprehensive concept of all the anatomical systems of the human body 3. To give a illustrative overview about the human bones and its anatomical significance								
CO1	Explain the components and significance of organs in the pelvis.								
CO2	Understand the anatomical structure of the urinary system.								
CO3	Develop fundamental knowledge on the human reproductive organs.								
CO4	Classify the nervous system of the human body.								
CO5	Describe the sensory organs and the composition of the lymphatic system.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>PELVIS:</b> General description of pelvic organs.	7	Describe, define and explain the different structure of organs in the pelvis.				1,2		
II	<b>URINARY SYSTEM:</b> Structure of kidney, ureter, urinary bladder, male and female urethra.	10	Explain, define and classify the structure of organs involved in the urinary system.				1,2		
III	<b>REPRODUCTIVE SYSTEM:</b> Structure of male and female reproductive organs. Structure of breast.	10	Describe, illustrate and explain the different parts of the human reproductive system.				1,2		
IV	<b>NERVOUS SYSTEM:</b> Classification of Nervous system. Central Nervous system – Brain and Spinal cord, blood supply of brain. Spinal nerves and Cranial nerves. Autonomic nervous System	8	Describe, classify and explain the nervous system of the human body.				1,2		
V	<b>SENSORY ORGAN &amp; LYMPHATIC SYSTEM:</b> Skin, Eye, Ear, Nose, Tongue  Lymphatic vessels and lymph, lymph nodes, spleen	10	Classify, differentiate and explain various sensory organs along with the lymphatic system of the body.				1,2		

<b>Practical</b>	1. Study of bones of human body. 2. Study of organs: Brain, heart, lung, liver, kidney, spleen.	<b>30</b>		1,2, 3,4, 5
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### TEXT BOOKS:

T1. Allison Wynn Grant, Anne Waugh, and Kathleen J. W. Wilson 'Ross and Wilson Anatomy and Physiology', Elsevier, Amsterdam, Netherlands, 13th Edition (2020).

T2 Richard Drake, A. Wayne Vogl, Adam Mitchell, 'Gray's Anatomy for Students', Elsevier, Amsterdam, Netherlands, 4th Edition (2019).

### REFERENCE BOOKS:

R1 BD CHAURASIAS., 'HUMAN ANATOMY' CBS publisher, New Delhi, 8th Edition (2017).

R2 Inderbir Singh. 'Anatomy and Physiology' CBS Publisher, Newdelhi 2ndEdition (2004).

R3 Frederic Martini, Judi Nath, Robert Tallitsch, 'Human Anatomy', pearson Publisher, USA, 1st edition( 2017) L

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain the components and significance of organs in the pelvis.	1,3,4,8
2	Understand the anatomical structure of the urinary system.	1,3,4,8
3	Develop fundamental knowledge on the human reproductive organs.	1,3,4,8
4	Classify the nervous system of the human body.	1,3,4,8
5	Describe the sensory organs and the composition of the lymphatic system.	1,3,4,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
<b>22BEDM12 1R</b>	<b>Anatomy II</b>	3	1	2	2	1	1	1	2

SEMESTER – II									
Course Title	Physiology II								
Course code	22BCIC122R	Total credits: 4 Total hours: 45T+30P	L	T	P	S	R	O/F	C
			3	0	2	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	II semester of first year of the programme								
Course Objectives	1.To understand the underlined mechanism that work to keep the human body alive and functioning 2.To provide a comprehensive concept of all physiological systems of the human body 3. To develop abilities to analyze problems, conduct experiments, and interpret findings in physiology.								
CO1	Develop fundamental knowledge on the endocrine system along with the hormones they secrete.								
CO2	Understand the human excretory system and their functions.								
CO3	Explain the structure and functions of male and female reproductive system.								
CO4	Describe the muscle and nervous system along with their functions.								
CO5	Classify the different types of lymph and immune cells in the body and their function.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>ENDOCRINE SYSTEM:</b> Structure and hormones of endocrine glands, pituitary, thyroid, parathyroid, Pancreas, Adrenal, testes and ovary. Functions and regulation of secretion of hormones.	7	Describe, explain and define the different endocrine glands along with the hormones secreted in the human body.					1,2	
II	<b>EXCRETORY SYSTEM:</b> Structure and functions of kidneys, nephron, ureter, urinary bladder and urethra. Urine formation. Renal function tests	10	Describe, explain and define the various structures of organs in the excretory system along with their functions.					1,2,3	
III	<b>REPRODUCTIVE SYSTEM:</b> Male and female reproductive organs and changes during puberty. Menstrual cycle, ovulation. Physiological changes during pregnancy, Placenta and placental circulation	10	Describe, illustrate and explain the different parts of the human reproductive system along with the changes that occurs during puberty and pregnancy.					1,2,3,4	
IV	<b>NERVOUS SYSTEM AND MUSCLE:</b> Organization of nervous system. Structure and function of muscle and nerve cells. Functions of brain, Spinal cord, cranial and spinal nerves Motor system.	8	Classify and explain the different structures of the nervous system along with the functions and structures involved in the muscular system.					1,2,3,4	

	Sensory system. ANS Synapse, neuromuscular transmission reflex arc, reflex action and reflexes Cerebrum spinal fluid			
<b>V</b>	<b>LYMPHATIC AND IMMUNOLOGICAL SYSTEM, SPECIAL SENSES:</b>  Lymph glands and circulation of lymph Spleen structure and function Immunity – Formation of T- cells and B-cells, Antigen, Antibody and Immune response. Functions of skin, eye, ear, nose, tongue.	<b>10</b>	Classify, differentiate and explain various mechanism of the lymphatic system and the immune system of the human body.	1,2, 3,4
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Blood group</li> <li>• DLC</li> <li>• Total count of RBC and WBC</li> </ul>	<b>30</b>	Identify, differentiate and analyze different types of blood group, RBC, WBC and apply this knowledge to understand and interpret medical test results accurately.	2,3, 4,5

### TEXT BOOKS:

- T1. Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.  
T2. Principles of Physiology – DevasisPramanik, 5th edition.  
T3. Human Physiology for BDS –Dr A.K. Jain, 5th edition

### REFERENCE BOOKS:

- R1 Inderbir Singh, A text book of Anatomy and Physiology  
R2 Gyton, A text Book of Physiology

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop fundamental knowledge on the endocrine system along with the hormones they secrete.	<b>1,3,4,8</b>
<b>2</b>	Understand the human excretory system and their functions.	<b>1,3,4,8</b>
<b>3</b>	Explain the structure and functions of male and female reproductive system.	<b>1,3,4,8</b>
<b>4</b>	Describe the muscle and nervous system along with their functions.	<b>1,3,4,8</b>
<b>5</b>	Classify the different types of lymph and immune cells in the body and their function.	<b>1,3,4,8</b>

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BEDM12 2R</b>	<b>Physiology II</b>	3	1	2	3	1	1	1	2



SEMESTER– II									
Course Title	BIOCHEMISTRY-II								
Course code	22BCIC123R	Total credits: 4 Total hours: 45T+30P	L	T	P	S	R	O/F	C
			3	0	2	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	II semester of first year of the programme								
Course Objectives	1. To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites 2. To understand the energy flow in the form of ATP in the human body and cells. 3. To give a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids								
CO1	Describe classification, mechanism of enzymes, and factors affecting enzyme actions.								
CO2	Define the mechanism of carbohydrate metabolism in the body.								
CO3	Explain the metabolism of protein and its significant effects on different organs of body.								
CO4	Describe the process of Lipids metabolism and associated clinical conditions.								
CO5	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body								
Unit-No.	Content		Contact Hour	Learning Outcome					KL
I	ENZYMES		7	Describe, classify and explain the types of enzymes along with the factors affecting their actions.					1,2,3
<ul style="list-style-type: none"> <li>Definition and classification of enzyme.</li> <li>Basic idea of co-enzyme, iso-enzyme.</li> <li>Mechanism of enzyme Action.</li> <li>Factors affecting enzyme action</li> </ul>									
II	CARBOHYDRATES METABOLISM								
<ul style="list-style-type: none"> <li>Glycolysis</li> <li>Kreb's Cycle</li> <li>Gluconeogenesis</li> <li>Glucogenesis</li> <li>Glycogenolysis</li> </ul>									
III	PROTEIN METABOLISM		10	Describe, illustrate and explain the metabolism of protein and their significance.					2,3,4,5
<ul style="list-style-type: none"> <li>Transamination</li> <li>Deamination</li> </ul>									

	Urea Cycle and its Significance			
<b>IV</b>	<b>LIPID METABOLISM, CLINICAL BIOCHEMISTRY</b> <ul style="list-style-type: none"> <li>● <math>\beta</math> oxidation of Fatty Acids.</li> <li>● Ketone bodies</li> <li>● Ketosis and ketoacidosis</li> <li>● Liver function test.</li> </ul> Renal function test	<b>8</b>	Define and explain the metabolism of lipids along with the clinical diagnostic tests and their significance.	3,4,5
<b>V</b>	<b>VITAMINS AND MINERALS :</b> <ul style="list-style-type: none"> <li>● Definition and classification of vitamins according to solubility.</li> <li>● Sources and functions of individual vitamins.</li> <li>● Deficiency.</li> </ul> Individual minerals (calcium, phosphorus, iron, magnesium flu slide, copper, selenium, molybdenum etc) – their sources, function and properties.	<b>10</b>	Describe, explain and classify the different types of vitamins and minerals along with their sources and functions.	1,2,3,4
<b>Practical</b>	<ul style="list-style-type: none"> <li>● To perform precipitation test to determine the presence of proteins in an unknown urine sample.</li> <li>● To perform heat and acetic acid test to determine the presence of proteins in an unknown urine sample.</li> <li>● To perform Heller’s test to determine the presence of proteins in an unknown urine sample.</li> </ul> To perform lipid solubility test.	<b>30</b>	Demonstrate biochemical tests—including precipitating, heating with acetic acid, and conducting Heller’s tests to identify the presence of proteins in unknown urine samples.	3,4,5

### TEXT BOOKS:

T1- “Biochemistry” by U Satyanaryana and U Chakrapani

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe classification, mechanism of enzymes, and factors affecting enzyme actions.	1,4,8
2	Define the mechanism of carbohydrate metabolism in the body.	1,4,8
3	Explain the metabolism of protein and its significant effects on different organs of body.	1,4,8

<b>4</b>	Describe the process of Lipids metabolism and associated clinical conditions.	<b>1,4,8</b>
<b>5</b>	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body	<b>1,4,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>22BEDM12 3R</b>	<b>Biochemistry II</b>	3	1	1	2	1	1	1	2

SEMESTER – II									
Course Title	HDPC II								
Course code	22BCIC124R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To identify and manage poisoning cases, administer first aid, and understand legal responsibilities.</li> <li>Understand drug types, administration methods, and ethical considerations in safe drug handling.</li> <li>To gain development skills in specimen collection, diagnostic testing, and ensure compliance with quality standards in the lab.</li> </ol>								
<b>CO1</b>	Describe signs and symptoms of common poisonings and its immediate management								
<b>CO2</b>	Explain the medical ethics and its importance on the healthcare system								
<b>CO3</b>	Identify the different types of shock along with the management.								
<b>CO4</b>	Classify the different types of emergency drugs along with the dosage and effects.								
<b>CO5</b>	Proficient in performing quality laboratory investigation process and laboratory management								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
<b>I</b>	<b>Poisoning:</b> <ul style="list-style-type: none"> <li>Definition</li> <li>Causes of poisoning</li> <li>Sources of Poisoning</li> <li>Symptoms of poisoning</li> <li>First aid &amp; Management</li> <li>Antidotes</li> <li>Common drugs poisoning</li> <li>Carbon monoxide poisoning</li> <li>Legal Responsibility</li> <li>Act of commission</li> <li>Act of omission</li> <li>Act of rashness, negligence &amp; damage</li> <li>Legal liabilities of medical profession</li> </ul> Advantage & disadvantage of the act		<b>5</b>	Define, describe and explain the different types of poisons along with their sources and management including the classification of various legal liabilities of medical professions.				1,2,3	
<b>II</b>	<ul style="list-style-type: none"> <li>Malpractice</li> <li>Civil negligence</li> <li>Clinical negligence</li> <li>Corporate negligence</li> <li>Preparation of patients</li> </ul>		<b>5</b>	Describe, illustrate and explain various ethical and legal responsibilities of medical professionals along with the techniques of specimen collection.				1,2,3	

	<ul style="list-style-type: none"> <li>● Preparation of equipments</li> </ul> <p>Collection of specimen of urine, stool, sputum, blood, CSF, Pericardial fluid, Peritoneal fluid, Pleural fluid, etc</p>			
<b>III</b>	<ul style="list-style-type: none"> <li>● Definition</li> <li>● Types of shock</li> <li>● General Features of shock</li> <li>● Investigations of shock</li> <li>● Initial management &amp; first aid of shock</li> <li>● Definition</li> <li>● Clinical features</li> <li>● Diabetes laboratory tests for diabetes</li> <li>● Different types of glycosuria</li> <li>● Ketone bodies</li> <li>● Glucose tolerance test.</li> <li>● Definition</li> <li>● Etiology &amp; Clinical Features</li> <li>● Investigations for hypoglycaemia</li> </ul>	<b>10</b>	Describe, classify and explain shock along with their clinical manifestations, management including the diagnostic tests for diabetes.	2,3, 4,5
<b>IV</b>	<ul style="list-style-type: none"> <li>● Definition</li> <li>● Names &amp; classification of drugs</li> <li>● Different preparations of drugs</li> <li>● Effects of drugs</li> <li>● Adverse effects of drugs</li> <li>● Tolerance, Abuse, addiction of drug</li> <li>● Different routes of drug administration</li> <li>● Storing of medicine</li> <li>● Units of standard measurement</li> </ul>	<b>5</b>	Describe, classify and explain the different types of emergency drugs along with their mechanism, routes of administration, indications and adverse effects.	3,4, 5
<b>V</b>	<ul style="list-style-type: none"> <li>● Function of medical Professional</li> <li>● Qualities of good professional</li> <li>● Ethics of Medical Profession</li> <li>● Laboratory designing</li> <li>● Laboratory management</li> <li>● Different laboratory</li> <li>● Functions of receptionist, Head of section, laboratory specialist, business manager, quality officer, safety officer</li> <li>● Disposal of wastes</li> <li>● Reporting of tests of laboratory</li> <li>● Quality control and accreditation</li> <li>● Control of fire, infection, corrosive chemicals, toxic fumes, broken glasses, carcinogen.</li> <li>● Legal and ethical regulation.</li> </ul>	<b>10</b>	Describe, illustrate and explain medical ethics along with the guidelines and management of different laboratories in the hospital.	2,3, 4,5

## TEXT BOOKS:

- T1-.National Health Programs Of India National Policies and Legislations Related to Health: 1 J. Kishore (Author)
- T2. A Dictionary of Public Health Paperback by J Kishor
- T3. Health System in India: Crisis & Alternatives , National Coordination Committee, Jan Swasthya Abhiyan
- T4- In search In Search of the Perfect Health System
- T5-Central Bureau of Health Intelligence (1998). Health Information of India, Ministry of Health and Family Welfare, New Delhi.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe signs and symptoms of common poisonings and its immediate management	1,2,3,6
2	Explain the medical ethics and its importance on the healthcare system	6,8
3	Identify the different types of shock along with the management.	1,2,3,4
4	Classify the different types of emergency drugs along with the dosage and effects.	1,2,3,4
5	Proficient in performing quality laboratory investigation process and laboratory management	1,3,4,6

## MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
22BEDM12 4R	HDPC II		3	2	2		3	2	2

SEMESTER – II									
Course Title	TECHNO PROFESSIONAL SKILLS								
Course code	22BCIC125R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To learn on how to assess vital signs, conduct thorough history taking, and perform effective physical examinations.</li> <li>To Identify and classify types of shock, apply appropriate assessment and management methods</li> <li>To understand the importance of positioning in patient care, differentiate between various positions, and apply appropriate techniques while considering indications and contraindications.</li> </ol>								
CO1	A complete knowledge and skill of vital sign and its assessment techniques.								
CO2	Skilled with process of history taking.								
CO3	Apply knowledge on patient's physical examination.								
CO4	Skilled with identification and pre-hospital management of shock.								
CO5	Apply knowledge on assessment and management of poisoning.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Vitals sign</b> <ul style="list-style-type: none"> <li>Blood pressure</li> <li>Pulse rate</li> <li>Heart rate</li> <li>Oxygen saturation</li> <li>Respiratory rate</li> </ul>	7	Describe, illustrate and explain cell organization and functions, microscopy and structural differences.					1,2,3	
II	<b>History Taking</b> <ul style="list-style-type: none"> <li>Purpose of history taking</li> <li>Components of history taking</li> <li>Chief complaint</li> </ul>	10	Describe, illustrate and explain membrane structure, function; cell organization and the proteins involved in transportation.					3,4,5	
III	<b>Physical Examination</b> <ul style="list-style-type: none"> <li>Techniques of examination</li> <li>General observation</li> <li>Head to toe examination</li> </ul>	10	Describe, illustrate and explain chromosomal structure and types.					3,4,5	
IV	<b>Examination of Shock</b> <ul style="list-style-type: none"> <li>Types of shock</li> <li>Identification of shock</li> <li>Assessment and management</li> </ul>	8	Describe, illustrate and explain the mechanism of cell to cell communication					2,3,4,5	
V	<b>Positioning</b> <ul style="list-style-type: none"> <li>Types of positions</li> <li>Importance of positioning</li> </ul>	10	Describe, illustrate and explain the cell cycle and division in general and in some specific cell types					2,3,4,5	

	<ul style="list-style-type: none"> <li>• Indication/contra-indication for different positions</li> </ul>			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	A complete knowledge and skill of vital sign and its assessment techniques.	1,2,3,4,
2	Skilled with process of history taking.	2,6,7
3	Apply knowledge on patient's physical examination.	1,2,3,4,
4	Skilled with identification and pre-hospital management of shock.	1,2,3,4
5	Apply knowledge on assessment and management of poisoning.	2,3

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
22BEDM12 5R	Techno professional Skill	3	3	3	2		2		2



SEMESTER – II									
Course Title	Extra-Curricular								
Course code	22UBEC121	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Critical and Intensive Care Technology								
Semester	II semester of first year of the programme								
Course Objectives	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
<b>I</b>	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>		<b>60</b>	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2, 3,4	
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students members of the club are trained represent AdtU in various inter University student and national level competitions.</li> </ul>								
	<ul style="list-style-type: none"> <li>Renewed personalities are invited to</li> </ul>								

	conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	5,6,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	5,6,7,8
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	5,6,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,6,7,8
5	Evaluate overall growth alongside academic development.	5,6,7,8

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UBCC121	Extra-Curricular					2	2	2	

SEMESTER – II									
Course Title	CO-Curricular								
Course code	22UBCC121	Total credits: 2 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Critical and Intensive Care Technology								
Semester	II semester of first year of the programme								
Course Objectives	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>		60						1,2,3,4
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								
	<ul style="list-style-type: none"> <li>The student members of the club are trained represent AdtU in various inter University student and national level competitions</li> </ul>								

	<ul style="list-style-type: none"> <li>Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.</li> </ul>			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	5,6,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	5,6,7,8
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	5,6,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,6,7,8
5	Evaluate overall growth alongside academic development.	5,6,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO 8
22UBEC121	Extra-Curricular	1	1	1	1	2	2	2	2

SEMESTER – II									
Course Title	IMPLICIT ENGLISH(COMMUNICATIVE ENGLISH & SOFT SKILLS)								
Course code	22UBPD122R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	1. To improve sentence structure, tense usage, and vocabulary understanding. 2. To learn effective reading strategies and critical thinking methods like SQ3R. 3. To acquire strategies for resolving conflicts positively and managing time efficiently.								
CO1	Apply principles of sentence structure, grammar rules to construct clear and effective written communication.								
CO2	Evaluate and select appropriate synonyms and antonyms to enhance written and verbal expression.								
CO3	Analyze texts using the SQ3R method to extract key information and main ideas.								
CO4	Apply conflict resolution strategies to manage interpersonal disputes constructively.								
CO5	Develop time management principles to prioritize tasks and meet deadlines efficiently.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	Module 1-Grammar		5	Differentiate between interrogative, assertive, and exclamatory sentence types to enhance communication clarity.					2,3,4
	<ul style="list-style-type: none"> <li>Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences</li> <li>Types of Tenses</li> <li>Common Errors</li> </ul>								
II	Module 2-Vocabulary		5	Identify and classify homonyms in context to demonstrate understanding of word meanings.					2,3,4,5
	<ul style="list-style-type: none"> <li>Synonyms</li> <li>Antonyms</li> <li>Homonyms</li> </ul>								
III	Module 3-Reading Skills		10	Explain the importance of effective reading techniques in improving comprehension and information retention.					2,3,4
	<ul style="list-style-type: none"> <li>Techniques of Effective Reading</li> <li>Gathering ideas and information from a text</li> <li>The SQ3R Technique</li> <li>Interpret the text</li> </ul>								
IV	Module 4-Conflict Management		5	Discuss the effects of different conflict management styles on relationships and team dynamics.					1,2,3
	<ul style="list-style-type: none"> <li>Definition</li> <li>Type of Conflict Management</li> <li>Effects of Conflict Management</li> <li>Methods to deal with Conflicts (Negative)</li> </ul>								
V	Module 5-Time-ManagementSkills		10	Demonstrate effective planning and scheduling techniques to optimize personal and professional productivity.					2,3,4,5
	<ul style="list-style-type: none"> <li>Introduction To Time Management,</li> <li>Purpose And Importance of Time</li> </ul>								

	Management, • Basic Tips to Maintain Time.			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply principles of sentence structure, grammar rules to construct clear and effective written communication.	6,7,8
2	Evaluate and select appropriate synonyms and antonyms to enhance written and verbal expression.	6,7,8
3	Analyze texts using the SQ3R method to extract key information and main ideas.	6,7,8
4	Apply conflict resolution strategies to manage interpersonal disputes constructively.	6,7,8
5	Develop time management principles to prioritize tasks and meet deadlines efficiently.	6,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
22UBPD123 R	Implicit English						2	3	

SEMESTER – II									
Course Title	Digital Proficiency								
Course code	22UCDL102R	Total credits: 2 Total hours: 60P	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>Understanding on identifying and analyse computer hardware, software and their uses.</li> <li>Improved ability to use MS-Office suite for various purposes.</li> <li>Equipped with the skills to use the Internet efficiently for required information as well as for digital financial transactions.</li> </ol>								
CO1	Develop fundamental knowledge of different computer systems and their functions.								
CO2	Knowledge on efficient use of MS- Office tools.								
CO3	Understanding on internet uses, types and cyber world.								
CO4	Knowledge on different uses of social media and its benefits & loses.								
CO5	Apply skills of digital payment systems.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Fundamentals of Computer Systems		10	Explain the fundamental of computer systems.				1,2	
	<ul style="list-style-type: none"> <li>Components of a Computer and their functions.</li> <li>Different Types of Computers and their Applications.</li> </ul>								
II	Introduction to MS-Office		10	Describe the functions on different tools of Microsoft Office like MS-Excel, MS-Word, etc.				1,2	
	<ul style="list-style-type: none"> <li>Components of the MS-Office suite.</li> <li>Creating documents with MS-Word.</li> <li>Creating Presentations with MS-Power Point.</li> <li>Creating Spreadsheets with MS-Excel.</li> </ul>								
III	Introduction to Internet & Cyber World		10	Explain the importance and use of internet along with its adverse side.				1,2	
	<ul style="list-style-type: none"> <li>Introduction to Computer Networks and Internet.</li> <li>World Wide Web, Websites and Web portals, Web browsing.</li> <li>Web Searching, Search engines, Introduction to Google Search Engine; How to search using Keywords, topics of Interest, etc.</li> <li>Creation and use of Email</li> </ul>								

	Accounts. Cyber Crimes.			
<b>IV</b>	<b>Introduction to Social Media</b> <ul style="list-style-type: none"> <li>The Power of Social Media, Relevance of Social Media in present scenario.</li> <li>Creating accounts and using some popular Social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, and LinkedIn.</li> </ul> Social Media Etiquettes.	<b>15</b>	Explain the power of social media their relevance and adverse effects to over using it.	1,2
<b>V</b>	<b>Digital Payments</b> <ul style="list-style-type: none"> <li>Introduction to Digital Payment Systems.</li> </ul> Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, and UPI.	<b>15</b>	Illustrate the types of digital payment and their risks.	1,2

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge of different computer systems and their functions.	4, 7
2	Knowledge on efficient use of MS- Office tools.	4,7
3	Understanding on internet uses, types and cyber world.	4,7
4	Knowledge on different uses of social media and its benefits & loses.	4,7
5	Apply skills of digital payment systems.	4,7

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UCDL10 2R	Digital Proficiency				3			2	



SEMESTER – II									
Course Title	UHV+ Professional Ethics								
Course code	22UUHV104R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	2	0	0	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings</li> <li>To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.</li> <li>To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature</li> </ol>								
CO1	Demonstrate the ability to verify truths based on personal acceptance and experiential validation								
CO2	Develop skills and habits that help them cultivate a greater sense of harmony within themselves and with others, leading to personal growth and development								
CO3	Identify and evaluate the role of harmony in family, society and universal order.								
CO4	Understand and associate the holistic perception of harmony at all levels of existence.								
CO5	Develop appropriate technologies and management patterns to create harmony in professional and personal live								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Course Introduction - Need, Basic Guidelines, Content and Process for Value Education	5	Explain the importance of value education and apply guidelines for integrating values into daily life.				1,2, 3,4, 5		
II	Understanding Harmony in the Human Being - Harmony in Myself!	5	Discuss the personal values which require achieving internal harmony and emotional balance.				1,2, 3,4, 5		
III	Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship	5	Discuss the interpersonal dynamics to enhance harmonious relationships within families and communities.				1,2, 3,4, 5		
IV	Understanding Harmony in the Nature and Existence - Whole existence as Co-existence	8	Explain the interconnectedness of humans with nature and identify sustainable practices for coexistence.				1,2, 3,4, 5		

<b>V</b>	<b>Implications of the above Holistic</b> Understanding of Harmony on Professional Ethics	<b>7</b>	Discuss how a holistic understanding of harmony influences ethical decision-making in professional contexts and propose strategies for promoting ethical behaviour.	1,2, 3,4, 5
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate the ability to verify truths based on personal acceptance and experiential validation	<b>6,7,8</b>
<b>2</b>	Develop skills and habits that help them cultivate a greater sense of harmony within themselves and with others, leading to personal growth and development	<b>6,7,8</b>
<b>3</b>	Identify and evaluate the role of harmony in family, society and universal order.	<b>6,7,8</b>
<b>4</b>	Understand and associate the holistic perception of harmony at all levels of existence.	<b>6,7,8</b>
<b>5</b>	Develop appropriate technologies and management patterns to create harmony in professional and personal life	<b>6,7,8</b>

### MAPPING TABLE

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>22UUHV10 4R</b>	<b>UHV+ Professi onal Ethics</b>						3	1	2

SEMESTER – III									
Course Title	Pathology								
Course code	22BCIC211R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 45T	3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ III semester of first year of the programme								
Course Objectives	<p>1. To understand the concept of cell injury, the change produces thereby, in the different tissues and organs.</p> <p>2. To understand the body capacity for healing, understand the etiopathogenesis, the pathological effects,</p> <p>3. Clinical pathological correlation of common infectious and non-infectious diseases as well the concept of neoplasia with respect to etiology, gross and microscopic features, diagnosis and prognosis in different tissues and organs of the body.</p>								
CO1	Describe the pathophysiology of cellular adaptation and mechanism of cell injury.								
CO2	Identify the various types of inflammation, their processes, as well as the factors that contribute to both acute and chronic inflammation								
CO3	Explain fundamental knowledge on the different hemodynamic disorders along with their causes and treatment								
CO4	Identify carcinogenic agents along with the classification and nomenclature of tumors.								
CO5	Classify various immune system defenses and how immune system disorders can result in disease.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Introduction to Pathology:</b> <ul style="list-style-type: none"> <li>Cellular Adaptation, Cell injury and death</li> <li>Cellular adaptation – Atrophy, Hypertrophy, Hyperplasia, Metaplasia, aplasia</li> <li>Causes and mechanism of cell injury</li> <li>Classification of cell injury – Reversible and irreversible, Necrosis, Healing and factors affecting healing.</li> </ul>	7	Describe, classify and explain cell adaptation and mechanism of cell injury.					1,2	
II	<b>Inflammation:</b> <ul style="list-style-type: none"> <li>General features of inflammation</li> <li>Classification-Acute and chronic inflammation</li> </ul>	10	Classify, identify and explain the types of inflammation.					1,2	

	<ul style="list-style-type: none"> <li>Chemical mediators of inflammation</li> </ul>			
<b>III</b>	<b>Haemodynamic Disorders:</b> <ul style="list-style-type: none"> <li>Hyperemia, Ischemia and edema, Haemorrhage, Thrombosis, embolism and infraction, shock.</li> </ul>	<b>10</b>	Describe, illustrate and explain various haemodynamic disorders along with their causes.	1,2,3
<b>IV</b>	<b>Neoplasia:</b> Nomenclature, carcinogenic agents, Tumours and Tumours grading	<b>8</b>	Describe, classify and explain the pathophysiology of tumors including carcinogenic agents.	2,3,4
<b>V</b>	<b>Immunity Disorders:</b> <ul style="list-style-type: none"> <li>General features of immune system</li> <li>Disorders of Immune system</li> <li>Clinical Pathology: <ul style="list-style-type: none"> <li>Routine examination of Urine, CSF and others body fluids.</li> </ul> </li> </ul>	<b>10</b>	Describe, illustrate and explain the features of disorders in the immune system including the pathological tests to examine body fluids.	1,2,3,4,5

### TEXT BOOKS:

T1- Harsh Mohan **Textbook of pathology** 8<sup>th</sup> edition

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe the pathophysiology of cellular adaptation and mechanism of cell injury.	1
2	Identify the various types of inflammation, their processes, as well as the factors that contribute to both acute and chronic inflammation	1,2
3	Explain fundamental knowledge on the different hemodynamic disorders along with their causes and treatment	1,7
4	Identify carcinogenic agents along with the classification and nomenclature of tumors.	2,5,8
5	Classify various immune system defenses and how immune system disorders can result in disease.	1,7,8

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BCIC211R	Pathology	3	1	2		1		2	2

SEMESTER – III									
Course Title	Pharmacology I								
Course code	22BCIC212R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ III semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To explain the fundamentals of pharmacology and comprehend the range of numerous disciplines, definitions, and drug nomenclature at the conclusion of each study unit.</li> <li>To understand the drug's mechanism of action, potential side effects, dosage recommendations, and therapeutic applications.</li> </ol>								
CO1	Explain the concept of Pharmacology including Emergency Medicines and the routes of administration.								
CO2	Recognize different drugs that affect the Autonomic Nervous System.								
CO3	Classify sedative and antiepileptic drugs along with their mechanism of action.								
CO4	Discuss different drugs used to treat cardiovascular and respiratory conditions								
CO5	Identify different types of IV fluids and their preparations as well as anti-diabetic drugs.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
<b>I</b>	General Pharmacology <ol style="list-style-type: none"> <li>Introduction, definition and classification of drugs</li> <li>Routes of drug administration</li> <li>Pharmacokinetics</li> <li>Pharmacodynamics</li> <li>Factors modifying drug response</li> <li>Adverse effects</li> </ol>	<b>7</b>	Define, explain and classify various drugs and the routes of drug administration.				1,2		
<b>II</b>	Autonomic Nervous System: <ol style="list-style-type: none"> <li>General Considerations</li> <li>Cholinergic and Anti – Cholinergic drugs</li> <li>Adrenergic and Adrenergic blocking drugs</li> <li>Skeletal muscle relaxants</li> </ol>	<b>5</b>	Describe, classify and explain the drugs used to manage disorders in the nervous system.				1,2		
<b>III</b>	Neuropharmacology: <ol style="list-style-type: none"> <li>Sedative – Hypnotic Drugs: Barbiturates, Benzodiazepines</li> <li>Antiepileptic drugs, narcotic analgesics.</li> </ol>	<b>5</b>	Describe, classify and explain the drugs used for sedation and pain management.				1,2		

<b>IV</b>	Cardiovascular and Respiratory Pharmacology: 13. Drugs used in heart failure – Digitalis, Diuretics, vasodilators. 14. Antihypertensive Drugs – ACE inhibitors. 15. Drugs for ischemic Heart Disease – Nitrates, Beta blockers, Calcium channel blockers. 16. Vasopressors, Inotropic agents 17. Anticoagulants and Thrombolytics 18. Bronchodilators and Mucokinetic agents.	<b>8</b>	Describe, classify and explain the drugs used to treat cardiovascular and respiratory disorders.	1,2,3
<b>V</b>	Others: 19. IV Fluids with different preparation. 20. Anti-Diabetic drugs – Insulin, Steroids	<b>5</b>	Describe, classify and explain the different types of IV fluids including antidiabetic drugs.	1,2,4

### TEXT BOOKS:

T1- Essentials of Medical Pharmacology - Dr KD Tripathi

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Explain the concept of Pharmacology including Emergency Medicines and the routes of administration.	<b>1,2</b>
<b>2</b>	Recognize different drugs that affect the Autonomic Nervous System.	<b>1,2,5</b>
<b>3</b>	Classify sedative and antiepileptic drugs along with their mechanism of action.	<b>2</b>
<b>4</b>	Discuss different drugs used to treat cardiovascular and respiratory conditions	<b>1,2</b>
<b>5</b>	Identify different types of IV fluids and their preparations as well as ant diabetic drugs.	<b>7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	P04	P05	P06	PO7	PO8
<b>22BCIC212R</b>	Pharmacology I	3	3	3				1	1

SEMESTER – III									
Course Title	Nutrition								
Course code	22BCIC213R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ III semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food.</li> <li>Understanding nutrients in health and disease processes, provide nutrition counselling and education to individuals, groups.</li> <li>Communities throughout the lifespan using a variety of communication strategies as well as evaluate nutrition information based on scientific reasoning for clinical, community, and food service application.</li> </ol>								
CO1	Discuss the principles of nutrition and basic knowledge on recommended dietary allowance.								
CO2	Explain about macro nutrients including their functions and the signs of its deficiency and excess of macro nutrients.								
CO3	Describe the functions and the signs of its deficiency and excess of micro nutrients.								
CO4	Discuss the distribution of body fluids along with different types of electrolytes, their functions and causes of imbalances.								
CO5	Identify the roles of dietary plan and its importance with special reference to the benefits of dietary plans in critically ill patients								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Introduction to Nutrition Science:</b> <ul style="list-style-type: none"> <li>Definitions, history, role of nutrition in maintaining health, classification of food.</li> <li>RDA – factors affecting RDA, determinants of RDA for different nutrients, requirements and allowances, balanced diet.</li> </ul>	7	Describe and explain nutrition; it's history and roles in maintaining health including the recommended dietary allowance.					1,2	
II	<b>Macro Nutrients:</b> Carbohydrates, Proteins and fats – their functions, source, digestion and absorption, effects of deficiency and excess.	10	Describe, classify and explain macro nutrients along with their sources and functions.					1,2,3	
III	<b>Micro Nutrients:</b> <ul style="list-style-type: none"> <li>Vitamins and minerals, their functions, source, digestion and</li> </ul>	10	Describe, classify and explain micro nutrients along with their sources and functions.					1,2,3	

	absorption, effects of deficiency and excess.			
<b>IV</b>	<b>Water and electrolyte balance:</b> <ul style="list-style-type: none"> <li>Distribution of body water – ECF/ICF, functions, different electrolytes – their functions, thirst mechanism, water/electrolyte balance, water imbalance.</li> </ul>	<b>8</b>	Describe, classify and explain the different types of electrolytes in the body along with their functions in the body.	2,3,4
<b>V</b>	<b>Diet Therapy:</b> <ul style="list-style-type: none"> <li>Principles of diet therapy</li> <li>Therapeutic diets, types of therapeutic diets</li> <li>Modification of consistency, feeding techniques, hospital routine diet, different types of diet for ICU patient</li> <li>Role of nutrition in critically ill patients with reference to ICU care</li> </ul>	<b>10</b>	Describe, classify and explain the diet therapy along with their significance and roles in critically ill patients.	1,2,3,4,5

### TEXT BOOKS:

T1- Nutrition Science 7<sup>th</sup> Edition by B Srilakshmi

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Discuss the principles of nutrition and basic knowledge on recommended dietary allowance.	1
2	Explain about macro nutrients including their functions and the signs of its deficiency and excess of macro nutrients.	1,2
3	Describe the functions and the signs of its deficiency and excess of micro nutrients.	1,5
4	Discuss the distribution of body fluids along with different types of electrolytes, their functions and causes of imbalances.	1,5
5	Identify the roles of dietary plan and its importance with special reference to the benefits of dietary plans in critically ill patients	3,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BCIC213R	Nutrition	3	3			3		2	1



SEMESTER – III									
Course Title	Airway Management and Respiratory Emergencies								
Course code	22BCIC214R	Total credits: 3 Total hours: 30T+30P	L	T	P	S	R	O/F	C
			2	0	2	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ III semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. This course seeks to instruct students on the anatomy, opening, and maintenance of the airways. Focuses on providing high-quality hands-on training in accordance with global standards. On intubation trainers, all participants will be able to practise various techniques and equipment.</li> <li>2. To introduce the students on how to assess the patient's airway obstruction and manage them in the hospital as well as out of hospital settings.</li> <li>3. Recognition of airway compromise, including recognition and management of upper airway obstruction including foreign bodies and infections.</li> </ol>								
CO1	Describe anatomy and physiology of the airway and understand the basic airway adjuncts and functions								
CO2	Explain advanced airway management techniques and develop the skills necessary for their effective application.								
CO3	Classify surgical & non-surgical airways.								
CO4	Identify the symptoms of airway and breathing conditions.								
CO5	Demonstrate the assessment and management of various respiratory disorders								
Unit-No.	Content		Contact Hour	Learning Outcome					KL
I	<b>Airway Management:</b> Review of Anatomy and Physiology		7	Describe and explain the anatomy and physiology of the respiratory system including the basic airway adjuncts.					1,2
II	<b>Basic Airway Management:</b> <ol style="list-style-type: none"> <li>1. Manual Airway maneuvers</li> <li>2. Airway adjuncts</li> <li>3. Suctioning</li> <li>4. Assisted and artificial ventilation</li> </ol>		10	Describe, explain and demonstrate advance airway manoeuvres along with basic airway adjuncts and procedure of suctioning.					3,4,5
III	<b>Advanced Airway Management:</b> <ol style="list-style-type: none"> <li>1. Endo tracheal intubations</li> <li>2. Kings PtL Airway</li> <li>3. Digital intubations</li> <li>4. Laryngeal mask airways and Combitube intubations</li> <li>5. Rapid sequence intubations</li> </ol>		10	Classify and explain different airways along with their indications, contraindications and procedure.					3,4,5

	6. Surgical and non surgical airways 7. Special patient consideration			
<b>IV</b>	<b>Respiratory Emergencies I</b> 1. Airway problems versus breathing problems	<b>8</b>	Classify and differentiate between airway and breathing problems.	3,4, 5
<b>V</b>	<b>Respiratory Emergencies II</b> 1. Obstructive airway diseases 2. Assessment and management of various respiratory problems.	<b>10</b>	Describe, identify and manage various respiratory disorders.	3,4, 5
<b>Practical I</b>	1. 1. Airway Maneuver- • Head-tilt-chin-lift • Jaw thrust 2. Suctioning, inserting a oral airway 3. ET tube intubation 4. Non-invasive mask 5. Tracheotomy 6. Removal of ET tube	<b>30</b>		3,4 ,5

### TEXT BOOKS:

T1-Nancy caroline Emergency care in the street 7<sup>th</sup> edition

### REFERENCE BOOKS:

R1- Textbook of critical care. 6<sup>th</sup> edition

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe anatomy and physiology of the airway and understand the basic airway adjuncts and functions	1,2
2	Explain advanced airway management techniques and develop the skills necessary for their effective application.	1,2,3
3	Classify surgical & non-surgical airways.	1,3
4	Identify the symptoms of airway and breathing conditions.	1,2
5	Demonstrate the assessment and management of various respiratory disorders	3,4,7&8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BCIC214R	Airway Management and Respiratory Emergencies	3	3	3	1		2	1	1

SEMESTER – III									
Course Title	SYSTEMIC EXAMINATION OF THE PATIENT(TPS)								
Course code	22BCIC215R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	1	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ III semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>Equip students with the ability to systematically conduct thorough physical examinations for each body system, identifying normal and abnormal findings.</li> <li>Improve students' capabilities in correlating clinical examination findings with potential diagnoses, contributing to effective patient management and treatment planning.</li> <li>Understanding of the importance of effective communication, empathy, and professionalism during patient examinations to ensure accurate assessments and patient comfort.</li> </ol>								
CO1	Understanding the basic knowledge of systemic examination for a patient.								
CO2	A comprehensive knowledge on cardiovascular system and taking its assessment.								
CO3	Identify different respiratory disorders and manage the condition.								
CO4	Skilled with assessment of musculoskeletal system injuries.								
CO5	Knowledge on assessment of neurological system.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to systemic examination	6	Describe the basics of systemic examination.					1,2,	
II	<b>Cardiovascular system</b> <ul style="list-style-type: none"> <li>Auscultating heart sound</li> <li>ECG</li> <li>Medical history</li> </ul>	6	Explain different type cardiovascular diseases and its assessment.					1,2	
III	<b>Respiratory system</b> <ul style="list-style-type: none"> <li>Inspection of the chest</li> <li>Palpation of the chest</li> <li>Percussion of the chest</li> <li>Auscultating lungs sound</li> </ul>	6	Describe the assessment techniques of chest inspection using different methods for respiratory system.					3, 4, 5	
IV	<b>Musculoskeletal system</b> <ul style="list-style-type: none"> <li>DCAPBTLS</li> <li>Assessment of range of motion</li> </ul> Assessment of muscle strength	6	Illustrate the procedure of musculoskeletal system assessment.					3, 4, 5	
V	<b>Neurological system</b> <ul style="list-style-type: none"> <li>Glasgow coma scale</li> <li>Cranial nerves</li> </ul> Motor and sensory examination	6	Explain the procedures of neurological system assessment.					3,4, 5	

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Equip students with the knowledge, skills, and attitudes necessary to conduct a thorough and effective health assessment, and provide high-quality patient care.	<b>1,2</b>
<b>2</b>	Equip students with the basic knowledge, skills necessary to assess and manage cardiovascular disease.	<b>1</b>
<b>3</b>	Students will develop clinical skills for assessing the respiratory system, including identifying and interpret respiratory abnormalities, including abnormal breath sounds	<b>3,4</b>
<b>4</b>	Students will learn how to identify and interpret musculoskeletal abnormalities, including joint deformities, muscle weakness, and pain	<b>4,5</b>
<b>5</b>	Students will develop clinical skills for assessing the neurological system, and identifying neurological abnormalities, including abnormal reflexes, weakness, sensory deficits, and changes in mental status.	<b>6,7,8</b>

### MAPPING TABLE

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BCIC215R</b>	Systemic Examination OfThe Patient (TPS)	1	1	3	2	1	2	2	1

<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>GENERIC ELECTIVE</b>								
<b>Course code</b>	<b>22BCICGE01</b>	<b>Total credits: 1</b> <b>Total hours: 15T</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Science in Critical and Intensive Care Technology</b>								
<b>Semester</b>	<b>Fall/ III semester of first year of the programme</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To equip with a thorough understanding of the course material through engaging online content.</li> <li>2. To provide hands-on experience through interactive exercises and real-world projects.</li> <li>3. To promote effective communication and teamwork through online discussions and group activities.</li> </ol>								
<b>CO1</b>	Demonstrate a strong grasp of key principles and theories covered in the course.								
<b>CO2</b>	Apply learned concepts to solve real-world problems through practical projects and exercises.								
<b>CO3</b>	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
<b>CO4</b>	Develop their ideas clearly and effectively in both written and verbal forms.								
<b>CO5</b>	Demonstrating strong collaboration and teamwork skills.								

SEMESTER – III									
Course Title	CO-CURRICULAR								
Course code	22UBCC211	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ III semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To develop skills and interests through participation in diverse extracurricular and co-curricular activities.</li> <li>To learn about teamwork and leadership abilities by engaging students in club-led events and competitions.</li> <li>To provide opportunities for personal growth and practical learning beyond the academic curriculum.</li> </ol>								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<ol style="list-style-type: none"> <li>AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> <li>The student members of the club are trained represent AdtU in various inter University student and national level competitions.</li> </ol>	60	Develop skills and confidence to participate in different activities organized by the institution.				1,2,3,4,		

	6. Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.			
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SEMESTER – III									
Course Title	EXTRA-CURRICULAR								
Course code	22UBCE211	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives (Minimum 3)	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 1. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 2. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	1. AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.  2. These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.  3. Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.  4. The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.  5. The student members of the club are trained represent AdtU in various inter University student and national level competitions.  6. Renewed personalities are invited to conduct	60	Develop skills and confidence to participate in different activities organized by the institution.				1,2,3,4,		

	workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.			
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SEMESTER – III									
Course Title	EXECUTIVE ENGLISH								
Course code	22UULS211R	Total credits: 2 Total hours: 60P	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ III semester of first year of the programme								
Course Objectives	1. To enable students to learn and comprehend about the proficiency of the English language. 2. To improve the writing skill of the learners and enable them to prepare CV and cover letter for professional development. 3. To evaluate certain attributes in a candidate that can be otherwise difficult or time consuming to ascertain.								
CO1	Understanding the use of grammar in prepositions.								
CO2	Knowledge on use of active & passive voice and direct & indirect speech.								
CO3	Skilled with writing different documents like resume, paragraph writing, etc.								
CO4	Apply knowledge on self-management.								
CO5	Apply skills on non-verbal communications using body language.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Grammar		5	Describe the accommodation management using different techniques.				1,2	
	<ul style="list-style-type: none"> <li>Use of Prepositions</li> <li>Tag questions</li> </ul>								
II	Grammar		10	Explain the fundamentals of cooking, including hygiene, safety, equipment's use, etc.				1,2,3	
	<ul style="list-style-type: none"> <li>Active and Passive Voice</li> <li>Direct and Indirect Speech</li> </ul>								
III	Writing Skills		10	Illustrate different methods of cooking.				1,2,3	
	<ul style="list-style-type: none"> <li>The Basics of Writing; avoid ambiguity and vagueness</li> <li>Paragraph Writing</li> <li>Resume, CV and Cover Letter</li> </ul>								
IV	Self-Management Skills		5	Illustrate different formats of form writing like- CV, Passport Application form, Registration form, etc.				1,2,3,4,	
	<ul style="list-style-type: none"> <li>SWOT Analysis</li> <li>Goal Setting</li> <li>Personal Hygiene</li> </ul>								
V	Non- Verbal Communication-Sciences of Body Language								
	<ul style="list-style-type: none"> <li>What is Non-Verbal Communication &amp; Body Language,</li> <li>Types of Body Language,</li> <li>Importance and Impact of Body language</li> <li>Types of Communication through Body Language,</li> </ul>								

	<ul style="list-style-type: none"> <li>• Body Language Do's and Don'ts, Doubt Clearing Session</li> </ul> <p><b>Group Discussion (Theory)</b></p> <ul style="list-style-type: none"> <li>• Importance,</li> <li>• Planning, Elements, and Skills assessed;</li> <li>• Effectively disagreeing,</li> <li>• Summarizing and Attaining the Objective.</li> </ul>			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Students will have basic knowledge of cooking methods.	1
2	Students will gain the knowledge of organizing & Cleaning of Rooms.	2
3	Students will be able to gain the travel management concept.	7
4	Students will be able to acquire the knowledge of basic households amenities for day- to-day use.	8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
22UBPD211R	Executive English							3	

SEMESTER – III									
Course Title	Basic Acclimatizing skills								
Course code	22UULS211R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ III semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To impart knowledge of the fundamentals of Hospitality industry and its applications.</li> <li>Students will be able to familiarize with the cooking equipments &amp; Utensils.</li> <li>Students will be able to handle different modes of reservations</li> </ol>								
CO1	Students will have basic knowledge of cooking methods.								
CO2	Students will gain the knowledge of organizing & Cleaning of Rooms.								
CO3	Students will be able to gain the travel management concept.								
CO4	Students will be able to acquire the knowledge of basic household amenities for day- to-day use.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Introduction to Accommodation Management</b> <ul style="list-style-type: none"> <li>Telephone handling technique</li> <li>Organizing of Rooms.</li> <li>Cleaning agents.</li> <li>Cleaning equipment and uses.</li> <li>Bed making Process</li> </ul>	5	Describe the accommodation management using different techniques.				1,2		
II	<b>Fundamentals of Cooking</b> <ul style="list-style-type: none"> <li>Definition of cookery – Aim &amp; Objectives of cooking.</li> <li>Use of basic Cooking equipment</li> <li>Personal Hygiene and Safety</li> <li>Use of Fire &amp; Fuels</li> </ul>	10	Explain the fundamentals of cooking, including hygiene, safety, equipment use, etc.				1,2,3		
III	<b>Methods of Cooking</b> <ul style="list-style-type: none"> <li>Different Cuts.</li> <li>Use of Herbs and Spices.</li> <li>Basic Food and Beverage Preparation.</li> <li>Regional food Habits.</li> </ul>	10	Illustrate different methods of cooking.				1,2,3		
IV	<b>Forms &amp; Format's</b> <ul style="list-style-type: none"> <li>C –form</li> <li>Reservation form</li> </ul>	5	Illustrate different formats of form writing like- CV, Passport Application form, Registration form, etc.				1,2,3,4		

	<ul style="list-style-type: none"> <li>Registration form</li> </ul>			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Students will have basic knowledge of cooking methods.	1
2	Students will gain the knowledge of organizing & Cleaning of Rooms.	2
3	Students will be able to gain the travel management concept.	7
4	Students will be able to acquire the knowledge of basic households amenities for day- to-day use.	8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UULS211R	BASIC ACCLIMATIZING SKILLS		1		1			2	3

SEMESTER – IV									
Course Title	Microbiology								
Course code	22BCIC221R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ IV semester of second year of the programme								
Course Objectives	1. The study of microbes helps us to understand our world and our place within it. 2. It gives us insights into the complexity of nature and society, which in turn provide much different health, environmental, social, cultural, industrial and economic benefits. 3. Students learn about the roles microorganisms play in human health and disease.								
CO1	Develop comprehensive knowledge on the different microbes and their mode of transmission.								
CO2	Understand the significance of infection control in ICU.								
CO3	Classify different types of infections including nosocomial and tropical infections.								
CO4	Understand the growth and control of microbes as well as specimen collection for diagnostic tests.								
CO5	Demonstrate the preparation of examination slides and uses of laboratory instruments.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction and spread of Infection:		7	Describe, classify and explain infectious agents including their sources and transmission.				1,2	
	1. Agents causing infection – Bacteria, virus, fungus. 2. Sources 3. Transmission of infection 4. Bio-hazardous materials and handling.								
II	Infection control:		10	Describe, illustrate and explain the significance of infection control along with the roles and responsibilities of healthcare workers in the ICU.				1,2,3	
	1. Importance of infection in ICU 2. Spread of infection 3. Cleaning & methods of sterilization of instruments 4. Fumigation of ICU 5. Hygiene standards of ICU 6. Disposal of infections waste 7. Surveillance 8. Quality control and role of health care workers								
III	Specific infections:		10	Describe, illustrate and explain the different types of nosocomial infections.				2,3	
	1. Nosocomial Infection – Types and prevention 2. HIV – AID Tropical infections – Tetanus, Malaria.								

<b>IV</b>	<b>Clinical Microbiology:</b> 1. Growth of microbes 2. Collection and transport of clinical specimens 3. Methods in Diagnostic microbiology 4. Serological and Skin test	<b>8</b>	Describe, illustrate and explain the growth and control measure of microbes along with the pathological tests.	1,2,3,4
<b>V</b>	<b>Fundamental of laboratory Technique:</b> 1. Introduction to principle of different advance laboratory instruments and uses. 2. Inoculation of culture media and preparation and examination of slide.	<b>10</b>	Describe, illustrate and explain the principles of laboratory instruments including their uses and procedure for preparation of examination slides.	1,2,3,4,5

### TEXT BOOKS:

T1- Nd Medical Parasitology book by S Arora

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop comprehensive knowledge on the different microbes and their mode of transmission.	1
2	Understand the significance of infection control in ICU.	2
3	Classify different types of infections including nosocomial and tropical infections.	1
4	Understand the growth and control of microbes as well as specimen collection for diagnostic tests.	2
5	Demonstrate the preparation of examination slides and uses of laboratory instruments.	3

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
222BCIC22 1R	Microbiology	2	3	2					1



SEMESTER – IV									
Course Title	PATIENT ASSESSMENT, VENOUS ACCESS AND DRUG ADMINISTRATION								
Course code	22BCIC222R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To conduct thorough patient assessments using vital signs, history taking, and physical examination techniques to gather comprehensive patient information.</li> <li>To perform safe and effective venous access procedures for fluid and medication administration in diverse patient populations.</li> <li>To administer medications accurately and safely, adhering to protocols and considering patient-specific factors to ensure optimal therapeutic outcomes.</li> </ol>								
CO1	Explain and apply the techniques of assessment for medical and trauma patients.								
CO2	Discuss the technique of history taking and demonstrate the process to perform head-to-toe examination.								
CO3	Apply principles for critical thinking and implement skills on techniques of documentation and communication								
CO4	Identify the different composition of fluid in the body, different types of IV Fluids, gain IV sites and access								
CO5	Describe the routes of drug administration and utilize skills to perform correct techniques.								
Unit-No.	Content		Contact Hour	Learning Outcome					KL
I	Patient assessment		7	Identify and differentiate between medical and trauma patient along with their assessment.					1,2
	<ol style="list-style-type: none"> <li>Medical patient assessment</li> <li>Trauma patient assessment</li> </ol>								
II	History taking		10	Describe, demonstrate and explain the different techniques of history taking including full body examination.					1,2
	<ol style="list-style-type: none"> <li>Techniques of history taking</li> <li>Special assessment challenges</li> <li>Vital signs</li> <li>Head to toe physical examination</li> <li>Limits of physical exam</li> </ol>								
III	Data Interpretation & Special Situations		10	Describe, illustrate and explain skills on documentation and communication techniques.					1,2
	<ol style="list-style-type: none"> <li>Concept formation</li> <li>Data interpretation</li> <li>Application of principle</li> <li>Reflection in and on action.</li> <li>Various communication matters.</li> <li>Documentation techniques</li> <li>Verbal and nonverbal skills</li> <li>Special interview situations.</li> </ol>								
IV	Venous access		8	Describe and explain the fluid composition in the body along					1,2

	Fluid composition & distribution in the body I.V. fluid composition Techniques of I. V access.		with the different types of IV fluids and IV access.	
<b>V</b>	<b>Medication administration</b> Routes of medication administration Calculating fluid infusion rates.	<b>10</b>	Describe, illustrate and explain the various routes of medication administration including the calculation of drug doses.	1,2
<b>Practical</b>	1. IV Cannulation Procedure 2. Performing full body exam 3. Drawing Medication 4. Blood withdrawal 5. Medication administration Via IM, IV, SC, IM, 6. Administering Medication via nebulizer	<b>30</b>	Demonstrate the techniques of IV cannulation, physical examination and medication administration via different routes	1,2, 3,4

### TEXT BOOKS:

T1- Nancy caroline Emergency care in the street 7<sup>th</sup> edition

### REFERENCE BOOKS:

R1- Textbook of critical care. 6<sup>th</sup> edition

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Explain and apply the techniques of assessment for medical and trauma patients.	<b>1,2,3,4</b>
<b>2</b>	Discuss the technique of history taking and demonstrate the process to perform head-to-toe examination.	<b>2,3,4,6,7</b>
<b>3</b>	Apply principles for critical thinking and implement skills on techniques of documentation and communication	<b>6,7,8</b>
<b>4</b>	Identify the different composition of fluid in the body, different types of IV Fluids, gain IV sites and access	<b>2,3,4,6</b>
<b>5</b>	Describe the routes of drug administration and utilize skills to perform correct techniques.	<b>3,4,6,8</b>

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BCIC222R</b>	PATIENT ASSESSMENT, VENOUS ACCESS AND DRUG ADMINISTRATION		3	3	2	1	2		2

SEMESTER – IV									
Course Title	MEDICAL AND SURGICAL EMERGENCY AND INTENSIVE CARE								
Course code	22BCIC223R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 45T	3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ IV semester of second year of the programme								
Course Objectives	<p>1. This course is designed to assist students in developing expertise and in depth understanding in the field of medical and surgical emergency.</p> <p>2. It will help the students to develop advanced skills for surgical intervention in various conditions.</p> <p>3. helps the student to develop a comprehensive knowledge in dealing with psychiatric emergencies.</p>								
CO1	Explain the nervous system and skills to perform various neurological examination.								
CO2	Discuss the pathophysiology, assessment and management of neuromuscular diseases.								
CO3	Classify types of poisoning, the routes of entry and its management.								
CO4	Explain the strategies to handle the patients having pregnancy-related emergency.								
CO5	Identify the possible causes and management of behavioural emergencies, including drug overdoses, violent behaviour and mental illness.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Respiratory System:</b> <ol style="list-style-type: none"> <li>Status Asthmatics/ Acute exacerbation of Respiratory distress</li> <li>Respiratory failure</li> <li>Acute Respiratory Distress Syndrome</li> <li>Aspiration Pneumonia <ul style="list-style-type: none"> <li>Chronic obstructive airways disease</li> <li>Atelectasis. Collapse, Lung abscess</li> </ul> </li> <li>Pleural diseases: <ul style="list-style-type: none"> <li>Pneumothorax, Pleural effusion</li> <li>Pulmonary Embolism</li> <li>Pulmonary Odema</li> <li>Pulmonary Hypertension</li> </ul> </li> </ol>	7	Explain, identify and classify various respiratory disorders.				1,2		
II	<b>Cardiovascular System:</b> <ol style="list-style-type: none"> <li>Cardiac arrest</li> <li>Congestive cardiac failure</li> <li>Acute left ventricular failure</li> <li>Ischemic heart disease – myocardial infarction.</li> <li>Arrhythmias, Atrial fibrillation.</li> </ol>	10	Explain, identify and classify various cardiovascular disorders.				1,2		

<b>III</b>	<b>Gastrointestinal, Hepatic Pancreas:</b> 1. Upper GI bleeding 2. Hepatic coma 3. Pancreatitis 4. Hypoglycaemia and Hyperglycaemia, Diabetic Ketoacidosis	<b>10</b>	Explain, identify and classify various disorders of the hepatic and gastro-intestinal system.	1,2
<b>IV</b>	<b>Others:</b> 1. Shock: ▪ Pathophysiology of shock ▪ Recognition of shock 2. Renal failure 3. Sepsis 4. Anaphylaxis	<b>8</b>	Explain, identify and classify various medical disorders such as shock, renal failure and sepsis.	1,2

### TEXT BOOKS:

T1- Nancy caroline Emergency care in the street 7<sup>th</sup> edition

### REFERENCE BOOKS:

R1- Textbook of critical care. 6<sup>th</sup> edition

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain the nervous system and skills to perform various neurological examination.	1
2	Discuss the pathophysiology, assessment and management of neuromuscular diseases.	1,2
3	Classify types of poisoning, the routes of entry and its management.	2,3
4	Explain the strategies to handle the patients having pregnancy-related emergency.	4
5	Identify the possible causes and management of behavioural emergencies, including drug overdoses, violent behaviour and mental illness.	7,8

### MAPPING TABLE

Course code	Course Name	PO 1	PO 2	PO3	PO4	PO5	PO 6	PO 7	PO8
<b>22BCIC223 R</b>	Medical And Surgical Emergency And Intensive Care	1	2	3	1			2	2

SEMESTER – IV									
Course Title	VENTILATION AND INTENSIVE CARE I								
Course code	22BCIC224R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 45T	3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ IV semester of second year of the programme								
Course Objectives	1. Introduction to ventilators, suction machine, monitoring devices and all other equipment's. 2.They will get knowledge about oxygen therapy, maintenance of clear airway equipment 3. Problem solving skills including skill drills.								
CO1	Discuss the basic physiology of the respiratory system.								
CO2	Demonstrate technique on common artificial airways including intubation and extubation.								
CO3	Explain the process to perform airway care and maintenance such as securing, suctioning and humidification.								
CO4	Apply knowledge and skills on technique of oxygen delivery and monitoring.								
CO5	Explain the technique to monitor hemodynamic status of a patient.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Basics of airways:		7	Describe and explain the pathophysiology of the airway system.				1,2	
1. Airway resistance, thoracic and lung compliance, dead space, tidal volume, vital capacity.									
II	Common artificial airways:		10	Explain, illustrate and demonstrate the indications, procedure and complications of artificial airways.				1,2	
1. Indications for artificial airways 2. Orotracheal intubation procedure 3. Tracheostomy and Management, Complications 4. Extubation and post extubation care									
III	Airway care and maintenance:		10	Demonstrate techniques to secure and maintain artificial airways along with the procedure of suctioning.				2,3,4	
1. Securing the airway and confirming placement 2. Airway clearance – Suctioning 3. Humidification 4. Care of cuff of tube									
IV	ICU Procedures:		8	Describe, illustrate and explain the different procedures in the ICU including the delivery and				1,2,3	
1. Oxygen therapy – Sources and									

	storage of O <sub>2</sub> 2. Oxygen delivery systems, hazards of O <sub>2</sub> , 3. Modes of O <sub>2</sub> therapy 4. Monitoring O <sub>2</sub> – delivery system 5. Pulse oximetry 6. IV line cannula, central line cannula infusion pump.		monitoring of oxygen therapy, pulse oximetry and IV line.	
<b>V</b>	<b>Haemodynamic monitoring:</b> 1. ECG Pulmonary arterial catheter 2. CVP, Cardiac output and vascular resistance calculation 3. Monitoring of mixed venous saturation.	<b>10</b>	Describe, illustrate and explain the techniques of monitoring catheters along with the calculation of CVP, cardiac output and vascular resistance.	1,2,3,4,5

### TEXT BOOKS:

T1- Nancy Caroline's 'Emergency Care in the Streets, Andrew N. Pollak, MD, FAAOS, 7<sup>th</sup> Edition (1970)

T2- Andrew N. Pollak, MD, FAAOS, 'Critical Care Transport' American College of Emergency Physician, (2009)

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Discuss the basic physiology of the respiratory system.	<b>1,2</b>
<b>2</b>	Demonstrate technique on common artificial airways including intubation and extubation.	<b>1,2&amp;3</b>
<b>3</b>	Explain the process to perform airway care and maintenance such as securing, suctioning and humidification.	<b>1,2&amp;3</b>
<b>4</b>	Apply knowledge and skills on technique of oxygen delivery and monitoring.	<b>5,7</b>
<b>5</b>	Explain the technique to monitor hemodynamic status of a patient.	<b>5,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
22BCIC224 R	Ventilation And Intensive Care I	3	3	3		2		2	1



SEMESTER – IV									
Course Title	TRAUMA EMERGENCY								
Course code	22BCIC225R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To analyze the patient's condition using the ABCDE approach during the initial assessment.</li> <li>To understand the principles of triage and their application in mass casualty incidents and multiple casualty situations.</li> <li>To apply critical thinking and problem-solving skills to provide immediate and appropriate emergency care</li> </ol>								
<b>CO1</b>	Apply the knowledge to stabilize and manage fractures using appropriate techniques and materials.								
<b>CO2</b>	Apply the general rules for applying dressings and bandages to provide effective emergency care for fractures and wounds.								
<b>CO3</b>	Classify types of hemorrhage and special forms of bleeding. and implement appropriate control measures to manage bleeding effectively								
<b>CO4</b>	Assess and provide immediate care for various injuries (head, chest, abdominal, blast, crush, burns, scalds, electrical injuries)								
<b>CO5</b>	Demonstrate the appropriate use of dressings and bandages for wound management.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
<b>I</b>	<b>Fractures:</b> <ul style="list-style-type: none"> <li>Cause of Fracture</li> <li>Types of fracture</li> <li>Classification of fractures</li> <li>Skull fractures</li> <li>Jaw and Facial fractures</li> <li>Upper Trunk and Limbs</li> <li>Lower Trunk and Limbs</li> </ul>		<b>7</b>	Analyze the causes, types, and classifications of fractures, including skull, jaw, facial, upper trunk and limbs, and lower trunk and limbs fractures.				1,2	
<b>II</b>	<b>Dressings &amp; Bandages Types of dressing</b> <ul style="list-style-type: none"> <li>General rules for applying dressings</li> <li>General Rules for applying</li> </ul>		<b>10</b>	Understand and apply the general rules for applying dressings and bandages, including the types of dressings and bandages and the use of slings.				1,2	

	<ul style="list-style-type: none"> <li>- Bandages</li> <li>- Types of bandages</li> <li>- Slings</li> </ul>			
<b>III</b>	<b>Haemorrhage or Bleeding:</b> <ul style="list-style-type: none"> <li>- Types of haemorrhage</li> <li>- Special forms of Bleeding</li> </ul>	<b>10</b>	Identify and classify types of haemorrhage and special forms of bleeding.	1,2
<b>IV</b>	<b>Injuries:</b> <ul style="list-style-type: none"> <li>- Head injuries</li> <li>- Chest injuries</li> <li>- Abdominal wounds</li> <li>- Blast injuries</li> <li>- Crush injuries</li> <li>- Burns and Scalds</li> <li>- Electrical Injuries Wounds and</li> <li>- Soft Tissue Injuries</li> </ul>	<b>8</b>	Evaluate and manage head, chest, abdominal, blast, crush, burns, scalds, and electrical injuries.	1,2
<b>V</b>	<b>Wounds:</b> <ul style="list-style-type: none"> <li>- Definition</li> <li>- Emergency care for open wounds</li> <li>- Wound with foreign body</li> <li>- Special wounds</li> </ul>	<b>10</b>	Discuss various types of wounds and provide emergency care for open wounds, wounds with foreign bodies, and special wounds.	1,2

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12th edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Apply the knowledge to stabilize and manage fractures using appropriate techniques and materials.	<b>1,2,3,4,6</b>
<b>2</b>	Apply the general rules for applying dressings and bandages to provide effective emergency care for fractures and wounds.	<b>2,3,4,8</b>
<b>3</b>	Classify types of hemorrhage and special forms of bleeding. and implement appropriate control measures to manage bleeding effectively	<b>1,2,3,4,6</b>
<b>4</b>	Assess and provide immediate care for various injuries (head, chest, abdominal, blast, crush, burns, scalds, electrical injuries)	<b>1,2,3,4</b>
<b>5</b>	Demonstrate the appropriate use of dressings and bandages for wound management.	<b>2,3,4</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
<b>22BCIC225 R</b>	<b>Trauma emergency</b>	2	3	3	3	2	2		

SEMESTER – IV									
Course Title	CO-CURRICULAR								
Course code	22UBCC311	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ IV semester of third year of the programme								
Course Objectives	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	1. AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.  2. These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.  3. Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.  4. The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.  5. The student members of the club are trained represent AdtU in various inter University student and national level competitions.  6. Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.	60	Develop skills and confidence to participate in different activities organized by the institution.				1,2,3,4,5&6		

SEMESTER – V									
Course Title	EXTRA-CURRICULAR								
Course code	22UBEC311	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	1. AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.  2. These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.  3. Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.  4. The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.  5. The student members of the club are trained represent AdtU in various inter University student and national level competitions.  6. Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn	60	Develop skills and confidence to participate in different activities organized by the institution.				1,2,3,4,5&6		

	from experts in the respective fields.			
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SEMESTER – IV									
Course Title	ENVIRONMENTAL SCIENCE								
Course code	22UBES201R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To understand and address complex environmental issues from a problem-oriented, interdisciplinary perspective</li> <li>To develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, Skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and prevention of new ones.</li> <li>To explore strategies for sustainable development and living, including conservation, renewable energy, waste reduction, and responsible consumption</li> </ol>								
CO1	Discuss the importance of Environment Studies and the need for public awareness.								
CO2	Identify natural resource, its importance, and its impacts on the environment.								
CO3	Explore in-depth knowledge on concept of ecosystem.								
CO4	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.								
CO5	Explain various environmental pollution and its impact on human and ecosystem.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
<b>I</b>	<b>Multidisciplinary nature of environmental studies:</b> <ul style="list-style-type: none"> <li>Definition</li> <li>Scope and importance</li> <li>Need for public awareness</li> </ul>	<b>5</b>	Explain the definition, scope, and importance of environmental studies and discuss the need for public awareness.				1,2		
<b>II</b>	<b>Natural Resources:</b> <b>Renewable and non-renewable resources:</b> <ul style="list-style-type: none"> <li>Forest resources</li> <li>Water resources</li> <li>Mineral resources</li> <li>Food resources</li> <li>Energy resources</li> </ul>	<b>8</b>	Describe different types of natural resources (renewable and non-renewable) and explain their uses and environmental impacts.				1,2,3,4		

	<ul style="list-style-type: none"> <li>Land resources</li> </ul>			
<b>III</b>	<b>Ecosystems</b> Concept of an ecosystem: <ul style="list-style-type: none"> <li>Structure and function-Producers, consumers, and decomposers.</li> <li>Energy flow</li> <li>Ecological succession</li> <li>Food chains, food webs and ecological pyramids</li> <li>Introduction- types, characteristic features, structure, and function of the following ecosystem: -Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems</li> </ul>	7	Describe the components of an ecosystem, explain energy flow and ecological succession, and Compare different types of ecosystems.	1,2,3
<b>IV</b>	<b>Biodiversity and its conservation</b> <ul style="list-style-type: none"> <li>Introduction –</li> <li>Definition</li> <li>Value of biodiversity</li> <li>Threats to biodiversity</li> <li>Conservation of biodiversity</li> </ul>	5	Discuss, explain biodiversity’s value and threats, and describe methods for its conservation.	1,2,3
<b>V</b>	<b>Environmental Pollution</b> <ul style="list-style-type: none"> <li>Definition Cause, effects, and control Measures of: Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards</li> <li>solid waste management</li> <li>Disaster management</li> </ul>	5	Describe and explain the Environment Pollution and their causes.	1,2,3,4

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12th edition, Burlington, Massachusetts, USA; 2021.



## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss the importance of Environment Studies and the need for public awareness.	<b>8</b>
<b>2</b>	Identify natural resource, its importance, and its impacts on the environment.	<b>8</b>
<b>3</b>	Explore in-depth knowledge on concept of ecosystem.	<b>8</b>
<b>4</b>	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.	<b>8</b>
<b>5</b>	Explain various environmental pollution and its impact on human and ecosystem.	<b>8</b>

### MAPPING TABLE

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>
22UBES201 R	Environmental science								3

SEMESTER – IV									
Course Title	ENHANCED PROFESSIONAL SKILLS								
Course code	22UUFL223R	Total credits: 2 Total hours: 60P	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ IV semester of second year of the programme								
Course Objectives	1. To enhance the writing skills in different areas including Paragraph writing and letter writing. 2. To understand and enhance the Self-management skills. 3. To familiarize students with the use of Contextual vocabulary and Use of phrasal verbs and idioms in a conversation								
CO1	Develop proficiency in paragraph writing and letter writing								
CO2	Develop student's self-management skills to plan their goals.								
CO3	Develop writing skills in different areas including Paragraph writing and letter writing.								
CO4	Enhance their capacity in understanding dress code ethics and develop interview skills								
CO5	Enhance comprehend sentences accurately and quickly and controlling the emphasis in writing								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Writing Skills</b> - Paragraph Writing & Narratives - Letter Writing - Technical Writing <b>Pipe and cistern</b> - Introduction of pipes and cistern - Solving different types of questions		10	Write a technical document that introduces the principles of pipes and cisterns, while explaining the concept clearly and illustrating its application through solving different types of questions.				1,2,	
II	<b>Self- Management Skills</b> - SWOT Analysis - Goal Setting and Personal Hygiene <b>Mixture allegation and Clock</b> - Introduction of basics - Solving questions on mixture		10	Explain the importance of conducting a SWOT analysis for personal development and setting SMART goals, as well as the significance of personal hygiene in professional and personal settings.				1, 2, 3,4	
III	<b>Vocabulary Development</b> - Understanding different aspects of a word (such as the use of say, tell, speak) - Learning strategies to develop vocabulary Contextual vocabulary learning - Use of phrasal verbs and idioms in a conversation - Effectively using dictionary, thesaurus		15	Explain various strategies for developing vocabulary, including contextual learning and the use of phrasal verbs and idioms in conversation.				1,2, 3,4	

	<p><b>Statement and Course of</b></p> <ul style="list-style-type: none"> <li>- <b>action</b></li> <li>- Revision of syllogism</li> <li>- Statement and conclusion</li> <li>- Course of action based on statement</li> </ul>			
<b>IV</b>	<p><b>Interview Skills &amp; Dress Code Ethics</b></p> <ul style="list-style-type: none"> <li>- Types of interview- telephonic, virtual &amp; face to face online interview, personal interview, Panel interview, Group interview</li> <li>- Common interview questions and answering strategies</li> <li>- Dress Code Ethics during Interviews</li> <li>- Mock Interview Session</li> </ul> <p><b>Sitting arrangement (puzzle)</b></p> <ul style="list-style-type: none"> <li>- Linear arrangement puzzle</li> <li>- Circular arrangement puzzle</li> <li>- Matrix</li> </ul>	<b>15</b>	Explain common interview questions and effective answering strategies, as well as the importance of dress code ethics during interviews.	1,2
<b>V</b>	<p><b>Grammar (Flipped Classroom)</b></p> <ul style="list-style-type: none"> <li>- Word-stress, Syllables Practice Session: Common Errors (testing the students 'grammar already learnt)</li> </ul> <p><b>Profit loss and discount</b></p> <ul style="list-style-type: none"> <li>- Introduction to basics</li> <li>- Introduction to discount</li> <li>- Problems related on the topic</li> </ul>	<b>10</b>	Identify common grammar errors related to word stress and syllable division.	1,2

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12th edition, Burlington, Massachusetts, USA; 2021.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop proficiency in paragraph writing and letter writing	<b>6,7,8</b>
<b>2</b>	Develop student's self-management skills to plan their goals.	<b>6,7,8</b>
<b>3</b>	Develop writing skills in different areas including Paragraph writing and letter writing.	<b>6,7,8</b>
<b>4</b>	Enhance their capacity in understanding dress code ethics and develop interview skills	<b>6,7,8</b>
<b>5</b>	Enhance comprehend sentences accurately and quickly and controlling the emphasis in writing	<b>6,7,8</b>

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO8
<b>22UBPD22 1R</b>	Enhanced Professional Skills						2	3	2

SEMESTER – IV									
Course Title	BASIC LIFE SAVING SKILLS								
Course code	22UULS222R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ IV semester of second year of the programme								
Course Objectives	1. To learn and demonstrate essential Basic Life Support (BLS) techniques for assisting in medical emergencies before professional help arrives. 2. To enhance communication, teamwork, and conflict resolution skills to improve personal and professional interactions. 3. To Understand the Triage system, recognize different levels of triage, and classify common medical emergencies to prioritize patient care effectively.								
CO1	Demonstrate knowledge and skill to perform CPR use an AED, and respond to choking in adults and children.								
CO2	Understand the significance of communication and teamwork in various situations								
CO3	Apply knowledge and skill about pre-hospital care and management of trauma emergencies								
CO4	Understand the principles and purpose of the Triage system in healthcare settings.								
CO5	Identify and manage common medical emergency conditions								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Basic Life Support ( BLS)		5	Apply the principles of Basic Life Support (BLS) to perform CPR, ventilation, and use an AED correctly in emergency scenarios.				1,2	
<ul style="list-style-type: none"> <li>- Introduction of BLS</li> <li>- Chain of survival</li> <li>- ABCs Assessment</li> <li>- CPR and Ventilation Technique</li> <li>- AED</li> <li>- Choking for adult and children</li> </ul>									
II	Soft skills		5	Demonstrate the effective communication and teamwork skills in emergency situations, ensuring clear and concise information exchange and coordinated efforts.				1,2, 3,4	
<ul style="list-style-type: none"> <li>- Introduction</li> <li>- Communications Skills</li> <li>- Situational Skills</li> <li>- Team Work</li> <li>- Other Soft Skills</li> </ul>									
III	Trauma emergencies		10	Analyze the priorities of initial trauma care to conduct scene safety, primary assessment, bleeding control, and proper handling of injured patients in pre-hospital settings.				1,2, 3,4	
<ul style="list-style-type: none"> <li>- Introduction</li> <li>- Priorities of Initial approach in pre-hospital care               <ul style="list-style-type: none"> <li>a) Scene safety</li> <li>b) Primary assessment</li> <li>c) Bleeding control</li> <li>d) Helmet removal</li> <li>e) Care of amputated body part</li> <li>f) Extrication of victims and safetransfer</li> <li>g) Cervical spine stabilization</li> <li>h) Cervical collar application</li> </ul> </li> </ul>									

	- Splinting of broken Limbs			
<b>IV</b>	<b>Triage system</b> - Introduction - Flow chart approach of Triage - Triage of Multiple Casualties in Pre-Hospital setting - Triage of Single casualty	<b>5</b>	Evaluate different triage methods to prioritize care for single and multiple casualties efficiently in a pre-hospital setting.	1,2,3,4,5
<b>V</b>	<b>Medical emergencies</b> - Introduction - Victim centred approach in medicalemergency - Management of :- a)seizures b)heart attack c)asthma d)diabetic emergencies e)emergency childbirth f) stroke recovery position	<b>5</b>	Develop a comprehensive care plan for managing specific conditions such as seizures, heart attacks, and asthma, ensuring a victim-centered approach in simulated scenarios.	2,3,4,5

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Demonstrate knowledge and skill to perform CPR, use an AED, and respond to choking in adults and children.	<b>1,2,3,4,6</b>
<b>2</b>	Understand the significance of communication and teamwork in various situations.	<b>2,3,4,8</b>
<b>3</b>	Apply knowledge and skill about pre-hospital care and management of trauma emergencies	<b>1,2,3,4,6</b>
<b>4</b>	Understand the principles and purpose of the Triage system in healthcare settings.	<b>1,2,3,4</b>
<b>5</b>	Identify and manage common medical emergency conditions .	<b>2,3,4</b>

### MAPPING TABLE

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
22UULS222 R	Basic life saving skills		3	3	2	2			2

SEMESTER – V									
Course Title	MEDICAL AND SURGICAL EMERGENCY & INTENSIVE CARE I								
Course code	22BCIC321R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 60T	4	0	0	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	<p>1. This course is designed to assist students in developing expertise and in depth understanding in the field of medical and surgical emergency.</p> <p>2. It will help the students to develop advanced skills for surgical intervention in various conditions.</p> <p>3. It helps the student to develop a comprehensive knowledge in dealing with psychiatric emergencies.</p>								
CO1	Develop fundamental knowledge on the nervous system along with the assessment of neurologic examinations.								
CO2	Understand the pathophysiology and management of neuromuscular disorders.								
CO3	Describe signs and symptoms of common poisonings and its immediate management.								
CO4	Explain the assessment and management of various obstetric emergencies.								
CO5	Identify the signs of behavioral emergencies and manage accordingly.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Nervous System:</b> <ol style="list-style-type: none"> <li>1. Cerebrovascular disease – <ul style="list-style-type: none"> <li>▪ CVA</li> </ul> </li> <li>• Haemorrhage, Embolism, Thrombosis</li> <li>2. Head Injury</li> <li>3. Delirium, Persistent vegetative state</li> <li>4. Brain death</li> <li>5. Coma.</li> </ol>	7	Explain, identify and assess various neurologic disorders including their etiology and pathophysiology.					1,2	
II	<b>Neuromuscular disease:</b> <ol style="list-style-type: none"> <li>1. Myasthenia Gravis</li> <li>2. Guillain Barre Syndrome</li> </ol>	10	Explain, identify and assess neuromuscular disorders such as myasthenia gravis and gullain barre syndrome.					1,2,3	
III	<b>Poisoning :</b> <ol style="list-style-type: none"> <li>1. Common poisons</li> <li>2. General supportive care</li> <li>3. Snake bite</li> <li>4. Insect and animal bite – scorpion sting</li> </ol>	10	Explain, identify and manage various types of poisoning including snake bite, animal bite, insect bite, etc.					1,2,3	
IV	<b>Obstetric Emergency:</b> <ol style="list-style-type: none"> <li>1. Complications of labour - Fetal distress, obstructed labour, reputed uterus</li> </ol>	8	Explain, identify and assess various obstetric complications and emergencies.					1,2,3,4,5	



	<ol style="list-style-type: none"> <li>2. Antepartum Hemorrhage</li> <li>3. Post partum Hemorrhage</li> <li>4. Preeclampsia, Eclampsia</li> <li>5. Ectopic pregnancy</li> <li>6. Puerperal sepsis</li> </ol>			
<b>V</b>	<p><b>Behavioural Emergencies:</b></p> <ol style="list-style-type: none"> <li>1. Psychiatric signs and symptoms</li> <li>2. Management of behavioural emergencies</li> <li>3. Management and handling of violent patients</li> <li>4. Management of post ventilation psychosis.</li> </ol>	<b>10</b>	Explain, identify and manage psychiatric and behavioural emergencies.	1,2, 3,4, 5

### TEXT BOOKS:

Textbook of critical care. 6<sup>th</sup> edition

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop fundamental knowledge on the nervous system along with the assessment of neurologic examinations.	<b>1,2</b>
<b>2</b>	Understand the pathophysiology and management of neuromuscular disorders.	<b>1,2</b>
<b>3</b>	Describe signs and symptoms of common poisonings and its immediate management.	<b>2,3</b>
<b>4</b>	Explain the assessment and management of various obstetric emergencies.	<b>3,7</b>
<b>5</b>	Identify the signs of behavioral emergencies and manage accordingly.	<b>7,8</b>

## MAPPING TABLE

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>
22BCIC321 R	Medical And Surgical Emergency & Intensive Care I	3	3	1		1		1	1

SEMESTER – V									
Course Title	VENTILATION & INTENSIVE CARE II								
Course code	22BCIC312R	Total credits: 4 Total hours: 60T+60P	L	T	P	S	R	O/F	C
			4	0	4	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	1. Introduction to ventilators, suction machine, monitoring devices and all other equipment's. 2.They will get knowledge about Oxygen therapy, maintenance of clear Airway equipment 3. Problem solving skills including skill drills.								
CO1	Understand the basic mechanism of breathing and ventilation.								
CO2	Develop fundamental knowledge on the indication and complications of ventilation.								
CO3	Classify the different modes of ventilation and its parameters.								
CO4	Apply knowledge and skills to monitor the parameters during ventilation.								
CO5	Identify the indication and modes of weaning.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Basic concept:</b>  6. Mechanics of ventilation 7. Work of breathing 8. Pressure – Peak, Plateau	10	Explain, illustrate and define the mechanism of ventilation along with the parameters.					1,2	
II	<b>Initiation of ventilation:</b>  1. Clinical conditions leading to mechanical ventilation 2. Ventilatory failure, oxygenation failure 3. Strategies to improve ventilation and oxygenation	10	Describe, illustrate and explain the indications and complications of ventilation.					1,2	
III	<b>Operating modes of ventilation :</b>  4. Modes of ventilation 5. Invasive modes- controlled, assisted, SIMV, APRV, Pressure support 6. Noninvasive modes- CPAP & BiPAP Ventilator settings 7. Timings: inspiratory, expiratory, inspiratory hold PEEP, FiO <sub>2</sub> 8. Alarm settings	15	Describe, classify and explain the various modes of mechanical ventilation including the significance of each parameters.					1,2, 3,4, 5	
IV	<b>Monitoring during ventilation:</b>  9. Vital signs, chest inspection & auscultation 10. Arterial blood gases (ABG), Oxygen and end tidal carbon dioxide	15	Describe, illustrate and explain the techniques of monitoring a patient on ventilators.					2,3, 4,5	

	monitoring 11. Fluid electrolyte balance 12. Acid base balance			
<b>V</b>	<b>Weaning :</b>  13. Modes, weaning criteria's 14. Care of ventilator 15. Tubing and sterility complications during mechanical ventilation.	<b>10</b>	Describe, illustrate and explain the criteria and modes of weaning along with the complications.	1,2,3,4
<b>Practical</b>	1. Basic knowledge of ICU: ICU Setup, sterilisation, nursing and general care and nutritional support in ICU  2. Concept on ICU procedures: Oxygen delivery system, monitoring system, ABG analysis, suctioning of ventilated patient, central line cannula and fusion pump  3. Operating procedures of ventilators: Ventilator setting, different modes of ventilation, weaning from ventilation, care during mechanical ventilation, pre-use check up of ventilator.	<b>60</b>	Demonstrate the ICU setup, concept on ICU procedure and operating procedures of ventilators.	1,2,3,4,5

### TEXT BOOKS:

T1- Nancy caroline Emergency care in the street 7<sup>th</sup> edition

### REFERENCE BOOKS:

R1- Textbook of critical care. 6<sup>th</sup> edition

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the basic mechanism of breathing and ventilation.	1
2	Develop fundamental knowledge on the indication and complications of ventilation.	2,4
3	Classify the different modes of ventilation and its parameters.	4
4	Apply knowledge and skills to monitor the parameters during ventilation.	4,6
5	Identify the indication and modes of weaning.	6,8

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BCIC321R</b>	Ventilation & Intensive Care II	1	3	2	3		1		1

SEMESTER – V									
Course Title	DIALYSIS								
Course code	22BCIC313R	Total credits: 4 Total hours: 60T	L	T	P	S	R	O/F	C
			4	0	0	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	1. Comprehend the various modalities of renal replacement therapy with the knowledge of merits and demerits of each of haemodialysis 2. The various forms of haemodialysis and when each is to be used in the clinical setting.								
CO1	Explain the renal anatomy and physiology.								
CO2	Discuss the principles of acute and chronic renal diseases followed by the purpose and types of dialysis.								
CO3	Discuss the use of hemodialysis machine its Performance and maintenance								
CO4	Discuss about the Peritoneal Dialysis machine and its applicability.								
CO5	Discuss various drugs used during treatment of renal diseases.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Review of Anatomy & Physiology:		10	Describe, illustrate and explain cell organization and functions, microscopy and structural differences.				1,2	
	1. Anatomy of Kidney 2. Physiology of Kidney								
II	Basics of Dialysis:		10	Describe, illustrate and explain membrane structure, function; cell organization and the proteins involved in transportation.				1,2,3	
	1. Indications of dialysis – Acute and chronic renal disease 2. Principles of dialysis, definitions 3. Types of dialysis								
III	Haemodialysis		15	Describe, illustrate and explain chromosomal structure and types.				1,2,3	
	1. Haemodialysis apparatus – types of dialyzer & membrane 2. Types of vascular access for haemodialysis 3. Introduction, functioning and management machine 4. Priming of dialysis apparatus 5. Assessment during dialysis 6. Common complications of haemodialysis 7. Monitoring of patient during dialysis.								

<b>IV</b>	<b>Peritoneal Dialysis:</b> <ol style="list-style-type: none"> <li>1. Peritoneal dialysis machine</li> <li>2. Peritoneal access devices: types of catheter insertion</li> <li>3. Complications of dialysis (P.D.)</li> <li>4. Anticoagulation</li> <li>5. Withdrawal of dialysis criteria</li> </ol>	<b>15</b>	Describe, illustrate and explain the mechanism of cell to cell communication	2,3,4
<b>V</b>	<b>Drugs and Fluid:</b> <ol style="list-style-type: none"> <li>1. I.V. fluid therapy in renal disease</li> <li>2. Diuretics</li> <li>3. Antihypertensive and their use during dialysis</li> </ol>	<b>10</b>	Describe, illustrate and explain the cell cycle and division in general and in some specific cell types	1,2,3,4,5

### TEXT BOOKS:

A textbook of dialysis technician for paramedical; Dr, Gitesh Kumar Amrohit

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Explain the renal anatomy and physiology.	<b>1</b>
<b>2</b>	Discuss the principles of acute and chronic renal diseases followed by the purpose and types of dialysis.	<b>2</b>
<b>3</b>	Discuss the use of hemodialysis machine its Performance and maintenance	<b>2,3</b>
<b>4</b>	Discuss about the Peritoneal Dialysis machine and its applicability.	<b>4</b>
<b>5</b>	Discuss various drugs used during treatment of renal diseases.	<b>4,8</b>

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BCIC313 R	Dialysis	1	2	3	3				1

SEMESTER – V									
Course Title	Techno-professional skill (Basic Care Of Patient)								
Course code	22BCIC314R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	1	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	1. To provide knowledge and skills on monitoring the patients in ICU. 2. To give an insight knowledge and skills on different positioning and mobilization of patients. 3. To provide knowledge and skills on the control of infection in ICU								
CO1	Develop fundamental knowledge on the techniques of monitoring ICU patients.								
CO2	Understand various body positioning and mobility techniques including preventive measures of pressure injury.								
CO3	Apply skills and technique to maintain the airway along with the pharmacological management.								
CO4	Explain the different routes of medication administration and calculation of drug doses.								
CO5	Understand the importance of hygiene and personal protective equipment in infection control.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Monitoring of patients in ICU		7	Explain and illustrate knowledge on techniques of monitoring patients in the ICU.				1,2	
	<ul style="list-style-type: none"> <li>• Vital signs monitoring</li> <li>• ECG monitoring</li> <li>• Pain and sedation monitoring</li> </ul>								
II	Positioning and Mobilization		10	Describe, illustrate and explain various techniques of patient positioning and mobility including preventive measures of pressure injuries.				1,2	
	<ul style="list-style-type: none"> <li>• Positioning techniques</li> <li>• Mobility techniques</li> <li>• Pressure injuries and prevention in ICU patients</li> </ul>								
III	Airway maintenance		10	Explain, illustrate and demonstrate various airway management techniques along with the different drugs used in the procedure.				1,2	
	<ul style="list-style-type: none"> <li>• Positioning</li> <li>• Airway maneuvers</li> <li>• Airway adjuncts</li> <li>• Advanced airway equipments</li> <li>• Pharmacological interventions               <ul style="list-style-type: none"> <li>➤ Bronchodilators</li> <li>➤ Anti inflammatory</li> <li>➤ Mucolytic agents</li> </ul> </li> </ul>								
IV	Medication administration		8	Explain and illustrate the various routes of drug administration and dosage calculation.				1,2	
	<ul style="list-style-type: none"> <li>• Routes of administration</li> <li>• Dose calculation</li> </ul>								
V	Infection Control		10	Describe, illustrate and explain the important measures such as hand hygiene and PPE for				1,2	
	<ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Personal protective equipments</li> <li>• Isolation precautions</li> </ul>								



			infection control in the ICU.	
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**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12th edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop fundamental knowledge on the techniques of monitoring ICU patients.	<b>2,3,4,6,8</b>
<b>2</b>	Understand various body positioning and mobility techniques including preventive measures of pressure injury.	<b>1,2,3,4,6,8</b>
<b>3</b>	Apply skills and technique to maintain the airway along with the pharmacological management.	<b>1,2,3,4,8</b>
<b>4</b>	Explain the different routes of medication administration and calculation of drug doses.	<b>2,3,6,7,</b>
<b>5</b>	Understand the importance of hygiene and personal protective equipment in infection control.	<b>2,3,4,7</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BCIC314R</b>	Techno-professional skill (Basic Care Of Patient)		3	3	3	2	2	2	

SEMESTER – V									
Course Title	BIOMEDICAL WASTE								
Course code	22BCIC315R	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	1. Understand regulations and guidelines for biomedical waste management. 2. Learn safe handling, segregation, and disposal techniques. 3. Implement effective waste management systems.								
CO1	Attain the adequate knowledge about types of biomedical waste and the severity of hazardousness								
CO2	Understand the importance color coding for waste segregation and collection								
CO3	Demonstrate the types of waste disposal and its process to dispose								
CO4	Learn about modern technology and protective devices for handling biomedical waste								
CO5	Outline the methods of bioethics and environment safety.								
Unit-No.	Content		Contact Hour	Learning Outcome					KL
I	Introduction & Waste Segregation		3	Describe and explain various types of biomedical waste container including their disposal and segregation.					1,2
<ul style="list-style-type: none"> <li>Definition of Biomedical Waste, General and Hazardous health care waste.</li> <li>Color Coding and types of containers for disposal of medical waste, Segregation, Collection &amp; Disposal</li> </ul>									
II	Types of Biomedical Waste		3	Classify and explain various biomedical waste.					1,2
<ul style="list-style-type: none"> <li>Infectious waste, Genotoxic waste, Waste Sharps Categories, Categorization, and composition of Biomedical waste.</li> <li>Liquid Biomedical Waste - Radioactive wastes, Metals, Chemicals &amp; drugs</li> </ul>									
III	Hospital Generated Waste		3	Describe, illustrate and explain the different types of biological and pathological waste in the hospital.					1,2
Human Blood and Blood Products, pathological wastes, Contaminated sharps.									
IV	Types of Waste Disposal		3	Describe, illustrate and explain the various guidelines and techniques of waste disposal and disinfections in the hospital.					1,2
<ul style="list-style-type: none"> <li>Disinfections unit container for Autoclaving.</li> <li>Sharp waste containers for storage &amp; transportation,</li> <li>Autoclaving, Incineration, Plasma Pyrolysis /Gasification systems, Composting</li> </ul>									
V	Recent Trends and Bioethics		3	Explain the recent trends in bioethics and protective devices in handling of biomedical waste.					1,2
<ul style="list-style-type: none"> <li>Protective Devices</li> <li>Bioethics and Handling of Waste Management.</li> </ul>									

**TEXT BOOKS:**

- T1-Shyam Divan, Environmental law and policy in India, Oxford India Press, 2004.  
 T2- Charles A Wentz, Hazardous Waste Management, McGraw Hill Inc, Newyork, 1995

**REFERENCE BOOKS:**

- R1- V. J. Landrum, Medical Waste Management and disposal, Elsevier, 1991, ISBN: 978-0-8155-1264-6  
 R2- S A Tabish, Principles of Hospital Management, OUP, Jaypee Publishers.6th Edition 2000.  
 R3- S L Goel, Dr. R. Kumar, Encyclopedia of Hospital Management - Text and Case Studies Hospitals in Community Health Care, ISBN(Hardbound): 8184502273, 9788184502275. 2010.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Attain the adequate knowledge about types of biomedical waste and the severity of hazardousness	<b>2</b>
<b>2</b>	Understand the importance colour coding for waste segregation and collection	<b>3</b>
<b>3</b>	Demonstrate the types of waste disposal and its process to dispose	<b>3,7</b>
<b>4</b>	Learn about modern technology and protective devices for handling biomedical waste	<b>7</b>
<b>5</b>	Outline the methods of bioethics and environment safety.	<b>7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BCIC315R</b>	Biomedical Waste		1	1				2	2

SEMESTER – V									
Course Title	CO-CURRICULAR								
Course code	22UBCC311	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	1. AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.  2. These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.  3. Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.  4. The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.  5. The student members of the club are trained represent AdtU in various inter University student and national level competitions.  6. Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.	60	Develop skills and confidence to participate in different activities organized by the institution.				1,2,3,4,5		

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy	<b>7,8</b>
<b>2</b>	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests	<b>7,8</b>
<b>3</b>	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	<b>7,8</b>
<b>4</b>	Explore new platform to learn from invited experts in their respective fields.	<b>7,8</b>
<b>5</b>	Evaluate overall growth alongside academic development.	<b>7,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
22UBCC311	Co-Curricular							2	3

SEMESTER – VI									
Course Title	TRAUMA EMERGENCY AND INTENSIVE CARE								
Course code	22BCIC321R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 60T+60P	4	0	4	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	1. The course objective of trauma management typically involves teaching participants how to assess, stabilize, and treat patients with traumatic injuries efficiently and effectively. 2. This includes understanding trauma mechanisms, prioritizing interventions. 3. Coordinating care within a team to optimize patient outcomes.								
CO1	Determine the mechanism of injury and identify different trauma centers.								
CO2	Describe the anatomy and physiology of the skin with the ability to recognize and treat shock and soft tissue injuries.								
CO3	Discuss various skills to assess and manage injuries related to the abdominal and thoracic cavities including burns.								
CO4	Develop knowledge and skills to assess and manage injuries related to musculoskeletal system.								
CO5	Apply skills to assess and manage different types of injuries such as lightning strike, heat injury, etc.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Trauma systems and mechanism of injury:</b> 1. Energy 2. Biomechanics and 3. Kinematics 4. Trauma centers 5. Types of trauma	10	Describe, illustrate and explain the mechanism of injury along with the types of trauma and trauma centres.					1,2	
II	<b>Soft Tissue Injury and Bleeding and Shock:</b> 1. Anatomy and physiology of skin 2. Pathophysiology of shock 3. Assessment and management of shock in ICU 4. Wound healing 5. Closed versus open wounds 6. Crush injuries 7. Blast injuries 8. Management of crush syndrome	15	Describe, illustrate and explain the mechanism of soft tissue injuries and its management including bleeding and shock.					1,2,3	
III	<b>Burns, Abdominal Injuries &amp; Thoracic Injuries :</b> 1. Review of anatomy and physiology and abdomen and thorax	10	Explain, identify and assess injuries related to the abdominal and thoracic cavity including burns.					1,2,3,4	

	<ol style="list-style-type: none"> <li>2. Pathophysiology of burns</li> <li>3. Assessment and management of burns</li> <li>4. Pathophysiology, assessment and management of abdominal injuries</li> <li>5. Pathophysiology Assessment &amp; Management of Thoracic Injuries</li> </ol>			
<b>IV</b>	<b>Musculoskeletal injuries, Head and face and Spinal Injuries:</b> <ol style="list-style-type: none"> <li>1. Review of anatomy and physiology</li> <li>2. Assessment and management of head and facial injuries</li> <li>3. Assessment and management of spinal injuries</li> <li>4. Spinal immobilization techniques</li> </ol>	<b>15</b>	Describe, identify and demonstrate assessment of various musculoskeletal injuries along with techniques of spinal immobilization.	1,2,3,4,5
<b>V</b>	<b>Environmental Emergencies :</b> <ol style="list-style-type: none"> <li>1. Heat Illness</li> <li>2. Cold Injuries</li> <li>3. Drowning</li> <li>4. Diving Injuries</li> <li>5. Altitude Illness</li> <li>6. Lightning Strike</li> <li>7. Bites &amp; Stings.</li> </ol>	<b>10</b>	Explain, assess and manage environmental emergencies such as heat cramps, cold injuries, altitude sickness, etc.	1,2,3,4,5
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. different types of haemorrhage management</li> <li>2. dressing, bandaging</li> <li>3. burn management</li> <li>4. spinal immobilization techniques</li> </ol>	<b>60</b>	Explain and demonstrate of haemorrhage management, different types of dressing, bandages and burn management.	1,2,3,4,5

### TEXT BOOKS:

Nancy Caroline emergency street book 6<sup>th</sup> edition

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Determine the mechanism of injury and identify different trauma centers.	<b>1</b>
<b>2</b>	Describe the anatomy and physiology of the skin with the ability to recognize and treat shock and soft tissue injuries.	<b>1,2</b>
<b>3</b>	Discuss various skills to assess and manage injuries related to the abdominal and thoracic cavities	<b>3,4</b>

	including burns.	
<b>4</b>	Develop knowledge and skills to assess and manage injuries related to musculoskeletal system.	<b>3,4</b>
<b>5</b>	Apply skills to assess and manage different types of injuries such as lightning strike, heat injury, etc	<b>4,7&amp;8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
<b>22BCIC321 R</b>	Trauma Emergency And Intensive Care	1	3	3	2		2	2	1



SEMESTER – VI									
Course Title	PEDIATRIC EMERGENCIES, NEONATAL EMERGENCIES AND INTENSIVE CARE								
Course code	22BCIC322R	Total credits: 6 Total hours: 60T+60P	L	T	P	S	R	O/F	C
			4	0	4	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Critical and Intensive Care Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	<p>1. At the end of the course the student will be able to develop an understanding of special considerations related to the disease process, assessment and management, in neonatal and paediatric patients.</p> <p>2. This course will enable them to develop skills and attitude in providing competent neonatal</p> <p>3. Paediatric care in relation to an emergency.</p>								
CO1	Understand the cardiovascular and respiratory system of pediatric and neonates.								
CO2	Develop skills and techniques of pediatric advance life support.								
CO3	Identify and manage various pediatric respiratory disorders.								
CO4	Develop knowledge and skills on post-cardiac arrest care of pediatric patients.								
CO5	Demonstrate skills to assess and manage complications of newborns.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction :		15	Describe, illustrate and explain the anatomy and physiology of paediatric respiratory and cardiovascular system.				1,2	
	<ol style="list-style-type: none"> <li>Review of Cardiovascular and Respiratory System</li> <li>Paediatric Advanced life support</li> </ol>								
II	Major Concepts:		10	Explain the pathophysiology of cardiac arrest in neonates and paediatric; and demonstrate CPR and defibrillation technique.				1,2,3	
	<ol style="list-style-type: none"> <li>Distinction from Adult cardiac Arrest</li> <li>A Systemic Approach</li> <li>Assessment and Diagnosis</li> <li>Life Threatening issues</li> <li>The paediatric Chain of Survival</li> <li>Sequence of Resuscitation <ul style="list-style-type: none"> <li>Initiation of CPR</li> <li>Components of high quality CPR</li> <li>CPR technique</li> </ul> </li> </ol>								

	<ul style="list-style-type: none"> <li>▪ ABC</li> <li>▪ Advance airway interventions during CPR</li> <li>▪ Weight Based Dosing of Resuscitation Medication</li> <li>▪ Management of VF VT</li> </ul> <p>7. Defibrillation :</p> <ul style="list-style-type: none"> <li>▪ Paddle size, Type and Position</li> <li>▪ Energy Dose</li> </ul> <p>8. Assessment of Resuscitation Quality</p> <p>9. Extracorporeal CPR</p> <p>10. Resuscitation Tools</p> <ul style="list-style-type: none"> <li>▪ Intraosseous administration</li> <li>▪ Bag-Mask-valve</li> <li>▪ Endotracheal Intubation</li> <li>▪ Basic Airway adjuncts and Technique</li> </ul> <p>11. ET intubation</p> <p>12. ETCO<sub>2</sub></p> <p>13. Cricoids Pressure</p> <ul style="list-style-type: none"> <li>▪ AED for infants and children</li> </ul> <p>Pharmacological intervention/ tools</p>			
<b>III</b>	<p><b>Paediatric Emergencies:</b></p> <p>1. Respiratory Distress/ Failure</p> <ul style="list-style-type: none"> <li>▪ Recognizing</li> <li>▪ Respond</li> <li>▪ Management of respiratory failure</li> <li>▪ Foreign body airway obstruction</li> </ul> <p>2. Bradycardia :</p> <ul style="list-style-type: none"> <li>▪ Recognizing</li> <li>▪ Respond</li> <li>▪ Algorithm</li> </ul> <p>3. Tachycardia</p> <ul style="list-style-type: none"> <li>▪ Recognizing</li> <li>▪ Respond</li> <li>▪ Algorithm</li> </ul> <p>4. Shock</p> <ul style="list-style-type: none"> <li>▪ Recognizing</li> <li>▪ Respond</li> <li>▪ Assessment and Diagnosis</li> </ul> <p>5. Cardiac Arrest</p> <ul style="list-style-type: none"> <li>▪ Recognizing</li> <li>▪ Respond</li> </ul>	<b>10</b>	Describe, illustrate and explain various management of paediatric emergencies such as respiratory distress, bradycardia, shock, etc.	1,2,3
<b>IV</b>	<b>Paediatric Post Resuscitation Care:</b>	<b>15</b>	Describe, illustrate and explain the post cardiac arrest algorithm	2,3,4

	<ol style="list-style-type: none"> <li>1. Algorithm</li> <li>2. Post cardiac arrest - Care, management and Monitoring</li> <li>3. Post cardiac arrest- Blood Pressure management</li> <li>4. Post cardiac arrest - Oxygenation and Ventilation Management</li> <li>5. Post cardiac arrest recovery</li> </ol>		of paediatric including the parameters to monitor post resuscitation.	
<b>V</b>	<b>Neonatal Care:</b> <ol style="list-style-type: none"> <li>1. General Pathophysiology and assessment</li> <li>2. Specific Interventions and resuscitation steps</li> <li>3. Specific conditions</li> <li>4. Premature &amp; low birth weight infants</li> <li>5. Thermoregulations</li> <li>6. Hypoglycemia</li> <li>7. Common birth injuries</li> </ol>	<b>10</b>	Identify, assess and manage common birth complications in neonates such as hypoglycemia, hypothermia, etc.	1,2,3,4,5
<b>Practical</b>	Based on theory	<b>60</b>		1,2,3,4,5

#### TEXT BOOKS:

Nancy caroline's emergency care in the streets by Alfonso Mejia

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Understand the cardiovascular and respiratory system of pediatric and neonates.	<b>1</b>
<b>2</b>	Develop skills and techniques of pediatric advance life support.	<b>2,3</b>
<b>3</b>	Identify and manage various pediatric respiratory disorders.	<b>2,3</b>
<b>4</b>	Develop knowledge and skills on post-cardiac arrest care of pediatric patients.	<b>3,4</b>
<b>5</b>	Demonstrate skills to assess and manage complications of newborns.	<b>4,7,8</b>

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO8
<b>22BCIC322 R</b>	Paediatric Emergencies, Neonatal Emergencies And Intensive Care	1	3	3	2		1	2	1

<b>SEMESTER – VI</b>									
<b>Course Title</b>	<b>RESEARCH PROJECT</b>								
<b>Course code</b>	<b>22BCIC323R</b>	<b>Total credits: 6</b> <b>Total hours: 540R</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>0</b>	<b>6</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Science in Critical and Intensive Care Technology</b>								
<b>Semester</b>	<b>Fall/ V semester of third year of the programme</b>								
<b>Course Objectives</b>	1. Students get the opportunity and freedom to explore in depth research into the topic of their choice. 2. Students learn how to access the articles in PubMed and google Scholar and it allows the students to specialize in an area that they have previously covered in class. 3. It allows the students to develop their skills in writing research and review papers.								
<b>SEMESTER – VI</b>									
<b>Course Title</b>	<b>RESEARCH PROJECT</b>								
<b>Course code</b>	<b>22BCIC323R</b>	<b>Total credits: 6</b> <b>Total hours: 540R</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>0</b>	<b>6</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Science in Critical and Intensive Care Technology</b>								
<b>Semester</b>	<b>Fall/ V semester of third year of the programme</b>								
<b>Course Objectives</b>	1. Students get the opportunity and freedom to explore in depth research into the topic of their choice. 2. Students learn how to access the articles in PubMed and google Scholar and it allows the students to specialize in an area that they have previously covered in class. 3. It allows the students to develop their skills in writing research and review papers.								





# Assam down town University

## Curriculum and Syllabus

### Bachelor of Optometry

OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**

July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022



*Chairperson  
Board of Studies*



*Member Secretary  
Academic Council*





## **Vision**

To become a Globally Recognized University from North Eastern Region of India,  
Dedicated to the Holistic Development of Students and Making Society Better

## **Missions**

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community.

# Programme Details

## Programme Overview

The Bachelor of Optometry is a healthcare profession focused on the eye and related structures, vision, visual systems, and vision information processing in humans. Optometrists serve as primary care providers, diagnosing, managing, and treating eye diseases and refractive disorders.

### I. Specific Features of the Curriculum

The curriculum integrates evidence-based strategies for managing diverse eye diseases, emphasizing Orthoptics management and effective vision rehabilitation grounded in the latest research and clinical evidence. It promotes global competency through international optometric and interdisciplinary certification courses, ensuring graduates excel in the profession. Additionally, the curriculum fosters techno-professional efficiency by applying multidisciplinary concepts related to optometry, aiming to enhance the quality of life for patients.

### II. Eligibility Criteria:

Minimum 45% in 10+2 with Physics, Biology & Chemistry.

### III. Program Educational Objectives (PEOs):

**PEO-1:** Optometry graduates will have a successful career as Optometric Health Leaders and Entrepreneurs: Vision Therapist, Contact Lens practitioner, Low Vision Specialist, Ocularist, Occupational Optometrist, Academics, and Research.

**PEO-2:** Optometry graduates will be academically prepared to analyze the findings of routine ophthalmic procedures, create conclusive and differential diagnoses, and manage a variety of eye disorders with skilful use of Vision Care Instruments and materials.

**PEO-3:** The graduates will be well prepared to identify the health care needs of the community and will possess the initiative and critical acumen required to continuously improve their knowledge through perusing higher degree and through lifelong learning.

### IV. Program Specific Outcomes (PSOs):

**PSO1: Research-In-Practice:** Develop, convey and implement evidence-based

strategies for the management of diverse eye diseases ensuring Orthoptics management, effective vision rehabilitation and delivery of care grounded in the latest research and clinical evidence.

**PSO2: Global Competency:** Demonstrate global competency to excel in the profession through international optometric and interdisciplinary certification courses.

**PSO3: Techno-Professional Efficiency:** Apply the comprehensive understanding of multidisciplinary concepts related to optometry for improving quality of life.

**V. Program Outcome:**

**PO1: Optometry Knowledge:** Apply the knowledge of physics, general and ocular anatomy, general and ocular physiology, biochemistry, microbiology, pathology, ocular pharmacology, and optometric principles to solve visual defects, and create awareness about eye health.

**PO2: Problem Analysis:** Investigate, diagnose and analyse complex ocular problems reaching substantiated conclusions using principles of optics and optometry fundamentals.

**PO3: Problem-Solving:** Conduct eye examinations, assess visual needs, prescribe corrective measures, and manage therapeutic practices to enrich the overall quality of life.

**PO4: Modern Equipment Proficiency:** Operate modern optometric instruments efficiently, adhering to patient safety and protocols.

**PO5: Communication:** Demonstrate effective communication both with the patients, ophthalmologists and in multidisciplinary healthcare teams.

**PO6: Professional and Ethical Practices:** Adhering to moral principles, professional ethics, and responsibilities in the profession.

**PO7: Teamwork:** Perform efficiently as a member or leader in diverse teams/ multidisciplinary settings.

**PO8: Lifelong learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of optometric and technological change.

**VI. Career Prospects:**

Optometry graduates will have a successful career as Optometric Health Leaders and Entrepreneurs such as Vision Therapist, Contact Lens practitioner, Low Vision Specialist, Ocularist, Occupational Optometrist. Can build a career in Academics, and work on Research.

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 40% or as prescribed by the programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Sem Exam – I (ISE-I) (Written Examination)*	30
2.	In-Sem Exam – II (ISE-II) (Written Examination)*	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*are compulsory*

**Note:** Total Internal assessment should be out of 40

### INSTRUCTION

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.
2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.

3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

## **B. SEMESTER END EXAMINATION:**

Time table for end semester examination is published at least 25 days prior to the start of Examination.

### **I. Pre-Examination:**

#### **Eligibility Criteria for a student to appear in University Examinations:**

The student shall only be allowed to appear in a University Examination, if:

- i) He/ She is a registered student of the University;
- ii) He/ She is of good conduct and character;
- iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

### **II. Admit Card:**

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds.

### **III. Pattern of Question Papers:**

The question paper shall follow the principles of Bloom's Taxonomy.  
Table

<b>S. N.</b>	<b>Level</b>	<b>Questions /verbs for test</b>
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify
4	Analyze	Classify, outline, categorize, analyze, diagrams, illustrate,

		infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.
6	Create	Design, Formulate, Modify, Develop, integrate, etc.

**Note:** No course is to be evaluated on basis of **all 6 knowledge levels**.

The format of the question paper across all the program follow a unique pattern and the total marks is 60

**Table 1: Question paper pattern for End semester examination**

Sl no	Question pattern	Total marks
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

#### **V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

#### **VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Office-in-Charge of the center may take appropriate decisions as per the rules and procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

## **VII. Instruction to the Students:**

- (i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- (ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- (iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.
- (iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- (v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- (vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- (vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.
- (viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- (ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

## **VIII. Provision for an Amanuensis (writer):**

- (i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.
- (ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.
- (iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process.

### **C. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times CR$

#### **i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

#### **ii. Grade Point:**

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

#### **iii. Letter Grade:**

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:



- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades ‘O’ to ‘P’ shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

Letter Grade	Grade Points	Description
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

**iv. Grade Point Average:**

**a. SGPA (Semester Grade Point Average)**

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades ‘O’ to ‘F’ as given in Table 1.

$$SGPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  registered Course and  $C_i$  is the Credit (weight) of that Course.

### **b. CGPA (Cumulative Grade Point Average)**

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrollment in the Programme. In other words, taking into account all the Courses graded with 'O' to 'P' as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrollment.
- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  completed Course and  $C_i$  is the Credit (weight) of that Course.

$$CGPA = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

- (iii) The CGPA shall be convertible into equivalent percentage of marks using Equation Conversion of CGPA to percentage marks: = CGPA \* 10

## **D. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### **ii. Grievance Readdress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.
- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite proforma available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.
- (vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.

- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.
- (ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# INSTRUCTION TO TEACHERS AND STUDENTS

## (Teaching and Learning Methods)

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

### **1. Student- centric / Constructivist Approach:**

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer

and discuss in the successive class. This will help in the preparation for various competitive examination and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student-centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

#### **The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures	20%
Student-centric Approach, Students present and deliver lectures in the presence of teacher and supervised by teacher	60%
Students visit fields or perform experiments or teachers perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

### **Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned approaches and prepare a lesson plan for execution and maintain a file.

## **Curriculum Framework**

### **Breakdown of Credits**

<b>Sl. No</b>	<b>Category</b>	<b>Total number of Credits</b>
1	University Core(UC)	24
2	University Elective (UE)	5
3	Program Core(PC)	115
4	Program Elective (PE)	1
5	Faculty Elective (FE)	0
6	Faculty Core(FC)	32
7	SE	5
<b>Total number of credit</b>		<b>182</b>

### **Breakdown by categories of courses**

<b>Sl no</b>	<b>Category</b>	<b>Credits</b>	<b>%</b>
1	Paramedical Science	173	95.05%
2	FOCT	2	1.10%
3	Commerce and Management	1	0.55%
4	CLPDP	6	3.30%
<b>Total</b>		<b>182</b>	<b>100%</b>

**PCI, INC, AICTE regulated programs shall have to follow the regulating body**

### SEMESTER WISE COURSE DISTRIBUTION

	S. N.	Course Code	Course Title	Course Category	Engagement						C	IA*	Maximum Marks for			
					L	T	P	S	R	O			SEE*	PI*	PE*	Total
<b>Semester I</b>	1.	22BOPT111R	ANATOMY I	FC/SC	3	0	4	0	0	0	5	40	60	0	100	200
	2	22BOPT112R	PHYSIOLOGY I	FC/SC	3	0	4	0	0	0	5	40	60	0	100	200
	3	22BOPT113R	BIOCHEMISTRY I	FC/SC	3	0	0	0	0	0	3	40	60	0	0	100
	4	22BOPT114R	GEOMETRICAL OPTICS	FC/SC	2	0	2	0	0	0	3	40	60	0	100	200
	5	22UBPD111R	BASIC ENGLISH	UC	0	0	4	0	0	0	2	0	0	50	50	100
	6	22UBEC111	EXTRA-CURRICULAR	UE	0	0	0	4	0	0	1	0	0	100	0	100
	7	22BOPT115R	BASIC INSTRUMENTATION	PC	0	0	0	4	0	0	1	0	0	0	100	100
	<b>Total</b>											<b>20</b>				<b>1000</b>
	S. No.	Course Code	Course Title	Course Category	Engagement						C	IA*	Maximum Marks for			
					L	T	P	S	R	O			SEE*	PI*	PE*	Total
<b>Semester II</b>	1.	22BOPT121R	ANATOMY II	FC/SC	3	0	4	0	0	0	5	40	60	0	100	200
	2	22BOPT122R	PHYSIOLOGY II	FC/SC	3	0	4	0	0	0	5	40	60	0	100	200
	3	22BOPT123R	BIOCHEMISTRY II	FC/SC	3	0	0	0	0	0	3	40	60	0	0	100
	4	22BOPT124R	PHYSICAL OPTICS	FC/SC	2	0	2	0	0	0	3	40	60	0	100	200
	5	22BOPT125R	VISUAL OPTICS I	PC	2	0	0	0	0	0	2	40	60	0	0	100
	6	22UBPD121R	EFFECTIVE ENGLISH	UC	0	0	4	0	0	0	2	0	0	50	50	100
	7	22BOPT126R	OPTOMETRY PROFESSIONAL SKILLS I	PC	0	0	2	0	0	0	1	0	0	0	100	100
	8	22UBCC121	CO-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	0	100	100
	9	22UBEC121	EXTRA-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	100	0	100
	10	22BOPTMO01	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)	SE	0	0	0	4	0	0	1	0	0	0	100	100
	11	22UUHV106R	UNIVERSAL HUMAN VALUES (UHV) + PROFESSIONAL ETHICS	UC	1	0	2	0	0	0	2	0	0	0	100	200
	12	22UUDL101R	BASIC DIGITAL	UC	0	0	2	0	0	0	1	0	0	0	100	100



		LITERACY														1600
		<b>Total</b>			27											1600
S. No.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for					
				L	T	P	S	R	O	C	IA*	SEE*	PI*	PE*	Total	
1.	22BOPT211R	OCULAR PHARMACOLOGY	PC	2	0	0	0	0	0	2	40	60	0	100		
2	22BOPT212R	VISUAL OPTICS II	PC	2	0	0	0	0	0	2	40	60	0	100		
3	22BOPT213R	DISPENSING OPTICS I	PC	2	0	0	0	0	0	2	40	60	0	100		
4	22BOPT214R	PATHOLOGY AND MICROBIOLOGY	PC	2	0	0	0	0	0	2	40	60	0	100		
5	22BOPT215R	CLINICAL OPTICS AND REFRACTION I	PC	2	0	2	0	0	0	3	40	60	0	200		
6	22BOPT216R	INSTRUMENTATION AND INVESTIGATION I	PC	2	0	2	0	0	0	3	40	60	0	200		
7	22UBPD211R	ENGLISH LANGUAGE PROFICIENCY	UC	0	0	2	0	0	0	1	0	0	50	100		
8	22BOPT217R	OPTOMETRY PROFESSIONAL SKILLS II	PC	0	0	2	0	0	0	1	0	0	0	100		
9	22UBCC211	CO-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	0	100		
10	22UBEC211	EXTRA-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	100	100		
11	22BOPTGE01	GENERIC ELECTIVE	UE	2	0	0	0	0	0	2	0	0	0	100		
12	22BOPTMO01	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)	SE	0	0	0	4	0	0	1	0	0	0	100		
13	22UULS201R	BASIC ACCLIMATIZING SKILLS (BAS)	UC	0	0	2	0	0	0	1	0	0	0	100		
<b>Total</b>				22												1500

S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SEE*	PI*	PE*	Total
1.	22BOPT221R	CONTACT LENS I	PC	2	0	2	0	0	0	3	40	60	0	100	
2	22BOPT222R	OCULAR	PC	2	0	0	0	0	0	2	40	60	0	100	

			DISEASE I																
	3	22BOPT223R	INSTRUMENTATION AND INVESTIGATION II	PC	2	0	2	0	0	0	3	40	60	0	100	200			
	4	22BOPT224R	DISPENSING OPTICS II	PC	4	0	2	0	0	0	5	40	60	0	100	200			
	5	22BOPT225R	CLINICAL OPTICS AND REFRACTION II	PC	4	0	2	0	0	0	5	40	60	0	100	200			
	6	22UBPD221R	PERSONALITY DEVELOPMENT SKILL FOR EMPLOYABILITY	UC	0	0	2	0	0	0	1	0	0	50	50	100			
	7	22BOPT226R	OPTOMETRY PROFESSIONAL SKILLS III	PC	0	0	2	0	0	0	1	0	0	0	100	100			
	8	22UBCC221	CO-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	0	100	100			
	9	22UBEC221	EXTRA-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	100	0	100			
	10	22UBES201R	ENVIRONMENTAL SCIENCE	UC	2	0	0	0	0	0	2	40	60	0	0	100			
	11	22BOPTGE21	GENERIC ELECTIVE	UE	2	0	0	0	0	0	2	0	0	0	100	100			
	12	22BOPTMO21	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)	SE	0	0	0	4	0	0	1	0	0	0	100	100			
	13	22UULS202R	BASIC LIFE SAVING SKILLS (BLSS)	UC	1	0	0	0	0	0	1	40	60	0	0	100			
	14	22UUFLL201R	INTRODUCTION TO FINANCIAL BUDGETING AND PLANNING	UC	0	0	2	0	0	0	1	0	0	0	100	100			
	<b>Total</b>										<b>29</b>								<b>1800</b>
<b>Semester V</b>	<b>S. N.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>							<b>Maximum Marks for</b>							
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PI*</b>	<b>PE*</b>	<b>Total</b>			
	1.	22BOPT311R	CONTACT LENS II	PC	2	0	2	0	0	0	3	40	60	0	100	200			
	2	22BOPT312R	OCULAR DISEASE II	PC	2	0	0	0	0	0	2	40	60	0		100			
3	22BOPT313R	BINOCULAR VISION AND	PC	2	0	2	0	0	0	3	40	60	0	100	200				

		OCULAR MOTILITY													
4	22BOPT314R	LOW VISION AID AND VISUAL REHABILITATION	PC	2	0	2	0	0	0	3	40	60	0	100	200
5	22BOPT315R	BIOSTATISTICS	PC	2	0	0	0	0	0	2	40	60	0	0	100
6	22BOPT316R	CLINICAL EXAMINATION OF EYE I	PC	4	0	2	0	0	0	5	40	60	0	100	200
7	22BOPT317R	OPTOMETRY PROFESSIONAL SKILLS IV	PC	0	0	2	0	0	0	1	0	0	0	100	100
8	22UBCC311	CO-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	0	100	100
9	22UBEC311	EXTRA-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	100	0	100
10	22BOPTMO31	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)	SE	0	0	0	4	0	0	1	0	0	0	100	100
<b>Total</b>				<b>22</b>											<b>1400</b>

S. N.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for				
				L	T	P	S	R	O		IA*	SEE*	PI*	PE*	Total
1.	22BOPT321R	SYSTEMIC CONDITIONS AND THE EYE	PC	2	0	0	0	0	0	2	40	60	0	0	100
2	22BOPT322R	PUBLIC HEALTH AND COMMUNITY OPTOMETRY	PC	0	0	0	0	0	0	2	40	60	0	0	100
3	22BOPT323R	PROFESSIONAL PRACTICE MANAGEMENT	PC	2	0	0	0	0	0	2	40	60	0	0	100
4	22BOPT324R	APPLIED OPTOMETRY AND ORTHOPTICS	PC	4	0	2	0	0	0	5	40	60	0	100	200
5	22BOPT326R	CLINICAL EXAMINATION OF EYE II	PC	4	0	4	0	0	0	6	40	60	0	100	200
6	22UBCC321	CO-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	0	100	100
7	22UBEC321	EXTRA	UC	0	0	0	4	0	0	1	0	0	100	0	100

Semester VI

			CURRICULAR																
	8		MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)	SE										0	0	0	100	100	
		22BOPTMO32			0	0	0	4	0	0	1								
	9		BINOCULAR VISION ASSESSMENT	DE										0	0	0	100	100	
		22BOPT327R	CONTACT LENS ASSESSMENT		0	0	2	0	0	0	1					0			
	10	22BOPT329R	PROJECT WORK	PC	0	0	0	0	6	0	1			0	0	0	100	100	
	<b>Total</b>				<b>22</b>														<b>1200</b>
<b>Semester VII</b>	<b>S. N.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>							<b>Maximum Marks for</b>							
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PI*</b>	<b>PE*</b>	<b>Total</b>			
	1	22BOPT411 R	CLINICAL OBSERVATION I (HOSPITAL POSTING)	PC	0	0	36	0	0	0	18	0	0	0	0	100			
	2	22BOPT412 R	OPTOMETRY ETHICS	PC	2	0	0	0	0	0	2	0	0	0	0	100			
	<b>Total</b>				<b>20</b>											<b>200</b>			
<b>Semester VIII</b>	<b>S. N.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>							<b>Maximum Marks for</b>							
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PI*</b>	<b>PE*</b>	<b>Total</b>			
	1	22BOPT421 R	CLINICAL OBSERVATION II (HOSPITAL POSTING)	PC	0	0	36	0	0	0	18	0	0	0	0	100			
	2	22BOPT422 R	OCCUPATIONAL BEHAVIOURS OF OPTOMETRY	PC	2	0	0	0	0	0	2	0	0	0	0	100			
	<b>Total</b>				<b>20</b>											<b>200</b>			

**\*IA: Internal Assessment, SEE: Semester End Examination,  
PE: Practical Examination**

SEMESTER – I									
Course Title	ANATOMY I								
Course code	22BOPT111R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	3+2=5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To study the basic anatomical structure of human body</li> <li>To provide a comprehensive concept of all the anatomical systems of the human body</li> <li>Developing skills in anatomical terminology, anatomical imaging interpretation (e.g., from scans or diagrams), and effective anatomical concepts.</li> </ol>								
CO1	Basic knowledge on the structures of human body.								
CO2	Correlation & functions of different organ systems.								
CO3	Relationship of the organs with the circulating system.								
CO4	Application of anatomical knowledge with different diseases.								
CO5	Basic idea of micro anatomy.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	INTRODUCTION TO ANATOMICAL TERMS:  Organization of human body, Anatomical positions, axis and plans, common anatomical terminology.		10	Describe, illustrate and explain basic anatomy and functions.				1,2,3,4	
II	MUSCULO – SKELETAL SYSTEM-  Bones: Classification & types according to morphology & development structure and functions, description of bones of human body, blood supply of bones. Cartilage: Description. Joints: Definition, classification, structure and movements. Muscles: Types and structure of Muscles, name of the muscles of the body with some important muscles attachments.		16	Describe, illustrate and explain classifications, structures, functions and movements.				1,2,3,4	

<b>III</b>	THORAX-  Mediastinum – division and contents. Structure of heart and blood vessels. Circulation Full description of Respiratory tract and lungs. Para nasal sinuses.	18	Describe, illustrate and explain functions of blood	1,2, 3,4
<b>IV</b>	DIGESTIVE SYSTEM-  Structure of Gastro Intestinal tract and accessory organs of digestion.	18	Describe, illustrate and explain functions about digestive system	1,2, 3,4
<b>V</b>	TISSUE-  Classification and description of the basic tissues of the body. Histology: Epithelium, compact bone muscles, connective tissue, nervous tissue, artery, vein and lymphatic tissue.	4	Describe, illustrate and explain functions of tissues	1,2, 3,4
<b>Practical</b>	1. Study of anatomical planes and positions.	32	Describe, illustrate and explain functions anatomical planes	1,2, 3,4
	2. Study of Skelton and bones of human body. (Skull, Vertebrae, Ribs and bone of upper limb).	32	Describe, illustrate and explain functions of skeletons and bones	1,2, 3,4

### TEXT BOOKS:

T1. Text book of Histology, Practical guide:- J.P Gunasegar

### REFERENCE BOOKS:

R1: B.D. Chaurasia: Volume Upper limb & Thorax, Volume II- Lower limb, Abdomen & Pelvis Volume III- Head, Neck, Face

R2: Volume IV- Brain- Neuro-anatomy

R3: Vishram Singh Textbook of Anatomy Upper limb & Thorax Textbook of Anatomy Abdomen & Lower limb Textbook of Head, Neck and Brain

R4: Peter L. Williams And Roger Warwick:- Gray's Anatomy- Descriptive and Applied, 36<sup>th</sup> Ed; Churchill Livingstone.

R4: T.S. Ranganathan: Textbook of Human Anatomy

R5: Inderbir Singh, GPPal: Human Embryology

R6: Textbook of Histology, A practical guide :- J.P Gunasegar

## OTHER LEARNING RESOURCES:

<https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy-and-physiology>

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Basic knowledge on the structures of human body.	<b>1,6,8</b>
<b>2</b>	Correlation & functions of different organ systems.	<b>1,8</b>
<b>3</b>	Relationship of the organs with the circulating system.	<b>6,8</b>
<b>4</b>	Application of anatomical knowledge with different diseases.	<b>6,8</b>
<b>5</b>	Basic idea of micro anatomy.	<b>1,6,8</b>

SEMESTER – I									
Course Title	PHYSIOLOGY I								
Course code	22BOPT112R	Total credits: 3+2=5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	3+2=5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To provide concrete idea about the different physical system of human body</li> <li>To understand the mechanism that work to keep the human body alive and functioning</li> <li>Exploring the functions of major organ systems such as cardiovascular, respiratory, nervous, and endocrine systems, with a focus on how these systems interact and contribute to overall physiological balance.</li> </ol>								
CO1	To understand the function of the cell, tissue organs and organ system.								
CO2	To understand the importance of blood in transport, immunity and coagulation.								
CO3	To learn about the digestive system and its role ingestion, digestion absorption and egestion.								
CO4	To understand the relation between the heart and lungs in relation to transport of gas.								
CO5	To learn the interaction of various system of the human body and importance of maintaining homeostasis.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	GENERAL PHYSIOLOGY- <ul style="list-style-type: none"> <li>Organization of human body.</li> <li>Cell structure and organelle.</li> <li>Tissues and functions.</li> </ul>		5 hrs.	Describe, illustrate and explain about basic physiological units and hematological parameters				1,2,3,4	
II	BLOOD- <ul style="list-style-type: none"> <li>Blood volume and body fluids.</li> <li>Composition and functions of blood.</li> <li>Structure and formation and function of RBC, WBC and platelets.</li> <li>Hemoglobin.</li> <li>Plasma, blood coagulation.</li> <li>Blood groups.</li> </ul>		15 hrs.	Describe, illustrate and explain about basic hematological parameters				1,2,3,4	
III	<ul style="list-style-type: none"> <li>DIGESTIVE SYSTEM-</li> <li>General introduction, organizational plan of digestive system.</li> <li>Movement of G.I. Tract and functions of various components.</li> </ul>			Describe, illustrate extensive knowledge about Digestive System				1,2,3,4	



	<ul style="list-style-type: none"> <li>• Composition, functions and regulation of salivary, gastric, pancreatic, intestinal and ciliary secretion.</li> <li>• Functions of liver, gallbladder and pancreas.</li> <li>• Digestion and absorption of carbohydrate, protein and fat.</li> </ul>	10 hrs.		
<b>IV</b>	<b>RESPIRATORY SYSTEM:</b> <ul style="list-style-type: none"> <li>• General organization.</li> <li>• Mechanics of respiration.</li> <li>• Regulation of respiration.</li> <li>• Gaseous exchange in lung and tissues.</li> <li>• Pulmonary ventilation, volumes and capacities.</li> <li>• Effect of exercise on respiration, hypoxia.</li> </ul>	8 hrs.	Describe, illustrate understand and able to apply the knowledge of respiratory system in their real life situation	1,2,3,4
<b>V</b>	<b>CARDIOVASCULAR SYSTEM:</b> <ul style="list-style-type: none"> <li>• General organization, structure and properties of cardiac muscles.</li> <li>• Cardiac output, cardiac cycle, conducting system of heart.</li> <li>• Heart sounds, regulation of H.R., pulse, blood pressure and its regulation.</li> <li>• Systemic circulation, pulmonary circulation and coronary circulation.</li> <li>• ECG, cardio respiratory changes during exercise.</li> </ul>	10 hrs.	Describe, illustrate apply the knowledge of cardiovascular system in their real life situation	1,2,3,4

**TEXT BOOKS:**

T1. A book of Physiology, Dr.Khurana

**REFERENCE BOOKS:**

R1:Review of Medical Physiology – Ganong WilliamF.

R2:Physiological basis of Medical practice – Best &Taylor

**OTHER LEARNING RESOURCES:**

<https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy-and-physiology>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	To understand the function of the cell, tissue organs and organ system.	<b>1,6,8</b>
<b>2</b>	To understand the importance of blood in transport, immunity and coagulation.	<b>1,8</b>
<b>3</b>	To understand the relation between the heart and lungs in relation to transport of gas.	<b>6,8</b>
<b>4</b>	To learn about the digestive system and its role ingestion, digestion absorption and egestion.	<b>6,8</b>
<b>5</b>	To learn the interaction of various system of the human body and importance of maintaining homeostasis.	<b>1,6,8</b>

SEMESTER – I									
Course Title	BIOCHEMISTRY I								
Course code	22BOPT113R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3						3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. Understand structure, function, interrelationship of bio molecules.</li> <li>2. Integration of the various aspects of metabolism and their regulatory pathways.</li> <li>3. Illustrate balance diet</li> <li>4. Illustrate protein, carbohydrates, vitamins, minerals and eye.</li> </ol>								
CO1	To have a comprehensive knowledge of the metabolism of carbohydrates, protein, lipids, vitamins and minerals and their applied aspect.								
CO2	To have a comprehensive knowledge of the different enzymes of the body and their applied importance.								
CO3	To have overall concept of acid base system of the human body.								
CO4	Define the structure of DNA and RNA, including nucleotides, sugar-phosphate backbone, and nitrogenous bases.								
CO5	Define acids and bases, including their chemical properties								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	CARBOHYDRATES- <ol style="list-style-type: none"> <li>4. Definition and classification of carbohydrates.</li> <li>5. Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) and their sources.</li> <li>6. Biological significance of Carbohydrate.</li> </ol>		10hrs.	Describe, illustrate and explain about carbohydrate				1,2,3,4	
II	PROTEINS- <ul style="list-style-type: none"> <li>• Definition of Proteins along with the biological significance.</li> <li>• Amino acids and its classification. Essential and Non-essential amino acids.</li> </ul>		8hrs.	Describe, illustrate and explain about proteins				1,2,3,4	
III	LIPIDS- <ul style="list-style-type: none"> <li>• Definition and classification of lipids.</li> <li>• Classification of fatty acids.</li> </ul> Examples and functions of some common		8hrs.	Describe, illustrate about lipids				1,2,3,4	

	lipids (Phospholipids, Glycol-lipids, Steroids).			
<b>IV</b>	<p>NUCLEIC ACIDS-</p> <ul style="list-style-type: none"> <li>• Basic idea of the structure of DNA and RNA.</li> <li>• Function of DNA and RNA.</li> </ul>	8hrs.	Describe, illustrate about nucleic acids	1,2,3,4
<b>V</b>	<p>ACID-BASE BUFFERS</p> <ul style="list-style-type: none"> <li>• Basic idea of acids, bases, Ph,buffer.</li> <li>• Acid base balance.</li> </ul>	8 hrs.	Describe, illustrate about acid base buffers	1,2,3,4

#### **TEXT BOOKS:**

T1. Text book of Medical Biochemistry By Chatterjee and Shinde

T2. Text of Medical Laboratory Technology By Prafula Godkar

T3. Text book of Biochemistry by Dr. D.M.Vasudevan, Sreekumari S., Jaypee Publishers, New Delhi.

#### **REFERENCE BOOKS:**

R1: Biochemistry by V. Satyanarayan, Books and Allied Pvt. Ltd. Calcutt

#### **OTHER LEARNING RESOURCES:**

<https://www.khanacademy.org/science/biology/human-biology>

<https://open.oregonstate.education/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	To have a comprehensive knowledge of the metabolism of carbohydrates, protein, lipids, vitamins and minerals and their applied aspect	<b>1,6,8</b>
<b>2</b>	To have a comprehensive knowledge of the different enzymes of the body and their applied importance.	<b>1,8</b>
<b>3</b>	To have overall concept of acid base system of the human body.	<b>6,8</b>
<b>4</b>	Define the structure of DNA and RNA, including nucleotides, sugar-phosphate backbone, and nitrogenous bases.	<b>6,8</b>
<b>5</b>	Define acids and bases, including their chemical properties	<b>1,6,8</b>

SEMESTER – I									
Course Title	GEOMETRICAL OPTICS								
Course code	22BOPT114R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 30T+30P	2	0	2	0	0	0	2+1=3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To acquire skills allowing the student to identify and apply formulas of optics and wave physics using course literature.</li> <li>Apply geometric optics principles to analyze and solve practical problems encountered in clinical optometry practice, such as lens design, aberrations, and vision correction.</li> <li>Understand and effectively use various optical instruments, such as lenses, mirrors, and refractometers, to assess and correct visual abnormalities.</li> </ol>								
CO1	To predict the basic properties of the images formed on the retina by the optics of the eye.								
CO2	Gain proficiency in calculating the focal lengths of concave and convex spherical mirrors using geometric optics principles, including understanding the sign conventions.								
CO3	Knowledge of spherical lenses to practical applications in optics, such as in the design and optimization of corrective lenses, microscopes, and other optical instruments.								
CO4	Demonstrate a thorough understanding of the laws of refraction, particularly as applied to prisms, including Snell's law and its implications for different wavelengths of light.								
CO5	Gain proficiency in calculating and interpreting optical parameters such as magnification, resolution, field of view, and depth of focus for different types of optical instruments.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Ray Optics- 7. Definition and concept of light, reflection of light, regular and diffused reflections, reflection on plane surfaces, laws of reflection, image 8. Formation in reflection.	6 hrs	Describe, illustrate and explain about ray of light				1,2,3,4		
II	Reflection on spherical surfaces- • Spherical mirrors, image formation in spherical mirrors, concept of real and virtual image, sign conventions, mirror equation. • Refraction of light, refraction through plane surfaces, laws of refraction, refractive index, image formation, in refraction, total internal reflection,	6hrs	Describe, illustrate and explain about reflection of light				1,2,3,4		

	formation of mirage and looming			
<b>III</b>	Refraction through spherical surfaces lenses- <ul style="list-style-type: none"> <li>Different types of convex and concave lenses, image formation in lenses, sign convention, lens equation magnification of lens power.</li> </ul>	8 hrs.	Describe, illustrate about refraction of light.	1,2,3,4
<b>IV</b>	Refraction and dispersion of light through prism- <ul style="list-style-type: none"> <li>Angular dispersion, dispersive power, dispersion without deviation and deviation without dispersion, achromatic prism and lenses, prism dioptic, chromatic aberrations, spherical aberration, coma, astigmatism, distortion and its limitation.</li> </ul>	6 hrs.	Describe, illustrate about refraction of light.	1,2,3,4
<b>V</b>	Optical instruments and Photometry- <ul style="list-style-type: none"> <li>Human eye, defects of vision and corrections.</li> <li>Spectrometer, microscopes, magnifying power of simple and compound microscopes, telescopes, resolving power of optical instruments.</li> <li>Fiber optics, introduction and uses, general application in ophthalmic and optical field.</li> </ul> Photometry: <ul style="list-style-type: none"> <li>Basic concepts and definitions in photometry, inverse square law.</li> <li>Bunsen's grease spot photometer, lummer-brodhun photometer, reflection co-efficient transmission co-efficient, power transmitted.</li> </ul>	8 hrs.	Describe, illustrate about optical instruments of light	1,2,3,4
<b>PRACTICAL</b>				
<b>UNIT 1</b>	To determine the focal length of a focal mirror by UV method using optical bench	6	Describe, illustrate about optical instruments	1,2,3,4,5
<b>UNIT 2</b>	To determine the focal length of a convex lens by displacement method and hence determine the power of a lens	6	Describe, illustrate, understand power of lens.	1,2,3,4,5
<b>UNIT 3</b>	To determine the focal length and power of a concave lens by auxiliary lens method	6	Describe, illustrate about auxillary lens method	1,2,3,4,5

<b>UNIT 4</b>	To determine the refractive index (RI) of a glass slab using travelling microscope	6	Describe, illustrate and understand refractive index	1,2,3,4,5
<b>UNIT 5</b>	Determination of refractive index (RI) of a liquid by using a plane mirror and a convex lens.	8	Describe, illustrate and understand refractive index	1,2,3,4,5

### TEXT BOOKS:

T1. Theory and Practice of Optics and Refraction by AK Khurana.

T2. Optics for Optometry students by PC Mukherjee.

T3. Optics (fifth edition) by Eugene Hecht & A.R. Ganesan

### REFERENCE BOOKS:

R1:A textbook of optics by Dr. N Subrahmanyam & Brij Lal

### OTHER LEARNING RESOURCES:

1. <https://www.sciencedirect.com/topics/physics-and-astronomy/geometrical-optics>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	To predict the basic properties of the images formed on the retina by the optics of the eye.	1,4,8
2	Students will gain proficiency in calculating the focal lengths of concave and convex spherical mirrors using geometric optics principles, including understanding the sign conventions.	1,8
3	Students will apply their knowledge of spherical lenses to practical applications in optics, such as in the design and optimization of corrective lenses, microscopes, and other optical instruments.	4,8
4	Students will demonstrate a thorough understanding of the laws of refraction, particularly as applied to prisms, including Snell's law and its implications for different wavelengths of light.	1,8
5	Students will gain proficiency in calculating and interpreting optical parameters such as magnification, resolution, field of view, and depth of focus for different types of optical instruments.	4,8



SEMESTER – I									
Course Title	BASIC INSTRUMENTATION								
Course code	22BOPT115R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours:	0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. Develop workforce with expertise knowledge in the field of Ophthalmic, basic general medical and anaesthesia equipments used in the practice of Optometry, to serve various Eye-care Organizations in and around India.</li> <li>2. Integrate theoretical knowledge with practical application to enhance diagnostic abilities and clinical decision-making in optometric practice.</li> <li>3. Gain a comprehensive understanding of basic optical principles</li> </ol>								
CO1	Identify various ophthalmic instruments.								
CO2	Knowing the Parts and its uses.								
CO3	Principles and applications of instruments.								
CO4	Students should understand the physical principles underlying geometrical optics,								
CO5	Students should understand the relationship between rays, wave fronts and electromagnetic waves.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>TRIAL BOX-</b> <ul style="list-style-type: none"> <li>• Identification of the spherical and cylindrical lenses &amp; its movements.</li> <li>• Uses of various accessories.</li> <li>• Different trial frame designs and its compartments.</li> </ul> Identification of prisms		2hrs.	Learn about the trial box.				1,2,3,4,5	
II	<b>VISION CHARTS-</b> <ul style="list-style-type: none"> <li>• Components of Snellen chart (distance &amp; near).</li> <li>• Procedures of Snellen chart (distance &amp; near).</li> <li>• Interpretation of Snellen chart (distance &amp; near).</li> </ul>		2hrs.	Learn about the vision charts.				1,2,3,4,5	
III	<b>RETINOSCOPE -</b> <ul style="list-style-type: none"> <li>• Principle</li> <li>• Identification of Parts</li> <li>• Uses</li> </ul>			Learn about the retinoscope.				1,2,3,4,5	

	Procedure	2hrs.		
<b>IV</b>	OPHTHALMOSCOPE - <ul style="list-style-type: none"> <li>● Principle</li> <li>● Identification of Parts</li> <li>● Uses</li> </ul> Procedure	2hrs.	Learn about ophthalmoscope.	1,2, 3,4, 5
<b>V</b>	LENSOMETER - <ul style="list-style-type: none"> <li>● Principle</li> <li>● Identification of Parts</li> <li>● Uses</li> </ul>	2 hrs.	Learn about the Lensometer.	1,2, 3,4, 5

**TEXT BOOKS:**

T1. Optics and Refraction by A.K. KHURANA.

**REFERENCE BOOKS:**

R1: Optics for Optometry Students by P.C Mukherjee

**OTHER LEARNING RESOURCES:**

<https://depisteo.com/blog/optical-tools-required-practice/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Identify various ophthalmic instruments.	<b>2,4,5,8</b>
<b>2</b>	Knowing the Parts and its uses.	<b>2,4</b>
<b>3</b>	Principles and applications of instruments.	<b>4,5</b>
<b>4</b>	Students should understand the physical principles underlying geometrical optics,	<b>5,8</b>
<b>5</b>	Students should understand the relationship between rays, wave fronts and electromagnetic waves.	<b>2,4,5,8</b>

SEMESTER – I									
<b>Course Title</b>	BASIC ENGLISH (COMMUNICATIVE ENGLISH & SOFTSKILLS)								
<b>Course code</b>	22UBPD111R	Total credits: 2 Total hours: 60P	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
<b>Pre-requisite</b>	Nil	Co-requisite	Nil						
<b>Programme</b>	Bachelor of Optometry								
<b>Semester</b>	I semester of first year of the programme								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>To introduce the students to the basics of English grammar and their application.</li> <li>To enhance communication skills through listening and speaking exercises.</li> <li>To learn and understand the importance of pronunciation of words.</li> </ol>								
<b>CO1</b>	The application of grammatical rules will enable the students to improve the speaking and writing skills.								
<b>CO2</b>	It enables the learners to use the language effectively.								
<b>CO3</b>	It will strength both listening and speaking skills.								
<b>CO4</b>	It will strengthen their vocabulary and use of words.								
<b>CO5</b>	It will give an introduction on the concept of communication, its importance and barriers.								
<b>Unit- No.</b>	<b>Content</b>			<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>
<b>I</b>	Grammar <ul style="list-style-type: none"> <li>Parts of Speech</li> <li>Articles</li> <li>Affirmative and Negative Sentences</li> </ul>			6 hrs	Describe, illustrate about how to write speech, articles etc.				1,2, 3,4, 5
<b>II</b>	Grammar <ul style="list-style-type: none"> <li>Determiners</li> <li>Sentence Construction from jumbled words</li> <li>Types of Sentences (Assertive, Imperative etc.)</li> </ul>			6hrs	Describe, illustrate about how to write the sentence				1,2, 3,4, 5
<b>III</b>	Building Vocabulary <ul style="list-style-type: none"> <li>Synonyms</li> <li>Antonyms</li> </ul>			8 hrs.	Describe, illustrate about how to change the word.				1,2, 3,4, 5

<b>IV</b>	Speaking Skills <ul style="list-style-type: none"> <li>● Introduction and greetings</li> <li>● Pronunciation</li> <li>● Asking and offering in formation</li> <li>● Video Recording for self-analysis</li> </ul>	6 hrs.	Describe, illustrate about how to speaking.	1,2, 3,4, 5
<b>V</b>	Communication Skills <ul style="list-style-type: none"> <li>● Introduction to Communication,</li> <li>● Importance of Communication Skills,</li> <li>● Purpose of Communication,</li> <li>● Types of Communication,</li> <li>● Barriers to Communication,</li> </ul>	8 hrs.	Describe, illustrate about how to communicate	1,2, 3,4, 5

**TEXT BOOKS:**

T1. Wren& Martin (2017) *High School English Grammar and Composition* S.Chand Publishing.

T2. Pal, Rajendra. Suri, Premlata (2022) *English Grammar& Composition*. Sultan.

T3. Debnath Adhir (2018) *A Textbook of English Grammar and Composition*. Bina Library

**REFERENCE BOOKS:**

R1: Mitra Barun (2016) *Personality Development and Soft Skills2/ E*, Oxford University Press

R2: Murphy Raymond, (2012) *English Grammar in Use Book with Answers A Self-Study and Practice Book for Intermediate Learners of English*, Cambridge University Press

**OTHER LEARNING RESOURCES:**

<https://youtu.be/53SIKuCuHv0>

[https://youtu.be/Ljjiw9mC\\_Cg](https://youtu.be/Ljjiw9mC_Cg)

<https://youtu.be/xQfYiHbAjJo>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The application of grammatical rules will enable the students to improve the speaking and writing skills.	<b>5,7,8</b>
<b>2</b>	It enables the learners to use the language effectively.	<b>5,7,8</b>
<b>3</b>	It will strength both listening and speaking skills.	<b>5,7,8</b>
<b>4</b>	It will strengthen their vocabulary and use of words.	<b>5,7,8</b>
<b>5</b>	It will give an introduction on the concept of communication, its importance and barriers.	<b>5,7,8</b>

SEMESTER – I									
Course Title	EXTRA-CURRICULAR								
Course code	22UBEC111	Total credits: 1 Total hours: 15P	L	T	P	S	R	O/F	C
			0	0	0	1	0	0	1
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	I semester of first year of the programme								
Course Objectives	It is to develop the social and soft skills and to promote a holistic development of the learners								
CO	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to learn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.								
Content									
AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.									

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1*</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BOPT111R</b>	<b>ANATOMY I</b>	3					1		2
<b>22BOPT112R</b>	<b>PHYSIOLOGY I</b>	3					1		2
<b>22BOPT113R</b>	<b>BIOCHEMISTRY I</b>	3					1		1
<b>22BOPT114R</b>	<b>GEOMETRICAL OPTICS</b>	3			1				1
<b>22UBPD111R</b>	<b>BASIC ENGLISH (COMMUNICATIVE ENGLISH &amp; SOFT SKILLS)</b>					3		2	2
<b>22UBEC111</b>	<b>EXTRA CURRICULAR ACTIVITIES</b>					3		2	2
<b>22BOPT115R</b>	<b>BASIC INSTRUMENTATION</b>		2		3		1		1



SEMESTER – II									
Course Title	ANATOMY II								
Course code	22BOPT121R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 45T+60P	3	0	4	0	0	0	5
Pre-requisite	COMPULSORY	Co-requisite	ANATOMY I						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To provide a comprehensive concept of all the anatomically systems of the human body</li> <li>Explain the functional relationships between the structures of the urinary system, reproductive system, pelvis, nervous system, sensory organs, and lymphatic system, emphasizing their roles in maintaining homeostasis and overall health.</li> <li>Analyze clinical scenarios and apply knowledge of the urinary system, reproductive system, pelvis, nervous system, sensory organs, and lymphatic system to predict outcomes, diagnose disorders, and propose appropriate treatment or management strategies.</li> </ol>								
<b>CO1</b>	Understand the structure and function of urinary system								
<b>CO2</b>	Understand the structures of male and female reproductive organs and describe the general anatomy of pelvic organs								
<b>CO3</b>	Classify the nervous system components, including the central nervous system (brain and spinal cord) with an understanding of their blood supply, and differentiate between spinal nerves, cranial nerves, and the autonomic nervous system								
<b>CO4</b>	Identify and describe the structure and function of sensory organs including skin, eye, ear, nose, and tongue.								
<b>CO5</b>	Explain the structure and function of lymphatic vessels, lymph, lymph nodes, and spleen in the human body.								
Unit-No.	Content	Cont act Hour	Learning Outcome				K L		
I	URINARY SYSTEM- Structure of kidney, ureter, urinary bladder, male and female urethra.	7	Describe, illustrate and explain structures and functions of urinary system.				1, 2		
II	REPRODUCTIVE SYSTEM- <ul style="list-style-type: none"> <li>Structure of male and female reproductive organs.</li> <li>Structure of breast.</li> </ul> PELVIS: General description of pelvic organs.	8	Describe, illustrate and explain structures and functions of reproductive system.				1, 2		
III	NERVOUS SYSTEM- <ul style="list-style-type: none"> <li>Classification of Nervous system.</li> <li>Central Nervous system –Brain and Spinal cord, blood supply of brain.</li> <li>Spinal nerves and Cranial nerves.</li> </ul> Autonomic nervous System.	18	Describe, illustrate and explain nervous system, its classification.				1, 2		
IV	SENSORY ORGAN-		Describe, illustrate and explain the sensory				1, 2		

	Skin, Eye, Ear, Nose, Tongue.	11	organ and its functions.	
V	LYMPHATIC SYSTEM- Lymphatic vessels and lymph, lymph nodes, spleen.	4	Describe, illustrate and explain the lymphatic	1, 2
Practical	3. Study of bones of human body (Pelvic ones and bones of lower limb) 4. • Study of organs: Brain, heart, lung, liver, kidney, spleen.	30	Describe, illustrate and explain the bones of human body and organs.	1, 2, 3, 4

### TEXT BOOKS:

T1: Text book of Histology, Practical guide:-J.P Gunasegar

### REFERENCE BOOKS:

R1:B.D.Chaurasia:VolumeUpperlimb&Thorax,VolumeII-Lowerlimb,Abdomen&PelvisVolumeIII-Head,Neck,Face

R2:VolumeIV-Brain-Neuro-anatomy

R3:VishramSingh:TextbookofAnatomyUpperlimb&ThoraxTextbookofAnatomyAbdomen&LowerlimbTextbookofHeadneckandBrain

R4:PeterL.Williams And Roger Warwick:- Gray's Anatomy - DescriptiveandApplied,36thEd;ChurchillLivingstone.

R5:T.S.Ranganathan:TextbookofHumanAnatomy

R6:Inderbirsingh,GPPal:HumanEmbryology

R7:TextbookofHistology,Apracticalguide:-J.PGunasegar

### OTHER LEARNING RESOURCES:

<https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy-and-physiology>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the structure and function of urinary system	<b>1,6,8</b>
<b>2</b>	Understand the structures of male and female reproductive organs and describe the general anatomy of pelvic organs	<b>1,8</b>
<b>3</b>	Classify the nervous system components, including the central nervous system (brain and spinal cord) with an understanding of their blood supply, and differentiate between spinal nerves, cranial nerves, and the autonomic nervous system	<b>6,8</b>
<b>4</b>	Identify and describe the structure and function of sensory organs including skin, eye, ear, nose, and tongue.	<b>6,8</b>
<b>5</b>	Explain the structure and function of lymphatic vessels, lymph, lymph nodes, and spleen in the human body.	<b>1,6,8</b>

SEMESTER – II									
Course Title	PHYSIOLOGY II								
Course code	22BOPT122R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	PHYSIOLOGY I						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To provide concrete idea about the different physical system of human body</li> <li>To understand the underlined mechanism that work to keep the human body alive and functioning</li> <li>Understand the working mechanism of brain, spinal cords and nerves.</li> </ol>								
CO1	Demonstrate comprehensive knowledge of the structure, hormones, functions, and regulatory mechanisms of the endocrine glands including the pituitary, thyroid, parathyroid, pancreas, adrenal glands, testes, and ovaries.								
CO2	Apply knowledge of the structure, functions, and urine formation processes of the excretory system, including renal function tests, to evaluate and analyze renal health and function.								
CO3	Analyze the anatomical structures and physiological processes of the male and female reproductive systems, and the role of the placenta and placental circulation in fetal development.								
CO4	Demonstrate comprehensive understanding of the organization and functions of the nervous system and muscles, including sensory and motor pathways, reflex mechanisms, and the roles of special senses in sensory perception and integration.								
CO5	Analyze the structure, function, and interplay of lymphatic and immunological systems, including lymph glands, circulation of lymph, spleen function, and the processes involved in immune response								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	ENDOCRINE SYSTEM-		10	Describe, illustrate and explain the structure, functions and hormones of endocrine glands.				1,2	
	<ul style="list-style-type: none"> <li>Structure and hormones of endocrine glands, pituitary, thyroid, parathyroid, Pancreas, Adrenal, testes and ovary.</li> </ul> Functions and regulation of secretion of hormones.								
II	EXCRETORY SYSTEM-		6	Describe, illustrate and explain excretory system				1,2	
	<ul style="list-style-type: none"> <li>Structure and functions of kidneys, nephron, ureter, urinary bladder and urethra.</li> <li>Urine formation.</li> </ul> Renal function tests.								
III	REPRODUCTIVE SYSTEM-		6	Describe, illustrate and explain reproductive system				1,2	
	<ul style="list-style-type: none"> <li>Male and female reproductive organs and changes during puberty.</li> </ul>								

	<ul style="list-style-type: none"> <li>Menstrual cycle, ovulation.</li> </ul> Physiological changes during pregnancy, Placenta and placental circulation.			
<b>IV</b>	<b>NERVOUS SYSTEM AND MUSCLE-</b> <ul style="list-style-type: none"> <li>Organization of nervous system. Structure and function of muscle and nerve cells.</li> <li>Functions of brain, Spinal cord, cranial and spinal nerves</li> <li>Motor system.</li> <li>Sensory system.</li> <li>ANS</li> <li>Synapse, neuromuscular transmission reflex arc, reflex action and reflexes</li> <li>Spinal Cord and Cerebra spinal fluid</li> </ul> <b>SPECIAL SENSES:</b> Functions of skin, eye, ear, nose, tongue	<b>21</b>	Describe, illustrate and explain the structure, functions of nervous system and muscle.	1,2
<b>V</b>	<b>LYMPHATIC AND IMMUNOLOGICAL SYSTEM:</b> <ul style="list-style-type: none"> <li>Lymph glands and circulation of lymph</li> <li>Spleen structure and function</li> </ul> Immunity –Formation of T- cells and B- cells, Antigen, Antibody and Immune response.	<b>5</b>	Describe, illustrate and explain the lymphatic and immunological system.	1,2
<b>Practical</b>	<ol style="list-style-type: none"> <li>Blood Group</li> <li>ESR</li> <li>DLC</li> <li>Total count of RBC and WBC ( Demonstration)</li> </ol>	<b>64</b>	Describe, illustrate and explain and blood group.	1,2, 3,4

**TEXT BOOKS:**

T1: A book of Physiology, Dr.Khurana

T2: A book of Physiology, Dr.Khurana

**REFERENCE BOOKS:**

R1: Review of Medical Physiology – Ganong William F.

R2: Physiological basis of Medical practice – Best & Taylor

**OTHER LEARNING RESOURCES:**

<https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy-and-physiology>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate comprehensive knowledge of the structure, hormones, functions, and regulatory mechanisms of the endocrine glands including the pituitary, thyroid, parathyroid, pancreas, adrenal glands, testes, and ovaries.	<b>1,6,8</b>
<b>2</b>	Apply knowledge of the structure, functions, and urine formation processes of the excretory system, including renal function tests, to evaluate and analyze renal health and function.	<b>1,8</b>
<b>3</b>	Analyze the anatomical structures and physiological processes of the male and female reproductive systems, and the role of the placenta and placental circulation in fetal development.	<b>6,8</b>
<b>4</b>	Demonstrate comprehensive understanding of the organization and functions of the nervous system and muscles, including sensory and motor pathways, reflex mechanisms, and the roles of special senses in sensory perception and integration.	<b>6,8</b>
<b>5</b>	Analyze the structure, function, and interplay of lymphatic and immunological systems, including lymph glands, circulation of lymph, spleen function, and the processes involved in immune response	<b>1,6,8</b>

SEMESTER – II									
Course Title	BIOCHEMISTRY II								
Course code	22BOPT123R	Total credits: 4 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Compulsory	Co-requisite	Biochemistry I						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	1. Demonstrate knowledge and understanding of the molecular machinery of living cells. 2. Demonstrate knowledge and understanding of the principles that govern the structures of macromolecules and their participation in molecular recognition. 3. Acquire the knowledge on Protein, carbohydrates, vitamins, minerals and eye								
CO1	Explain the definition, classification, mechanisms of action, and factors influencing enzyme activity, demonstrating understanding through application and analysis in biological systems.								
CO2	Apply knowledge of carbohydrate metabolism pathways to analyze and predict metabolic outcomes in different physiological conditions.								
CO3	Evaluate the processes of transamination, deamination, and the urea cycle, emphasizing their roles and significance in protein metabolism,								
CO4	Analyze the processes of $\beta$ -oxidation of fatty acids, ketone body formation, and differentiate between ketosis and ketoacidosis.								
CO5	Evaluate the classification, sources, functions, deficiencies of vitamins and minerals, and analyze their roles in human health and metabolism through application and synthesis using Bloom's taxonomy.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>ENZYMES-</b> <ul style="list-style-type: none"> <li>• Definition and classification of enzyme.</li> <li>• Basic idea of co-enzyme, so-enzyme.</li> <li>• Mechanism of enzyme action.</li> </ul> Factors affecting enzyme action	10	Describe, illustrate and explain cell classification & mechanism of enzymes.				1,2		
II	<b>CARBOHYDRATES METABOLISM-</b> <ul style="list-style-type: none"> <li>• Glycol sis</li> <li>• Kreb'scycle</li> <li>• Glyconeogenesis</li> <li>• Glcogenesis</li> </ul> Glcogenolysis	10	Describe, illustrate and explain carbohydrates metabolism.				1,2		
III	<b>PROTEIN METABOLISM-</b> <ul style="list-style-type: none"> <li>• Transamination</li> <li>• Deamination</li> </ul> Urea cycle and its significance	8	Describe, illustrate and explain protein metabolism				1,2		

<b>IV</b>	<b>LIPID METABOLISM-</b> <ul style="list-style-type: none"> <li>• <math>\beta</math> oxidation of fattyacids.</li> <li>• Ketone bodies</li> </ul> Ketosis andketoacidosis	10	Describe, illustrate and explain the lipid metabolism	1,2
<b>V</b>	<b>VITAMINS AND MINERALS</b> <ul style="list-style-type: none"> <li>• Definition and classification of vitamins according to solubility.</li> <li>• Sources and functions of individual vitamins.</li> <li>• Deficiency.</li> </ul> Individual minerals (calcium, phosphorus, iron, magnesium fluslide, copper, selenium, molybdenum etc) – their sources, function and properties.	<b>10</b>	Describe, illustrate and explain the classifications of vitamins and minerals	1,2

### TEXT BOOKS:

T1: Text book of biochemistry by dr. D.m.vasudevan, sreekumari s., jaypee publishers, new delhi.

### REFERENCE BOOKS:

R1:Text book of biochemistry by dr. D.m.vasudevan, sreekumari s., jaypee publishers, new delhi.

R2: Biochemistry by v. Satyanarayan, books and allied pvt. Ltd. Calcutta

R3: Text book of medical biochemistry by chatterjee and shinde

R4: Text of medical laboratory technology byprafulagodkar.r2:volumeiv-brain-neuro-anatomy

### OTHER LEARNING RESOURCES:

<https://www.britannica.com/science/biochemistry>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Explain the definition, classification, mechanisms of action, and factors influencing enzyme activity, demonstrating understanding through application and analysis in biological	<b>1,6,8</b>



	systems.	
<b>2</b>	Apply knowledge of carbohydrate metabolism pathways to analyze and predict metabolic outcomes in different physiological conditions.	<b>1,8</b>
<b>3</b>	Evaluate the processes of transamination, deamination, and the urea cycle, emphasizing their roles and significance in protein metabolism,	<b>6,8</b>
<b>4</b>	Analyze the processes of $\beta$ -oxidation of fatty acids, ketone body formation, and differentiate between ketosis and ketoacidosis.	<b>6,8</b>
<b>5</b>	Evaluate the classification, sources, functions, deficiencies of vitamins and minerals, and analyze their roles in human health and metabolism through application and synthesis using Bloom's taxonomy.	<b>1,6,8</b>

SEMESTER – II									
Course Title	PHYSICAL OPTICS								
Course code	22BOPT124R	Total credits: 3 Total hours: 30T+30P	L	T	P	S	R	O/F	C
			2	0	2	0	0	0	3
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To acquire skills allowing the student to identify and apply formulas of optics and wave physics using course literature.</li> <li>Acquire knowledge on the principles of scattering phenomena, their applications and spectrum characteristics.</li> <li>Demonstrate the knowledge of polarization and its principles.</li> </ol>								
CO1	Evaluate various theories of light, including Newton's corpuscular theory, Huygens's wave theory, Planck's quantum theory, and the electromagnetic wave theory.								
CO2	Demonstrate knowledge of interference phenomena, to determine light wavelength, through application and evaluation in optical experiments.								
CO3	Analyze diffraction phenomena, distinguishing between interference and diffraction through evaluation and synthesis in optical experiments.								
CO4	Evaluate the concepts of polarization, the principles of the plane of polarization and vibrations, and Brewster's law.								
CO5	Evaluate the principles of scattering phenomena, their applications and spectrum characteristics.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>VARIOUS THEORIES OF LIGHT AND THEIR SHORTCOMINGS-</b> Newton's corpuscular theory, Huygens's wave theory, plane's quantum theory, electromagnetic wave theory etc, dual nature of light. Shm and its mathematical representation, ray and wave velocity		6	Describe, illustrate and explain various theories of light and their shortcomings				1,2	
II	<b>INTERFERENCE:</b> Definition and interpretation of interference, young's double slit experiment, coherent sources, interference in thin films, and color in thin films. Fresnel's biprism and Newton's ring method to determine the wavelength of light.		6	Describe, illustrate and explain Definition and interpretation of interference				1,2,3	
III	<b>DIFFRACTION:</b> Definition and interpretation of diffraction, Fresnel and Fraunhofer's types of diffraction, diffraction at single slit, diffraction gratings, distinction between interference and diffraction.		6	Describe, illustrate and explain Definition and interpretation of diffraction				1,2,4	

<b>IV</b>	<b>POLARISATION:</b> Definition and interpretation, pictorial representation of polarized light, light as transverse waves from polarization, plane of polarization and plane of vibrations, Brewster's law.	8	Describe, illustrate and explain the definition and interpretation of polarisation.	1,2
<b>V</b>	<b>SCATTERING AND SPECTRUM-</b> Definition and interpretation of the phenomenon, example like blue colour of the sky, Rayleigh's scattering, Raman scattering, Stokes and anti Stokes lines Spectrum: Definition of spectrum, pure and impure spectra, emission and absorption spectra, classifications, visible, ultraviolet (uv) and infrared (ir) spectrum, electromagnetic spectrum.	6	Describe, illustrate and explain the definition and interpretation of scattering and spectrum.	1,2
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of monochromatic light by using Fresnel's biprism</li> <li>4. To determine the radius of curvature of a plano-convex lens by Newton's ring method.</li> <li>5. To draw the curve of a prism with the help of a spectrometer and hence determine the refractive index of the material of the prism.</li> <li>6. To measure the width of a narrow slit by producing diffraction bands with a light source of known wavelength</li> <li>7. To determine the wavelength of a monochromatic light by producing diffraction bands using a diffraction grating.</li> </ol>	6 6 8 6 6	Describe, illustrate and explain the wavelengths	

### TEXT BOOKS:

T1: Theory and Practice of Optics and Refraction by AK Khurana.

T2: Optics for Optometry students by PC Mukherjee.

### REFERENCE BOOKS:

R1: Optics (fifth edition) by Eugene Hecht & A.R. Ganesan

**OTHER LEARNING RESOURCES:**

<https://www.sciencedirect.com/topics/physics-and-astronomy/geometrical-optics>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Evaluate various theories of light, including Newton's corpuscular theory, Huygens's wave theory, Planck's quantum theory, and the electromagnetic wave theory.	<b>1,4,8</b>
<b>2</b>	Demonstrate knowledge of interference phenomena, to determine light wavelength, through application and evaluation in optical experiments.	<b>1,8</b>
<b>3</b>	Analyze diffraction phenomena, distinguishing between interference and diffraction through evaluation and synthesis in optical experiments.	<b>4,8</b>
<b>4</b>	Evaluate the concepts of polarization, the principles of the plane of polarization and vibrations, and Brewster's law.	<b>1,8</b>
<b>5</b>	Evaluate the principles of scattering phenomena, their applications and spectrum characteristics.	<b>4,8</b>

SEMESTER – II									
Course Title	VISUAL OPTICS I								
Course code	22BOPT125R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	<p>1. This course builds on knowledge and skills gained in the geometric and physical optics to the optical characteristics of the human eye in relation to visual performance including errors of refraction and measurement and corrections using fundamental principles of light and optics.</p> <p>2. Acquire skills in measuring eye properties, including corneal curvature, refractive index, and thickness, using techniques such as keratometry and pachometry, and understand the schematic and reduced eye models.</p> <p>3. Develop the ability to identify and understand different types of refractive errors as well as explore mechanisms of accommodation and related measurements.</p>								
CO1	Demonstrate comprehensive understanding of the anatomy, physiology, and optical principles of the eye, through analysis and application in ocular optics and vision science.								
CO2	Apply knowledge of ocular measurements including schematic and reduced eyes, corneal properties and techniques like keratometry and pachymetry to analyze and assess ocular health and optics.								
CO3	Evaluate optical defects of the eye, including aberrations, depth of focus, diffraction, and resolving power, through analysis and application of principles related to optical and visual axes.								
CO4	Analyze different types of refractive errors, including their management strategies and effects on near vision and accommodation.								
CO5	Evaluate the mechanism, theories, and measurement of accommodation including Schiener disc experiment, modern lens changes, amplitude of accommodation, and depth of field.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>INTRODUCTION OF EYE-</b> <ul style="list-style-type: none"> <li>• Basic anatomy and physiology of cornea.</li> <li>• Basic anatomy and physiology of crystalline lens.</li> <li>• Basic anatomy and physiology of retina.</li> <li>• Optics of ocular structure of cornea, aqueous,</li> <li>• Crystalline lens and vitreous.</li> <li>• Optics of eye</li> </ul> <b>Purkinje's disc</b>	6	Describe, illustrate and explain basic anatomy and physiology of eye.					1,2	

II	<b>MEASUREMENT OF EYE-</b> <ul style="list-style-type: none"> <li>• Schematic and reduced eyes and their properties.</li> <li>• Corneal curvature, refractive index and thickness.</li> <li>• Keratometry and pachometry.</li> </ul> <b>Indices of aqueous and vitreous.</b>	6	Describe, illustrate and explain the measurement of eye	1,2
III	<b>OPTICAL DEFECTS OF THE EYE-</b> <ul style="list-style-type: none"> <li>• Optical axis, visual axis (angle alpha, fixation axis, angle gamma).</li> <li>• Aberration of the optical system of eye.</li> <li>• Depth of focus.</li> </ul> <b>Diffraction &amp; resolving power.</b>	6	Describe, illustrate and explain optical defects of eye	1,2
IV	<b>DIFFERENT TYPES OF REFRACTIVE ERROR-</b> <ul style="list-style-type: none"> <li>• Emmetropia, myopia, hyperopia, astigmatism and presbyopia.</li> <li>• Near vision addition.</li> <li>• Estimate of addition, unequal near vision addition.</li> </ul> <b>Effect of changing the spectacle distance of hypermetropia and accommodation.</b>	6	Describe, illustrate and explain the different types of refractive error.	1,2
V	<b>ACCOMMODATION-</b> <ul style="list-style-type: none"> <li>• Possible mechanism of accommodation.</li> <li>• Schiener disc experiment.</li> <li>• Theories of accommodation.</li> <li>• Modern theory- changes in the lens during accommodation.</li> <li>• The amplitude of accommodation.</li> <li>• The measurement of the amplitude of accommodation.</li> <li>• Depth of field.</li> <li>• Amplitude of accommodation versus age.</li> </ul>	8	Describe, illustrate and explain the theories of accommodation.	1,2

**TEXT BOOKS:**

T1: Borish's clinical refraction – i.M. Borish, w.J. Benjamin – w.B. Saunders co

## REFERENCE BOOKS:

R1: Borish's clinical refraction – i.M. Borish, w.J. Benjamin – w.B. Saunders co.

R2: Primary care optometry – theodore – butterworth-heinemann.

R3: Clinical procedures in optometry – eskridge, amos, bartlett. -j. B. Lippincott co.

R4: The ocular examination : measurement and findings – karlazadmik

## OTHER LEARNING RESOURCES:

<https://www.studocu.com/en-za/document/university-of-limpopo/visual-optics/visual-optics-notes/5572439>

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate comprehensive understanding of the anatomy, physiology, and optical principles of the eye, through analysis and application in ocular optics and vision science.	1,4,5,8
2	Apply knowledge of ocular measurements including schematic and reduced eyes, corneal properties and techniques like keratometry and pachymetry to analyze and assess ocular health and optics.	4,5,8
3	Evaluate optical defects of the eye, including aberrations, depth of focus, diffraction, and resolving power, through analysis and application of principles related to optical and visual axes.	1,4,8
4	Analyze different types of refractive errors, including their management strategies and effects on near vision and accommodation.	5,8
5	Evaluate the mechanism, theories, and measurement of accommodation including Schiener disc experiment, modern lens changes, amplitude of accommodation, and depth of field.	1,4,5,8

SEMESTER – II									
Course Title	EFFECTIVE ENGLISH(COMMUNICATIVE ENGLISH& SOFTSKILLS)								
Course code	22UBPD121R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 60P	0	0	4	0	0	0	2
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	1. To enable students to learn and understand the different types of sentences 2. To strengthens vocabulary of the students which will help in their writing and speaking. 3. To introduce with the Time Management technique.								
CO1	The learner will be able to analyze and use the techniques in language use.								
CO2	Communication and be have oral skills will boost their self-reliance.								
CO3	Students will learn the effective and efficient utilization of the time.								
CO4	It will strengthen their vocabulary and use of words.								
CO5	It will give an introduction on the concept of communication, its importance and barriers.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
<b>I</b>	Grammar I. Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences II. Types of Tenses Common Errors		6	Describe, illustrate the types of tenses, sentences.				1,2,3	
<b>II</b>	Vocabulary i. Homonyms Homophones		6	Describe, illustrate about vocabulary				1,2,3	
<b>III</b>	Reading Skills i. Techniques of Effective Reading Gathering ideas and in format ion from a text		8	Describe, illustrate about reading skills				1,2,3	
<b>IV</b>	Conflict Management i. Definition ii. Type of Conflict Management Effects of Conflict Management		6	Describe, illustrate the type of conflict management				1,2,3	
<b>V</b>	Time-Management Skills i. Introduction To Time Management, ii. ImportanceofTimeManagement, BasicTipstoMaintainTime.		8	Describe, illustrate the importance of time management.				1,2,3	



### TEXT BOOKS:

T1: Wren, P. and Martin, H. 1995. High School English Grammar and Composition, S Chand Publishing.

T2: Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyrus Press.

### REFERENCE BOOKS:

R1: Swan, Michael., (2014) Practical English Usage, Cambridge University Press

R2: Taylor J. and Wright, J., IELTS Advantage Reading Skills: A step-by-step guide to a high IELTS reading score, Delta Publishing by Klett.

### OTHER LEARNING RESOURCES:

- <https://clockify.me/time-management-techniques>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	The learner will be able to analyze and use the techniques in language use.	5,7,8
2	Communication and be have oral skills will boost their self-reliance.	5,7,8
3	Students will learn the effective and efficient utilization of the time.	5,7,8
4	It will strengthen their vocabulary and use of words.	5,7,8
5	It will give an introduction on the concept of communication, its importance and barriers.	5,7,8

SEMESTER – II									
Course Title	OPTOMETRY PROFESSIONAL SKILLS I								
Course code	22BOPT126R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	1. Learn to communicate effectively with a diverse group of patients, addressing their various optometric conditions and needs. 2. Acquire the ability to perform comprehensive history taking, including demographic data, chief complaints, and ocular and systemic history, and conduct basic eye examinations such as visual acuity testing and pupil examination. 3. Gain proficiency in the use of essential ophthalmic instruments, including the retinoscope and ophthalmoscope, and understand the implications of examination findings.								
CO1	Understand the ophthalmic patient education system which includes communication of the patient and proper handling techniques of optometric instruments								
CO2	Demonstrate proper history taking part of a clinical investigation								
CO3	Acquire knowledge about proper visual acuity recording process								
CO4	Understand the basics of eye examination which includes torch light examination, IPD measurement etc								
CO5	Introduction to ophthalmic instruments like retinoscope and ophthalmoscope								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Ophthalmic patient education</b> <ul style="list-style-type: none"> <li>The ability to communicate effectively with a diverse group of patients with a range of optometric conditions and needs.</li> </ul> The ability to use techniques in ocular examination and to understand the implication of findings in terms of subsequent examination techniques.		2	Learn the ability to communicate effectively.				1,2,3,5	
II	<b>History taking of an Ophthalmic care</b> Demographic data, chief complaint, ocular and systemic history, etc.		2	Demonstrate and explain the history taking.				1,2,3,5	
III	<b>Visual acuity</b> <ul style="list-style-type: none"> <li>Visual acuity testing – Distance, Near</li> </ul>		2	Describe, illustrate the visual acuity.				1,2,3,5	
IV				Describe, illustrate the type of eye				1,2,	

	<b>Basic of eye examination</b> <ul style="list-style-type: none"> <li>• Torch light Examination</li> <li>• Pupil Examination</li> </ul>	2	examination.	3,5
V	<b>Introduction to ophthalmic instruments</b> <ul style="list-style-type: none"> <li>• Retinoscope</li> </ul> Ophthalmoscope	2	Describe, illustrate the and demonstrate the ophthalmic instruments.	1,2,3

### TEXT BOOKS:

T1: Optics and Refraction by A.K.KHURANA.

### REFERENCE BOOKS:

R1: Optics for Optometry Students by P.C mukharjee

### OTHER LEARNING RESOURCES:

<https://depisteo.com/blog/optical-tools-required-practice/>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the ophthalmic patient education system which includes communication of the patient and proper handling techniques of optometric instruments	2,3,8
2	Demonstrate proper history taking part of a clinical investigation	4,5,7
3	Acquire knowledge about proper visual acuity recording process	
4	Understand the basics of eye examination which includes torch light examination, IPD measurement etc	4,5,7
5	Introduction to ophthalmic instruments like retinoscope and ophthalmoscope	2,3,8

<b>SEMESTER – II</b>									
<b>Course Title</b>	<b>CO-CURRICULAR</b>								
<b>Course code</b>	<b>22UBCC121</b>	<b>Total credits: 1</b> <b>Total hours: 15P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			0	0	0	1	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>II semester of first year of the programme</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities.</li> <li>2. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning.</li> <li>3. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.</li> </ol>								
<b>CO</b>	Co-curricular activities facilitate in the development of various domains of mind and personality such as intellectual development, emotional development, social development, moral development and aesthetic development. Creativity, Enthusiasm, and Energetic, Positive thinking are some of the facets of personality development and the outcomes of extracurricular activities.								
<b>Content</b>									
<p>The institute provides the opportunity to the teacher trainees to participate in various activities for their overall development. The institute conducts Seminars and Workshops, Guest Lectures, Essay writing, projects, general knowledge debates, quiz and discussion on current affairs, Discussion on social justice, National Days Celebrations, Assembly, Weekly meetings and Value Education programme, and also organize Dance, Dramatics, Singing competitions. Games and Sports are compulsory for all the students. Provision has, therefore been made for games and sports in college. The college will have unit of N.S.S. and will also give the opportunity to students to participate in it.</p>									

<b>SEMESTER – II</b>									
<b>Course Title</b>	<b>EXTRA-CURRICULAR</b>								
<b>Course code</b>	<b>22UBEC111</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 15P</b>	0	0	0	1	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>II semester of first year of the programme</b>								
<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners								
<b>CO</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to earn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.								
<b>Content</b>									
AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.									

SEMESTER – II									
Course Title	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)								
Course code	MOBOPSW121/2/3	Total credits: 1 Total hours: 15P	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	MOOCs (Massive Open Online Courses) have been around us since 2008, when around 2,300 students took part in a course called "Connectives and Connective Knowledge", organized by the University of Manitoba (Canada). However, 2012 was widely recognized as The year of the MOOC, because some MOOC initiatives, such as Coursera, Udacity, or edX, gained a world-wide popularity.								
CO	A massive open online course (MOOC) is an online course aimed at large-scale interactive participation and open access via the web. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for the students, professors, and teaching assistants (TAs). MOOCs are a recent development in distance education.								
Content									
<ul style="list-style-type: none"> <li>• The common duration of a MOOC is from 6 to 12 weeks. A MOOC is accessible 24 hours a day, 7 days a week. The majority of the content is delivered asynchronously (meaning students can access it in their own time and at their own pace). However, sometimes there can be optional synchronous events such as 'live' webinars (interactive sessions) which require participants to join in at specific dates/times.</li> <li>• A standard class becomes in a MOOC a set of videos of 5-10 minutes each.</li> <li>• The learning of students in a MOOC is usually assessed by multiple-choice questions.</li> <li>• An important component of MOOCs is assignments. Student have to upload assignment solutions into the MOOC platform. Assignments can be evaluated and graded:Automatically when possible.&amp;Peer-to-peer: students evaluate and grade themselves.</li> <li>• Another component is the forum, where students post questions that other students can answer.</li> <li>• Usually, there are no pre-requisites for taking a MOOC, apart from having access to a computer with an internet connection. Most of the time, the educational or academic background of students isn't important.</li> <li>• Students usually don't need to buy any books for these courses, because all reading is either be provided within the MOOC content or is linked to open access texts.</li> </ul>									

SEMESTER – II									
Course Title	UNIVERSAL HUMAN VALUES (UHV) + PROFESSIONAL ETHICS								
Course code	22UUHV106R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 15T+30P	1	0	2	0	0	0	2
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings</li> <li>To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way</li> <li>To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.</li> </ol>								
CO1	have basic understanding of Computer Hardware, Software and Computer handling.								
CO2	able to solve basic information management issues using MS-Office Products.								
CO3	able to efficiently search the Internet for required information.								
CO4	able to use computing technically ethically, safely, securely and legally for day-to-day use.								
CO5	evaluate the implications of harmony on professional ethics and apply this understanding to develop eco-friendly production systems and technologies, contributing to a universal human order at individual and societal levels.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Course Introduction - Need, Basic Guidelines, Content and Process for Value Education</b> <ul style="list-style-type: none"> <li>Understanding the need, basic guidelines, content and process for Value Education</li> <li>Self Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration</li> <li>Continuous Happiness and Prosperity- A look at basic Human Aspirations</li> <li>Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of</li> </ul>	12	Learn the ability to communicate effectively.				1,2		

	<p>aspirations of every human being with their correct priority</p> <ul style="list-style-type: none"> <li>• Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario</li> </ul> <p>Method to fulfill the above human aspirations: understanding and living in harmony at various levels.</p>			
<b>II</b>	<p>Understanding Harmony in the Human Being - Harmony in Myself!</p> <ul style="list-style-type: none"> <li>• Understanding human being as a co-existence of the sentient 'I' and the material 'Body'</li> <li>• Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha</li> <li>• Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)</li> <li>• Understanding the characteristics and activities of 'I' and harmony in 'I'</li> <li>• Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail</li> </ul> <p>Programs to ensure Sanyam and Swasthya- Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>	12	Demonstrate and explain the history taking.	1,2
<b>III</b>	<p>Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship</p> <ul style="list-style-type: none"> <li>• Understanding Harmony in the family – the basic unit of human interaction</li> <li>• Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship</li> <li>• Understanding the meaning of Vishwas; Difference between intention and competence</li> <li>• Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship</li> <li>• Understanding the harmony in the society (society being an extension of</li> </ul>	12	Describe, illustrate the visual acuity.	1,2



	<p>family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals</p> <p>Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!-Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>			
<b>IV</b>	<p>Understanding Harmony in the Nature and Existence - Whole existence as Co-existence</p> <ul style="list-style-type: none"> <li>• Understanding the harmony in the Nature</li> <li>• Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature</li> <li>• Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space</li> </ul> <p>Holistic perception of harmony at all levels of existence-Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>	10	Describe, illustrate the type of eye examination.	1,2
<b>V</b>	<p>Implications of the above Holistic Understanding of Harmony on Professional Ethics</p> <ul style="list-style-type: none"> <li>• Natural acceptance of human values</li> <li>• Definitiveness of Ethical Human Conduct</li> <li>• Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order</li> <li>• Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people-friendly and eco- friendly production systems, c) Ability to identify and develop appropriate technologies and management patterns for above production systems.</li> <li>• Case studies of typical holistic technologies, management models and production systems</li> </ul> <p>Strategy for transition from the present state to Universal Human Order: a) At the level of</p>	2	Describe, illustrate the and demonstrate the ophthalmic instruments.	1,2

	individual: as socially and ecologically responsible engineers,technologists and managers b) At the level of society: as mutually enriching institutions and organizations			
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**TEXT BOOKS:**

T1: The text book R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

T2: The teacher’s manual R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi, 2010.

**REFERENCE BOOKS:**

R1:B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

R2. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.

R3.Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986,1991

R4.Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins,USA

R5.Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III,1972, limits to Growth, Club of Rome’s Report, Universe Books.

R6.Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) KrishiTantra Shodh, Amravati.

R7.A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.

R8.E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.

R9. A.N. Tripathy, 2003, Human Values, New Age International Publishers.

**OTHER LEARNING RESOURCES:**

<https://depisteo.com/blog/optical-tools-required-practice/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	have basic understanding of Computer Hardware, Software and Computer handling.	<b>5,8</b>
<b>2</b>	able to solve basic information management issues using MS-Office Products.	<b>5,8</b>
<b>3</b>	able to efficiently search the Internet for required information.	<b>5,8</b>
<b>4</b>	able to use computing technically ethically, safely, securely and legally for day-to-day use.	<b>5,8</b>
<b>5</b>	evaluate the implications of harmony on professional ethics and apply this understanding to develop eco-friendly production systems and technologies, contributing to a universal human order at individual and societal levels.	<b>5,8</b>

SEMESTER – II									
Course Title	BASIC DIGITAL LITERACY								
Course code	22UUDL101R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	1. To identify and analyze computer hardware, software and their uses. 2. To use MS-Office suite for various purposes. 3. To use the Internet efficiently for required information as well as for digital financial transactions								
CO1	Understanding of Computer Hardware, Software and Computer handling.								
CO2	Learn to solve basic information management issues using MS-Office Products.								
CO3	Learn to efficiently search the Internet for required information								
CO4	Learn to use computing technically ethically, safely, securely and legally for day-to-day use								
CO5	Create accounts and effectively use various digital payment systems such as credit cards, debit cards, net banking, and UPI, demonstrating an understanding of the underlying processes and security measures involved								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Fundamentals of Computer Systems <ul style="list-style-type: none"> <li>Components of a Computer and their functions.</li> </ul> Different Types of Computers and their Applications.		12	Learn the ability to communicate effectively.				1,2	
II	Introduction to MS-Office <ul style="list-style-type: none"> <li>Components of the MS-Office suite.</li> <li>Creating documents with MS-Word.</li> <li>Creating Presentations with MS-PowerPoint.</li> </ul> Creating Spreadsheets with MS-Excel.		12	Demonstrate and explain the history taking.				1,2	
III	Introduction to Internet & Cyber World: <ul style="list-style-type: none"> <li>Introduction to Computer Networks and Internet.</li> <li>World Wide Web, Websites and Web portals, Web browsing.</li> <li>Web Searching, Search engines, Introduction to Google Search Engine; How to search using Keywords, topics of Interest, etc.</li> <li>Creation and use of Email Accounts.</li> </ul> Cyber Crimes.		12	Describe, illustrate the visual acuity.				1,2	

<b>IV</b>	Introduction to Social Media: <ul style="list-style-type: none"> <li>• The Power of Social Media, Relevance of Social Media in present scenario.</li> <li>• Creating accounts and using some popular Social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, LinkedIn.</li> </ul> Social Media Etiquettes.	10	Describe, illustrate the type of eye examination.	1,2
<b>V</b>	Digital Payments <ul style="list-style-type: none"> <li>• Introduction to Digital Payment Systems.</li> </ul> Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Netbanking, UPI	2	Describe, illustrate the and demonstrate the ophthalmic instruments.	1,2

### TEXT BOOKS:

T1: Sinha Pradeep K. and Priti Sinha. Computer Fundamentals: Concepts Systems & Applications. 3rd ed. New Delhi: BPB Publications.

T2: Goel, A, 2010. Computer Fundamentals, Pearson India

### REFERENCE BOOKS:

R1: Balaguruswamy, E. 2009 Fundamentals of Computers, Tata McGraw-Hill Education.

R2: Balaguruswamy, 2014. E. Fund Of Comp & Programming (Updated Ed Sem. I, Au) Tata McGraw-Hill Education.

R3: Lawson, C. 2022. Introduction to Social Media, Oklahoma State University.

### OTHER LEARNING RESOURCES:

- <https://www.w3schools.com>
- <https://edu.gcfglobal.org>
- <https://www.tutorialspoint.com>
- <https://www.javatpoint.com/>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding of Computer Hardware, Software	5,7,8

	and Computer handling.	
2	Learn to solve basic information management issues using MS-Office Products.	5,7,8
3	Learn to efficiently search the Internet for required information	5,7,8
4	Learn to use computing technically ethically, safely, securely and legally for day-to-day use	5,7,8
5	Create accounts and effectively use various digital payment systems such as credit cards, debit cards, net banking, and UPI, demonstrating an understanding of the underlying processes and security measures involved	5,7,8

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BOPT121R	ANATOMY II	3					1		2
22BOPT122R	PHYSIOLOGY II	3					1		2
22BOPT123R	BIOCHEMISTRY II	3					1		1
22BOPT124R	PHYSICAL OPTICS	3			1				1
22BOPT125R	VISUAL OPTICS I	3			1	2			1
22UBPD121R	EFFECTIVE ENGLISH (COMMUNICATIVE ENGLISH & SOFT SKILLS)					3		2	2
22BOPT126R	OPTOMETRY PROFESSIONAL SKILLS I		2	3	3	2		1	2
22UBCC121	CO-CURRICULAR					3		2	2
22UBEC111	EXTRA-CURRICULAR					3		2	2
MOBOPSW121/2/3	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)						1	2	3
22UUHV106R	UNIVERSAL HUMAN VALUES (UHV) + PROFESSIONAL ETHICS					1			2
22UUDL101R	BASIC DIGITAL LITERACY					1		1	2

SEMESTER – III									
Course Title	OCULAR PHARMACOLOGY								
Course code	22BOPT211R	Total credits: 2 Total hours: 30 T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. This course will help in learning about different types of drugs they work, and how they are used to treat different medical conditions related to eye.</li> <li>2. This course will also help in learning about the effects of drugs on the body, including potential side effects and interactions with other medications.</li> <li>3. This course will help to understand the routes of ocular drug administration and differentiate between various dosage forms used in ophthalmic pharmacology.</li> </ol>								
CO1	Discuss the general concept of pharmacology and factors in modifying drug dose								
CO2	Comprehend general principles of ocular pharmacology, including various dosage forms and routes of ocular drug administration								
CO3	Describe the use of various drugs in the management of ocular diseases								
CO4	Understand the mechanism of action of each class of therapeutic agents in addressing ocular disorders								
CO5	Explain sympathomimetics, sympatholytics, parasympathomimetics, and parasympatholytics in the context of ocular pharmacology.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>GENERAL PHARMACOLOGY-</b> <ul style="list-style-type: none"> <li>• General concept of pharmacology</li> <li>• Factors modifying drug dose</li> <li>• Pharmacodynamics</li> <li>• Pharmacokinetics</li> <li>• Routes of drug administration</li> </ul>		6	Describe, and explain about general pharmacology.				1,2	
II	<b>PRINCIPLES OF OCULAR PHARMACOLOGY-</b> <ul style="list-style-type: none"> <li>• General principles</li> <li>• Dosage forms</li> <li>• Routes of ocular drug administration</li> </ul>		6	Describe, about ocular pharmacology.				1,2	
III	<b>DRUGS USED IN MANAGEMENT OF OPHTHALMIC DISEASES-</b> <ul style="list-style-type: none"> <li>• Mydriatics</li> <li>• Miotics</li> <li>• Antibiotics</li> <li>• Drugs for glaucoma-drugs for ocular hypertension, drugs that enhance aqueous outflow,</li> </ul>		6	Describe, and explain basics of drugs used in ophthalmology.				1,2	

	inhibitors of aqueous secretion <ul style="list-style-type: none"> <li>• Anti-inflammatory agents</li> <li>• Topical anesthetics</li> </ul>			
<b>IV</b>	<b>OTHER SPECIFIC AGENTS-</b> <ul style="list-style-type: none"> <li>• CNS stimulants</li> <li>• CNS depressants</li> <li>• Anticoagulants</li> <li>• Diuretics</li> <li>• Cardio vascular drugs</li> <li>• Histamines and antihistamines</li> <li>• Prostaglandins</li> </ul>	<b>6</b>	Describe, and explain about other specific agents.	1,2
<b>V</b>	<b>PANTOMIMIC DRUGS-</b> <ul style="list-style-type: none"> <li>• Sympathomimetics</li> <li>• Sympatholytics</li> <li>• Parasympathomimetics</li> <li>• Parasympatholytics</li> </ul>	<b>6</b>	Describe, and explain pantomimic drugs.	1,2

#### **TEXT BOOKS:**

T1: K D TRIPATHI: Essentials of Medical Pharmacology. 4<sup>th</sup>,2003

T2: T S MAUGER & E L CRAIG - MOSBY'S - OCULAR DRUG HANDBOOK

#### **REFERENCE BOOKS:**

R1: Zimmerman: Text Book of Ocular Pharmacology,1999.

R2: Bartlett and Jaanus: Clinical Ocular Pharmacology.

R3: S P RANG, M M DALE, RITTER – Pharmacology, Ed.3 Churchill 1995.

#### **OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=8-Qtd6RhFVA>

<https://www.slideshare.net/pooranachithraflowry/introduction-to-pharmacokinetics-and-pharmacodynamics-principles>

<https://www.youtube.com/watch?v=6erefsWCVxg>

<https://www.slideshare.net/UmasankarKrishnamaraju/drug-distribution-40685564>



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss the general concept of pharmacology and factors in modifying drug dose	<b>1,6,8</b>
<b>2</b>	Comprehend general principles of ocular pharmacology, including various dosage forms and routes of ocular drug administration	<b>1,8</b>
<b>3</b>	Describe the use of various drugs in the management of ocular diseases	<b>6,8</b>
<b>4</b>	Understand the mechanism of action of each class of therapeutic agents in addressing ocular disorders	<b>1,6,8</b>
<b>5</b>	Explain sympathomimetics, sympatholytics, parasympathomimetics, and parasympatholytics in the context of ocular pharmacology.	<b>1,6,8</b>

SEMESTER – III									
Course Title	VISUAL OPTICS-II								
Course code	22BOPT212R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. This course will help to understand the principles of ocular anatomy and physiology.</li> <li>2. This course deals with the concept of the eye as an optical instrument and thereby covers various optical components of the eye, types of refractive error, and clinical approaches in diagnosis and movement of various types of refractive error.</li> <li>3. This course deals in assessing and correcting refractive errors in simplified schematic eyes, including understanding the effects of spectacle magnification and correction with contact lenses.</li> </ol>								
CO1	Understand the eye's anatomy and physiology, focusing on the cornea, crystalline lens, and retina, and their roles in visual perception.								
CO2	Identify the various optical defects and parameters								
CO3	Describe ametropia in the human eye, including its developmental growth, genetic factors, causes, and management of various eye conditions.								
CO4	Understand the different types of refractive errors and its managements								
CO5	Review the principles of retinoscopy and its instrumentation.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	INTRODUCTION OF EYE- <ul style="list-style-type: none"> <li>• Basic anatomy and physiology of cornea.</li> <li>• Basic anatomy and physiology of crystalline lens.</li> <li>• Basic anatomy and physiology of retina.</li> </ul>	4	Describe, illustrate and explain basic anatomy and physiology of eye.					1,2	
II	CLEAR AND BLURRED IMAGES IN THE REDUCED AND SIMPLIFIED SCHEMATIC EYES- <ul style="list-style-type: none"> <li>• The visual axis.</li> <li>• Pupil size and blur disc diameter.</li> <li>• Retinal image size in uncorrected reduced eye.</li> <li>• Spectacle magnification introduced and corrected eyes.</li> <li>• Nodal points and clear image size.</li> </ul>	6	Describe, illustrate and explain schematic eyes.					1,2,3	

	<ul style="list-style-type: none"> <li>• Retinal images with a near object.</li> <li>• Spectacle magnification in near vision.</li> <li>• Relative spectacle magnification.</li> <li>• Correction of spherical ametropia with contact lens.</li> <li>• Spectacle magnification with a contact lens.</li> </ul>			
<b>III</b>	<p>AMMETROPIA IN THE ACTUAL HUMAN EYE-</p> <ul style="list-style-type: none"> <li>• The growth of the human eye in emmetropia.</li> <li>• Spherical ametropia in adult eye.</li> <li>• Genetic aspects of refractive error.</li> <li>• Summary of the causative factors involved in Ammetropia.</li> <li>• Progressive myopia.</li> <li>• Juvenile stress myopia.</li> <li>• Aniseikonia</li> <li>• Anisometropia &amp; Asthenopia</li> </ul>	<b>6</b>	Describe, and explain ammetropia	1,2,3
<b>IV</b>	<p>REFRACTIVE ERROR OF APHAKIA AND ASTIGMATISM-</p> <ul style="list-style-type: none"> <li>• Reflective error in aphakia.</li> <li>• The retinal image size in aphakia.</li> <li>• Correction of aphakia by a contact lens.</li> <li>• Use of an intra ocular lens implantation.</li> <li>• Power of the implant and retinal image size.</li> <li>• Clinical aspects of aphakia.</li> </ul> <p>ASTIGMATISM-</p> <ul style="list-style-type: none"> <li>• Oblique astigmatism.</li> <li>• Astigmatism in the reduced eye.</li> <li>• The retinal images of point and extended objects.</li> <li>• Classification of astigmatism.</li> </ul>	<b>8</b>	Describe, illustrate and explain refractive error.	1,2,3,4,5

	<ul style="list-style-type: none"> <li>• Correction of astigmatism by spherocylindrical,</li> <li>• Toric and contact lenses.</li> <li>• Cross-cylindrical method of detecting astigmatism</li> </ul>			
<b>V</b>	<b>RETINOSCOPY –</b> <ul style="list-style-type: none"> <li>• Principle and use.</li> <li>• Clinical recording of standard of vision by visual acuity and the charts.</li> <li>• Review of subjective refractive methods.</li> <li>• Problem of review of objective refractive methods.</li> <li>• Contrast sensitivity of the eye.</li> </ul>	<b>8</b>	Describe, illustrate and explain retinoscopy.	1,2,3,4,5

### TEXT BOOKS:

T1: Clinical Visual optics Arthur G Bennett Ronald B Rabbetts -Butterworth- Heinemann Second edition 1989.

T2: Visual Optics and Refraction- A clinical approach David D Michaels: The C.V. Mosby Co., 1985.

### REFERENCE BOOKS:

R1: Clinical Optics, Andrew R Elkington& Helena J Frank - Blackwell Scientific Publications Oxford – London

R2: Optics and Refraction A User-friendly guide David Miller 1991 Gower Medical Publishing

### OTHER LEARNING RESOURCES:

<https://www.studocu.com/en-za/document/university-of-limpopo/visual-optics/visual-optics-notes/5572439>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Understand the eye's anatomy and physiology, focusing on the cornea, crystalline lens, and retina,	<b>1,4,8</b>

	and their roles in visual perception.	
<b>2</b>	Identify the various optical defects and parameters	<b>4,5,8</b>
<b>3</b>	Describe ametropia in the human eye, including its developmental growth, genetic factors, causes, and management of various eye conditions.	<b>1,8</b>
<b>4</b>	Understand the different types of refractive errors and its managements	<b>1,4</b>
<b>5</b>	Review the principles of retinoscopy and its instrumentation.	<b>5,8</b>

SEMESTER – III									
Course Title	DISPENSING OPTICS I								
Course code	22BOPT213R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. This course will help to analyze and apply principles of lens characteristics, including prescription writing, prismatic effects, and neutralization techniques, to effectively correct refractive errors.</li> <li>2. This course will help to differentiate between different types of lenses and lens materials, identifying their unique properties and suitable applications in optometric practice.</li> <li>3. This course will help to explain the distinctions among bifocal designs and progressive lenses.</li> </ol>								
CO1	Understand the fundamental characteristics of lenses, prescription writing, prismatic effects, and neutralization								
CO2	Distinguish different properties of lenses, and the characteristics of lens materials.								
CO3	Understand the basic differences between bifocal designs, progressive lenses, and apply the concept in progressive lens marking.								
CO4	Explain various types of lens coating and identify the concept of absorptive lenses								
CO5	Understand about the impact-resistant lenses, and the most beneficial impact-resistant lenses for specific patient needs.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>CHARACTERISTICS OF LENSES-</b> <ul style="list-style-type: none"> <li>• Introduction,</li> <li>• Spherical lenses, plano - cylindrical lenses, spherocylindrical lenses,</li> <li>• Designation of lens power and power of lenses,</li> <li>• Write the prescription,</li> <li>• Base curve,</li> <li>• Aberration of lens,</li> <li>• Prism effects in a lens,</li> <li>• Neutralization.</li> </ul>	6	Describe, and explain characteristics of different lenses.					1,2,3	
II	<b>PROPERTIES OF LENSES-</b> <ul style="list-style-type: none"> <li>• Optical Properties</li> <li>• Mechanical Properties</li> <li>• Electrical Properties</li> <li>• Chemical Properties</li> <li>• Thermal Properties</li> </ul>	8	Describe, and explain properties of lenses.					1,2,3	

	<p><b>CURRENT MATERIALS-</b></p> <ul style="list-style-type: none"> <li>• Crown glass,</li> <li>• Cr-39,</li> <li>• Photochromatic materials</li> <li>• Cellulose acetate.</li> <li>• Polycarbonate lens</li> <li>• Trivex lens</li> </ul>			
<b>III</b>	<p><b>INTRODUCTION OF LENSES-</b></p> <ul style="list-style-type: none"> <li>• History of bi-focal design and its types</li> <li>• Progressive lens and its types.</li> <li>• Comparison between bifocal, trifocal and progressive lens.</li> <li>• Marking of progressive lens.</li> </ul>	<b>6</b>	Describe, and explain basics of spectacle lenses.	1,2,3,4,5
<b>IV</b>	<p><b>OPHTHALMIC LENS COATING AND ABSORPTIVE LENSES-</b></p> <ul style="list-style-type: none"> <li>• Anti-reflecting coating &amp; protective coating</li> </ul> <p><b>ABSORPTIVE LENSES-</b></p> <ul style="list-style-type: none"> <li>• Classification of lens tints.</li> <li>• Effects in prescription on lens color.</li> <li>• Availability of tinted lenses.</li> </ul>	<b>6</b>	Describe, and explain lens coating	1,2,3
<b>V</b>	<p><b>IMPACT RESISTANT LENSES</b></p> <ul style="list-style-type: none"> <li>• Types of impact resistant lenses. Impact resistant dress- eyewear lenses.</li> <li>• Types of impact resistant lenses most beneficial of specific patients.</li> </ul>	<b>6</b>	Describe, and explain impact resistant lenses.	1,2,3

**TEXT BOOKS:**

T1: Brooks & Borish. Systems for Ophthalmic Dispensing. 2nd ed. The Professional Press, 1996.

**REFERENCE BOOKS:**

R1: Clinical optics and refraction by Andrew Keirl.

**OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=NqR0j-ZGCXg>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the fundamental characteristics of lenses, prescription writing, prismatic effects, and neutralization	<b>5,8</b>
<b>2</b>	Distinguish different properties of lenses, and the characteristics of lens materials.	<b>1,3</b>
<b>3</b>	Understand the basic differences between bifocal designs, progressive lenses, and apply the concept in progressive lens marking.	<b>1,3</b>
<b>4</b>	Explain various types of lens coating and identify the concept of absorptive lenses	<b>5,8</b>
<b>5</b>	Understand about the impact-resistant lenses, and the most beneficial impact-resistant lenses for specific patient needs.	<b>5,8</b>



SEMESTER – III									
Course Title	PATHOLOGY AND MICROBIOLOGY								
Course code	22BOPT214R	Total credits: 2 Total hours: 30 T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To prepare the students to gain essential knowledge about the bacteria, viruses, fungi and parasites.</li> <li>To acquire the knowledge of the principle of sterilisation and disinfection in hospital and ophthalmic practice.</li> <li>To understand basic principle of diagnostic ocular microbiology d. Pathology of various eye parts and annexe.</li> </ol>								
CO1	Discuss about the cell structure, classification, staining reactions and method of sterilization of bacteria and viruses								
CO2	Understand the viral morphology and its impact on ocular manifestations.								
CO3	Discuss the structure and function of the immune system.								
CO4	Explain about the acute inflammation changes along with their causes and features.								
CO5	Understand the source of infection, immune-pathogenesis, and disorder of growth to diagnose, treat, and analyze infectious diseases.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
PART- A: MICROBIOLOGY									
I	<b>BACTERIA:</b>  <b>CELL STRUCTURE-</b> <ul style="list-style-type: none"> <li>Elementary idea about classification and morphological basis.</li> </ul> <b>STAINING REACTIONS:</b> <ul style="list-style-type: none"> <li>Gram staining,</li> <li>Spore staining,</li> <li>Acid fast staining.</li> </ul> <b>BACTERIAL GROWTH:</b> <ul style="list-style-type: none"> <li>Nutritional requirements,</li> <li>Physical factor affecting culture media, and growth curve.</li> </ul>		6	Describe, illustrate and explain bacterial cell structure and growth.				1,2,3,4	

	<p><b>ELEMENTARY IDEA ABOUT BACTERICIDAL AGENTS:</b></p> <ul style="list-style-type: none"> <li>• Phenol, alcohol.</li> <li>• Sterilization (principles, types &amp; methods).</li> </ul> <p><b>PASTEURIZATION. ANTIBIOTICS:</b></p> <ul style="list-style-type: none"> <li>• Bacteriostatic and bactericidal effects.</li> </ul> <p><b>VIRUS:</b></p> <ul style="list-style-type: none"> <li>• Elementary knowledge of viral-morphology,</li> <li>• Viral genome and classification,</li> <li>• Viral replication.</li> <li>• Herpesviruses,</li> <li>• Hepatitis viruses,</li> <li>• Miscellaneous viruses,</li> <li>• Human immunodeficiency viruses.</li> </ul>			
<b>II</b>	<p><b>MICROBIAL GROWTH &amp; DEATH-</b></p> <ul style="list-style-type: none"> <li>• Laboratory culture, host pathogen interactions, antimicrobial chemotherapy,</li> <li>• Pathogenic mechanisms common to external ocular infections process –clinical pathology.</li> <li>• Treatment &amp; epidemiology of infectious diseases caused by bacteria, virus, fungi &amp; parasitic organisms with emphasis to disease with ocular manifestations &amp; infectious eye diseases in hot climate as in India.</li> <li>• <b>Aids &amp; eye</b></li> </ul>	<b>8</b>	Describe, and explain microbial growth	1,2,3,4
<b>PART B PATHOLOGY</b>				
<b>III</b>	<p><b>STRUCTURE &amp; FUNCTION OF IMMUNE SYSTEM –</b></p>	<b>6</b>	Describe, and explain immune system.	1,2

	<ul style="list-style-type: none"> <li>• Structure and function of thymus,</li> </ul> <p><b>SPLEEN &amp; RED BONE MARROW-</b></p> <ul style="list-style-type: none"> <li>• Immunity &amp; its types,</li> <li>• Plasma proteins &amp; immune reaction,</li> <li>• Cells involved in immune system.</li> <li>• Humoral immunity theories of antibodies formation.</li> <li>• Structure &amp; function of lymph nodes.</li> <li>• Structure &amp; function of thymus, spleen &amp; red bone marrow.</li> <li>• Nonspecific immunity,</li> <li>• Antibody mediated immunity,</li> <li>• Specific immunity,</li> <li>• Cell mediated immunity,</li> <li>• Active immunity,</li> <li>• Passive immunity.</li> </ul>			
<b>IV</b>	<p><b>THE ACUTE INFLAMMATORY REACTION –</b></p> <ul style="list-style-type: none"> <li>• Changes in acute inflammation,</li> <li>• Changes in the calibre of the blood vessels,</li> <li>• Changes in blood flow,</li> <li>• Changes associated with exudation.</li> <li>• Local sequel of acute inflammation.</li> <li>• The chemical mediators of acute inflammation.</li> <li>• Role of the mast cell in inflammation.</li> <li>• Role of the platelets in inflammation.</li> <li>• Chronic inflammation– cause, classification, general features</li> </ul>	<b>6</b>	Describe, and explain inflammatory reaction.	1,2
<b>V</b>	<p><b>SOURCE OF INFECTION-</b></p> <ul style="list-style-type: none"> <li>• Transmission of organisms to the body.</li> <li>• Wound infections.</li> <li>• Wound healing.</li> </ul> <p><b>IMMUNE-PATHOGENESIS –</b></p> <ul style="list-style-type: none"> <li>• Type i, ii, iii &amp; iv hypersensitivity.</li> <li>• Mechanism of autoimmunity.</li> <li>• Organ specific &amp; non-organ specific auto immune disease.</li> </ul>	<b>6</b>	Describe, and explain source of infection and immune pathogenesis.	1,2

	<ul style="list-style-type: none"> <li>• The Hla system histocompatibility complex.</li> <li>• Pyogenic &amp; bacterial infection. graft rejection- basic outline.</li> </ul> <p><b>DISORDER OF GROWTH –</b></p> <ul style="list-style-type: none"> <li>• Metaplasia,</li> <li>• Dysplasia,</li> <li>• Neoplasia.</li> <li>• Circulatory disturbances – thrombosis, infarction, ischemia,</li> <li>• Embolism.</li> <li>• Degeneration(calcification).</li> </ul>			
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**TEXT BOOKS:**

T1: Ocular microbiology by PK Mukherjee.

**REFERENCE BOOKS:**

R1: Textbook for microbiology by PC Trivedi.

**OTHER LEARNING RESOURCES:**

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss about the cell structure, classification, staining reactions and method of sterilization of bacteria and viruses	<b>1,8</b>
<b>2</b>	Understand the viral morphology and its impact on ocular manifestations.	<b>6,8</b>
<b>3</b>	Discuss the structure and function of the immune system.	<b>1,8</b>
<b>4</b>	Explain about the acute inflammation changes along with their causes and features.	<b>6,8</b>
<b>5</b>	Understand the source of infection, immune-pathogenesis, and disorder of growth to diagnose, treat, and analyze infectious diseases.	<b>1,8</b>

SEMESTER – III									
Course Title	Clinical optics & refraction I								
Course code	22BOPT215R	Total credits: 3 Total hours: 30T+30P	L	T	P	S	R	O/F	C
			2	0	2	0	0	0	2+1=3
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. Understanding the eye as a dioptric device and related basic scientific knowledge.</li> <li>2. This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment examination, neuro-ophthalmic examination, pediatric optometry examination, and clinical evaluation.</li> <li>3. Understanding the concept of visual acuity, including its measurement and components, and discuss its clinical significance in assessing vision.</li> </ol>								
CO1	Understand the needs and importance of ophthalmic history taking.								
CO2	Explain the concept of visual acuity and its important components.								
CO3	Evaluate objective and subjective refraction techniques.								
CO4	Assessment of accommodation and identify the anomalies.								
CO5	Demonstrate proficiency in prescribing add power, calculating add and near power.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>OPHTHALMIC CASE HISTORY TAKING-</b> <ul style="list-style-type: none"> <li>• Demographic data, chief complaints, ocular history, systemic history, history of past or current medications, family history, social history, birth history, allergy history, few example of history writing.</li> </ul>		8	Describe ophthalmic case history.				1,2	
II	<b>VISUAL ACTIVITY-</b> <ul style="list-style-type: none"> <li>• Step by step procedure of recording distance and near visual acuity, Snellen's chart, logMar chart, near visual acuity chart, pediatric visual acuity chart and tests according to different age groups, components of visual acuity</li> </ul>		8	Describe steps of Visual acuity.				1,2, 3,4, 5	
III	<b>OBJECTIVE REFRACTION-</b> Streak and spot retinoscopy: types, definitions,		6	Describe, and explain different methods of objective refraction.				1,2, 3,4, 5	

	<p>principles, procedures</p> <ul style="list-style-type: none"> <li>• Static and dynamic retinoscopy: mem, Nott's, sheard's, bells and crosss.</li> <li>• Other methods of retinoscopy- radical, near retinoscopy.</li> <li>• Autorefractometer.</li> </ul> <p><b>SUBJECTIVE REFRACTION:</b></p> <ul style="list-style-type: none"> <li>• Subjective adjustment,</li> <li>• Refinement, binocular balancing</li> <li>• Cycloplegic refraction, cycloplegia, different types of cycloplegic drops and their applications.</li> </ul>			
<b>IV</b>	<p><b>ACCOMMODATION-</b></p> <ul style="list-style-type: none"> <li>• Far point of accommodation, near point of accommodation, range of accommodation, amplitude of accommodation</li> <li>• Different methods of measuring amplitude of accommodation.</li> <li>• Correction of presbyopia:</li> <li>• different methods of calculating tentative presbyopic addition, amplitude of accommodation.</li> </ul>	<b>6</b>	Describe, and explain accommodation its classification and anomalies.	1,2, 3,4, 5
<b>V</b>	<p><b>SOME IMPORTANT WORKUP-</b></p> <ul style="list-style-type: none"> <li>• Occupational consideration during prescribing add power,</li> <li>• Calculation of add and near power,</li> <li>• Measurement of IPD and its significance.</li> </ul>	<b>6</b>	Describe, and explain clinical workup.	1,2, 3,4, 5
<b>Practical</b>				
<b>I</b>	<ul style="list-style-type: none"> <li>• History writing</li> <li>• Recording</li> </ul>	10		1,2, 3,4
<b>II</b>	<ul style="list-style-type: none"> <li>• Practice of streak retinoscopy</li> </ul>	12		1,2, 3,4, 5
<b>III</b>	<ul style="list-style-type: none"> <li>• To prescribe add power.</li> <li>• To write a prescription.</li> </ul>	10		1,2, 3,4

### TEXT BOOKS:

T1: Clinical optics and refraction by Andrew Keirl.

### REFERENCE BOOKS:

R1: Borish's clinical refraction – i.M. Borish, w.J. Benjamin – w.B. Saunders co.

R2: Primary care optometry – theodore – butterworth-heinemann.

R3: Clinical procedures in optometry – eskridge, amos, bartlett. -j. B. Lippincott co.

R4: The ocular examination: measurement and findings – karlazad mik

### OTHER LEARNING RESOURCES:

<https://www.youtube.com/watch?v=FYT-vpQpniY>

<https://www.youtube.com/watch?v=ObKHkYYgPrs>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the needs and importance of ophthalmic history taking.	2,3
2	Explain the concept of visual acuity and its important components.	4,6,8
3	Evaluate objective and subjective refraction techniques.	6,8
4	Assessment of accommodation and identify the anomalies.	6,8
5	Demonstrate proficiency in prescribing add power, calculating add and near power.	4,6,8

SEMESTER – III									
Course Title	Instrumentation and Investigation I								
Course code	22BOPT216R	Total credits: 3 Total hours: 30 T+30P	L	T	P	S	R	O/F	C
			2	0	2	0	0	0	2+1=3
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. In-depth knowledge of various investigation procedures in eye care services with basic instrumentations.</li> <li>2. Demonstrate proficiency in both subjective and objective refraction techniques for correcting refractive errors</li> <li>3. Understand the working principles, applications, and significance of different optometric instruments.</li> </ol>								
CO1	Describe various methods & techniques to access the degree of squint								
CO2	Understand and implement subjective and objective refraction procedures for refractive errors correction								
CO3	Understand the concept, working principle and application of different optometric instruments.								
CO4	Explain various methods and instruments for the measurement of IOP and visual field abnormalities.								
CO5	Demonstrate the application of advanced optometric instruments for comprehensive eye examinations.								
Unit-No.	Content		Contact Hour	Learning Outcome					KL
I	<b>OCULAR EXAMINATION AND DIAGNOSTIC TESTS HEAD POSITION–</b> <ul style="list-style-type: none"> <li>• Face turn, chin position, head tilt</li> <li>• Patient counseling</li> </ul>		6	Describe ocular examination for abnormal head posture.					1,2,3,4
II	<b>DIAGNOSTIC INSTRUMENTS IN OPTOMETRY-</b> <ul style="list-style-type: none"> <li>• Keratometer,</li> <li>• Slit-lamp biomicroscope,</li> <li>• Gonioscope,</li> <li>• Corneal topography</li> <li>• Brightness acuity test</li> </ul>		6	Describe the working principle and application of different optometric instruments.					1,2,3,4,5
III	<b>TONOMETRY –</b> <ul style="list-style-type: none"> <li>• Indentation and applanation.</li> </ul>		6	Describe various methods of tonometry.					1,2,3,4,5



	<ul style="list-style-type: none"> <li>• Test for colour vision.</li> <li>• Lensometer</li> </ul>			
<b>IV</b>	<b>REFRACTIVE INSTRUMENTS-</b> <ul style="list-style-type: none"> <li>• Test chart standards, choice of test charts, trial set.</li> <li>• Refractor(phoropter),</li> <li>• Trial frame design,</li> <li>• Near vision difficulties with units and trial frame</li> </ul>	7	Describe, and explain accommodation its classification and anomalies.	1,2,3,4,5
<b>V</b>	<b>DETAILED STUDY OF THE PRINCIPLES OF OPERATION, TYPES, OPTICAL PROPERTIES, CONSTRUCTION, ADJUSTMENT AND APPLICATION OF THE FOLLOWING INSTRUMENTS AND DEVICES-</b> <ul style="list-style-type: none"> <li>• Retinoscopes</li> <li>• Autorefractometer-</li> <li>• Ophthalmoscopes</li> </ul>	7	Describe, and explain applications of advanced optometric instruments.	1,2,3,4,5
<b>Practical</b>	<ul style="list-style-type: none"> <li>• To study the operations of the following instruments:</li> <li>• Focimeter or lensometer.</li> <li>• Keratometer</li> <li>• Retinoscope</li> <li>• Autorefractometer</li> <li>• Ophthalmoscope</li> <li>• Standard test charts.</li> </ul>	32	Describe, demonstrate and explain all the CL workup	1,2,3,4,5

**TEXT BOOKS:**

T1: Optics & refraction-l.p.Agarwal.

**REFERENCE BOOKS:**

R1: Introduction to visual optics, alan h. Tumadiffe(1987)

R2: Clinical optics- 2nd ed (1991)- a.r.Elington&h.j.Frank .

R3: Optics & refraction-l.p.Agarwal.

R4: Clinical optics-borrish..

**OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=8MFvQE2BfBI>

<https://www.youtube.com/watch?v=sXsl0HOX79s>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe various methods & techniques to access the degree of squint	<b>2,4,6,8</b>
<b>2</b>	Understand and implement subjective and objective refraction procedures for refractive errors correction	<b>6,8</b>
<b>3</b>	Understand the concept, working principle and application of different optometric instruments.	<b>2,4</b>
<b>4</b>	Explain various methods and instruments for the measurement of IOP and visual field abnormalities.	<b>4,6,8</b>
<b>5</b>	Demonstrate the application of advanced optometric instruments for comprehensive eye examinations.	<b>4,6,8</b>

SEMESTER – III									
Course Title	ENGLISH LANGUAGE PROFICIENCY (COMMUNICATIVE ENGLISH & SOFT SKILLS)								
Course code	22UBPD211R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 60P	0	0	4	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To enable students to learn and comprehend about the proficiency of the English language.</li> <li>To improve the writing skill of the learners and enable them to prepare CV and cover letter for professional development.</li> <li>To evaluate certain attributes in a candidate that can be otherwise difficult for time consuming to ascertain.</li> </ol>								
CO1	Understand prepositions and tag questions to analyse and correct grammatical structures in sentences.								
CO2	Analyse active and passive voice, and transform direct into indirect speech.								
CO3	Comprehend the writing skills through various techniques of language use.								
CO4	Apply SWOT analysis and goal-setting techniques to evaluate personal and professional development strategies								
CO5	Assess behaviors, thoughts, and emotions in a conscious and productive way.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	Grammar i. Use of Prepositions ii. Tag questions		6	Explain use of prepositions.					1,2,3
II	Grammar i. Active and Passive Voice ii. Direct and Indirect Speech		8	Describe active, passive voice and direct & indirect speech.					1,2,3
III	Writing Skills i. The Basics of Writing; avoid ambiguity and vagueness ii. Paragraph Writing iii. Resume, CV and Cover Letter		8	Describe writing skills.					1,2,3
IV	Self-Management Skills i. SWOT Analysis ii. Goal Setting iii. Personal Hygiene		8	Describe, and explain self-management skills.					1,2,3
V	Non-Verbal Communication-Sciences of Body Language			Describe, and explain Non-Verbal Communication-Sciences of Body					1,2,3

	<ul style="list-style-type: none"> <li>i. What is Non-Verbal Communication &amp; Body Language,</li> <li>ii. Types of Body Language,</li> <li>iii. Importance and Impact of Body Language,</li> <li>iv. Types of Communication through Body Language,</li> <li>v. Body Language Do's and Don'ts, Doubt Clearing Session Basic Tips to Maintain Time.</li> </ul>	10	Language.	
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### TEXT BOOKS:

T1: Lata, P.,S.(2015).Communication Skills, Second Edition. India: Oxford University Press.

T2:Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.

T2:Mc Dowell, Gayle Laakmann. 2008. Cracking the Coding Interview (Indian Edition).

### REFERENCE BOOKS:

R1: Zinsser, William. (2006)On Writing Well: The Classic Guide to Writing Non-fiction, Harper Perennial

R2: Lacinai, Antonio. (2016)Understanding Body Language:51 gestures and what they signal, Books on Demand.

### OTHER LEARNING RESOURCES:

<https://learning.shine.com/talenteconomy/career-help/top-group-discussion-skills/>

<https://www.thoughtco.com/what-is-nonverbal-communication-1691351>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand prepositions and tag questions to analyse and correct grammatical structures in sentences.	<b>5,7,8</b>
<b>2</b>	Analyse active and passive voice, and transform direct into indirect speech.	<b>5,7,8</b>
<b>3</b>	Comprehend the writing skills through various techniques of language use.	<b>5,7,8</b>
<b>4</b>	Apply SWOT analysis and goal-setting techniques to evaluate personal and professional development strategies	<b>5,7,8</b>
<b>5</b>	Assess behaviours, thoughts, and emotions in a conscious and productive way.	<b>5,7,8</b>

SEMESTER – III									
Course Title	OPTOMETRY PROFESSIONAL SKILLS II								
Course code	22BOPT217R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Pre-requisite	Compulsory	Co-requisite	Techno Professional Skills I						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. This course covers optometric instruments, its basic principle, description, and usage in clinical practice.</li> <li>2. Develop effective skills in ophthalmic patient education counselling, enabling them to communicate clearly.</li> <li>3. Demonstrate proficiency in conducting visual acuity testing using various charts.</li> </ol>								
CO1	Describe ophthalmic patient education counselling.								
CO2	Understand the needs and importance of ophthalmic history taking.								
CO3	Explain the steps of visual acuity testing using various charts.								
CO4	Demonstrate proficiency in measuring interpupillary distance (IPD) during eye examinations								
CO5	Demonstrate competence in using ophthalmic instruments following correct procedures for examination and diagnosis.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Ophthalmic patient counselling</b> <ul style="list-style-type: none"> <li>• The ability to communicate effectively with a diverse group of patients with a range of optometric conditions and needs.</li> </ul>		2hrs	Describe, and explain ophthalmic patient counselling				1,2,3	
II	<b>Paediatric History taking of an Ophthalmic care</b> <ul style="list-style-type: none"> <li>• Demographic data, chief complaint, ocular and systemic history, etc.</li> </ul>		2hrs	Describe the steps of history taking.				1,2	
III	<b>Visual acuity testing charts</b> <ul style="list-style-type: none"> <li>• Types of visual acuity testing charts – Distance, Near</li> </ul>		2hrs	Describe and explain the steps of Visual acuity.				1,2,3,4,5	
IV	<b>Eye examination</b> <ul style="list-style-type: none"> <li>• IPD</li> </ul>		2hrs	Explain IPD.				1,2,3,4,5	
V	<b>Uses and procedure of ophthalmic</b>			Describe, and explain the procedure of ophthalmic				1,2,3,4,	

	<b>instruments</b> <ul style="list-style-type: none"> <li>• Retinoscope</li> <li>• Ophthalmoscope</li> </ul>	2 hrs.	instruments	5
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**TEXT BOOKS:**

T1: Optics and Refraction by A.K.KHURANA.

**REFERENCE BOOKS:**

R1: Optics for Optometry Students by P.C Mukherjee.

**OTHER LEARNING RESOURCES:**

<https://depisteo.com/blog/optical-tools-required-practice/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe ophthalmic patient education counselling.	2,3
2	Understand the needs and importance of ophthalmic history taking.	4,5
3	Explain the steps of visual acuity testing using various charts.	7,8
4	Demonstrate proficiency in measuring interpupillary distance (IPD) during eye examinations	2,3
5	Demonstrate competence in using ophthalmic instruments following correct procedures for examination and diagnosis.	4,5

SEMESTER – III									
Course Title	CO-CURRICULAR								
Course code	22UBCC211	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.								
CO	Co-curricular activities facilitate in the development of various domains of mind and personality such as intellectual development, emotional development, social development, moral development and aesthetic development. Creativity, Enthusiasm, and Energetic, Positive thinking are some of the facets of personality development and the outcomes of extracurricular activities.								
Content									
The institute provides the opportunity to the teacher trainees to participate in various activities for their overall development. The institute conducts Seminars and Workshops, Guest Lectures, Essay writing, projects, general knowledge debates, quiz and discussion on current affairs, Discussion on social justice, National Days Celebrations, Assembly, Weekly meetings and Value Education programme, and also organize Dance, Dramatics, Singing competitions. Games and Sports are compulsory for all the students. Provision has, therefore been made for games and sports in college. The college will have unit of N.S.S. and will also give the opportunity to students to participate in it.									



<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>EXTRA-CURRICULAR</b>								
<b>Course code</b>	<b>22UBEC211</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Pre-requisite</b>	<b>Compulsory</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>III semester of second year of the programme</b>								
<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners								
<b>CO</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to earn from invited experts in their respective fields. The students will get an exposure of 360degree learning methodology considering the overall growth along with the academics.								
<b>Content</b>									
AdtU encourages a range of activities outside the regular curriculum intended to meet learner’s interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.									

<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>GENERIC ELECTIVE</b>								
<b>Course code</b>	<b>22BOPTGE01</b>	<b>Total credits: 1</b> <b>Total hours: T+P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Pre-requisite</b>	<b>Compulsory</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>Fall/III semester of second year of the programme</b>								
<b>Course Objectives</b>	Provide students with a broad, interdisciplinary foundation that enhances their critical thinking, analytical, and problem-solving skills. It aims to expose students to diverse fields of knowledge beyond their major area of study, fostering a well-rounded educational experience. The course encourages intellectual curiosity and flexibility, preparing students to adapt to various professional and academic challenges.								

SEMESTER – III									
Course Title	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)								
Course code	MOBOPSW231/2/3	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours:	0	0	0	4	0	0	1
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	MOOCs (Massive Open Online Courses) have been around us since 2008, when around 2,300 students took part in a course called "Connectives and Connective Knowledge", organized by the University of Manitoba (Canada). However, 2012 was widely recognized as the year of the MOOC, because some MOOC initiatives, such as Coursera, Udacity, or edX, gained a world-wide popularity.								
CO	A massive open online course (MOOC) is an online course aimed at large-scale interactive participation and open access via the web. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for the students, professors, and teaching assistants (TAs). MOOCs are a recent development in distance education.								
Content									
<ul style="list-style-type: none"> <li>• The common duration of a MOOC is from 6 to 12 weeks. A MOOC is accessible 24 hours a day, 7 days a week. The majority of the content is delivered asynchronously (meaning students can access it in their own time and at their own pace). However, sometimes there can be optional synchronous events such as 'live' webinars (interactive sessions) which require participants to join in at specific dates/times.</li> <li>• A standard class becomes in a MOOC a set of videos of 5-10 minutes each.</li> <li>• The learning of students in a MOOC is usually assessed by multiple-choice questions.</li> <li>• An important component of MOOCs is assignments. Student have to upload assignment solutions into the MOOC platform. Assignments can be evaluated and graded: <ul style="list-style-type: none"> <li>- Automatically when possible.</li> <li>- Peer-to-peer: students evaluate and grade themselves.</li> </ul> </li> <li>• Another component is the forum, where students post questions that other students can answer.</li> <li>• Usually, there are no pre-requisites for taking a MOOC, apart from having access to a computer with an internet connection. Most of the time, the educational or academic background of students isn't important.</li> <li>• Students usually don't need to buy any books for these courses, because all reading is either be provided within the MOOC content or is linked to open access texts.</li> </ul>									

MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BOPT211R	OCULAR PHARMACOLOGY	3					3		2
22BOPT212R	VISUAL OPTICS-II	3			1	2			1
22BOPT213R	DISPENSING OPTICS I	1		3		2			1
22BOPT214R	PATHOLOGY AND MICROBIOLOGY	3					1		2
22BOPT215R	CLINICAL OPTICS & REFRACTION I		3	2	3		1		1
22BOPT216R	INSTRUMENTATION AND INVESTIGATION I		2		3		1		1
22UBPD211R	ENGLISH LANGUAGE PROFICIENCY (COMMUNICATIVE ENGLISH & SOFT SKILLS)					3		2	2
22BOPT217R	OPTOMETRY PROFESSIONAL SKILLS II		2	3	3	2		1	2
22UBCC211	CO-CURRICULAR					3		2	2
22UBEC211	EXTRA-CURRICULAR					3		2	2
22BOPTGE01	GENERIC ELECTIVE						1	2	3
MOBOPSW231/2/3	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)						1	2	3

SEMESTER – IV									
Course Title	Contact lens-I								
Course code	22BOPT221R	Total credits:3 Total hours: 30T+30P	L	T	P	S	R	O/F	C
			2	0	2	0	0	0	2+1=3
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	1.To perform a basic contact lens (CL) history and examination, and to be aware of additional basic tests and questions that are required for CL patients with more complex needs. 2.Understanding of the optical properties of contact lenses, as well as the classification, materials, patient selection, and indications and contraindications of contact lenses. 3. Acquire skills in fitting and assessing soft spherical and spherical RGP contact lenses, performing insertion and removal procedures, conducting important workups, and ensuring total contact lens care and maintenance								
CO1	Discuss the manufacturing methods, designs and benefits of contact lenses over spectacle.								
CO2	Understand contact lens optics and back vertex calculations.								
CO3	Describe the classification, selection of materials for the contact lens and its associated contraindications								
CO4	Discuss about contact lens fitting and assessment.								
CO5	Understand and implement of the push-up test and Taco method in the fitting and assessment of soft contact lenses.								
Unit- No.	Content				Contact Hour	Learning Outcome		KL	
I	INTRODUCTION OF CONTACT LENS-				6	Learn about the history, design, benefits of contact lens.		1,2	
<ul style="list-style-type: none"> <li>Contact lens history &amp; development</li> <li>Benefit of cl over spectacle.</li> <li>Basic designs of contact lens.</li> <li>Oxygen Permeability (Dk) and Oxygen Transmissibility(Dk/t)</li> <li>Manufacturing method of contact lens.</li> <li>Slit-lamp examination technique</li> </ul>									
II	OPTICAL PROPERTISE OF CONTACT LENS-				6	Illustrate about the optics of CL and also vertex distance calculation.		1,2	
<ul style="list-style-type: none"> <li>Contact lens optics.</li> <li>Back vertex calculation.</li> <li>Cl &amp; tear film lens system.</li> </ul>									
III	DIFFERENT CRITERIA OF CONTACT LENS-				6	Discuss & expalin about the classification, materials, indications and contraindication		1,2,5	
<ul style="list-style-type: none"> <li>Classification of cl &amp; FDA classification of contact lens</li> <li>Material of contact lens.</li> <li>Patient selection &amp; prescreening.</li> <li>Indication and contra indication of cl</li> </ul>									

			s of CL.	
<b>IV</b>	<b>CONTACT LENS FITTING AND ASSESSMENT-</b> <ul style="list-style-type: none"> <li>• Soft spherical cl fitting &amp; assessment and maintenance</li> <li>• Spherical RGP cl fitting &amp; assessment</li> <li>• Soft and RGP contact lens insertion and removal procedure.</li> </ul>	<b>6</b>	Explain and demonstrate about the different types of CL and also its fitting and assessments.	<b>1,3,4,5</b>
<b>V</b>	<b>SOME IMPORTANT WORKUP-</b> <ul style="list-style-type: none"> <li>• Push up test.</li> <li>• Taco method of soft contactlens</li> <li>• Total cl care and maintenance.</li> </ul>	<b>8</b>	Demonstrate about the different workup of CL.	<b>1,3,4,5</b>
<b>Practical</b>	<ul style="list-style-type: none"> <li>• CL designs</li> <li>• Examination of slit lamp for CL fitting</li> <li>• Soft &amp; RGP CL fitting &amp; removal</li> <li>• Care of CL</li> </ul>	<b>32</b>	Demonstrate about the	<b>1,2,3,4,5</b>

#### TEXT BOOKS:

T1: Textbook of contact lenses by R Sinha and V.K DADA

#### REFERENCE BOOKS:

R1: Contact lens primer by Monica Chaudhury

#### OTHER LEARNING RESOURCES:

<https://youtu.be/0pPVkAcwp7Q>

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Discuss the manufacturing methods, designs and benefits of contact lenses over spectacle.	<b>3,5</b>
<b>2</b>	Understand contact lens optics and back vertex calculations.	<b>6,8</b>
<b>3</b>	Describe the classification, selection of materials for the contact lens and its associated contraindications	<b>5,8</b>
<b>4</b>	Discuss about contact lens fitting and assessment.	<b>3,5</b>
<b>5</b>	Understand and implement of the push-up test and Taco method in the fitting and assessment of soft contact lenses.	<b>6,8</b>

SEMESTER – IV									
Course Title	OCULAR DISEASE I								
Course code	22BOPT222R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	2
Pre-requisite	COMPULSORY	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	<ol style="list-style-type: none"> <li>1. To impart an understanding of the pathophysiological processes underlying ocular disease.</li> <li>2. By better understanding these processes, participants can better recognise disease states</li> <li>3. Identify progression of disease.</li> </ol>								
CO1	Describe the classification and etiologies of various diseases of the lids and lacrimal apparatus								
CO2	Identify clinical features and treatments for diseases of the conjunctiva and sclera.								
CO3	Understanding the clinical features and plan of treatment for corneal diseases.								
CO4	Demonstrate the etiology and classification of iris diseases and their treatment strategies.								
CO5	Describe the clinical features and treatment measures of cataract and Glaucoma.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	<b>DISEASE OF THE LIDS AND LACRIMAL APPARATUS-</b> <ul style="list-style-type: none"> <li>• Defination</li> <li>• Etiology</li> <li>• Classification</li> <li>• Clinicalfeatures</li> <li>• Investigation &amp;treatment</li> </ul>	6	Learn about the disease of eyelids and lacrimal apparatus.	1,2,3,5					
II	<b>DISEASE OF THE CONJUNCTIVA AND SCLERA-</b> <ul style="list-style-type: none"> <li>• Defination</li> <li>• Etiology</li> <li>• Classification</li> <li>• Clinicalfeatures</li> <li>• Investigation &amp;treatment</li> </ul>	6	Learn about conjunctiva and sclera, also the different types of disease associated with it.	1,2,3,5					
III	<b>DISEASE OF THE CORNEA-</b> <ul style="list-style-type: none"> <li>• Defination</li> <li>• Etiology</li> <li>• Classification</li> <li>• Clinicalfeatures,</li> <li>• Investigation &amp;treatment</li> </ul>	6	Learn about cornea and the diseases associated with it.	1,2,3,5					
IV	<b>DISEASE OF THE IRIS-</b> <ul style="list-style-type: none"> <li>• Defination</li> <li>• Etiology</li> </ul>	6	Learn about iris and its disease.	1,2,3,5					

	<ul style="list-style-type: none"> <li>• Classification</li> <li>• Clinical features</li> <li>• Investigation &amp; treatment.</li> </ul>			
<b>V</b>	<b>CATARACT AND GLAUCOMA-</b> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Etiology</li> <li>• Classification</li> <li>• Clinical features</li> <li>• Investigation &amp; treatment</li> </ul>	<b>8</b>	Learn about cataract and glaucoma.	1,2,3,5

### TEXT BOOKS:

T1: Comprehensive ophthalmology by A K Khurana

### REFERENCE BOOKS:

R1: Clinical Ophthalmology-A.K.Khurana., Hand Book Of Ophthalmology-B.C.Chatterjee. And Clinical Ophthalmology-J.Kanski.

### OTHER LEARNING RESOURCES:

<https://www.youtube.com/watch?v=RtpjJg20FwQ>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe the classification and etiologies of various diseases of the lids and lacrimal apparatus	2,5
2	Identify clinical features and treatments for diseases of the conjunctiva and sclera.	6,8
3	Understanding the clinical features and plan of treatment for corneal diseases.	2,5
4	Demonstrate the etiology and classification of iris diseases and their treatment strategies.	6,8
5	Describe the clinical features and treatment measures of cataract and Glaucoma.	5,8



SEMESTER – IV									
Course Title	INSTRUMENTATION AND INVESTIGATION II								
Course code	22BOPT223R	Total credits: 3 Total hours: 30T+30P	L	T	P	S	R	O/ F	C
			2	0	2	0	0	0	2+1=3
Pre-requisite	COMPULSORY	Co-requisite	INSTRUMENTATION AND INVESTIGATION I						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	1.Learn various methods and techniques to assess the degree of squint and understand and implement subjective and objective refraction procedures for correcting refractive errors. 2.Gain knowledge of the concepts, working principles, and applications of different optometric instruments 3.Demonstrate proficiency in using advanced optometric instruments to conduct comprehensive eye examinations.								
<b>CO1</b>	Describe various methods & techniques to access the degree of squint								
<b>CO2</b>	Understand and implement subjective and objective refraction procedures for refractive errors correction								
<b>CO3</b>	Understand the concept, working principle and application of different optometric instruments.								
<b>CO4</b>	Explain various methods and instruments for the measurement of IOP and visual field abnormalities.								
<b>CO5</b>	Demonstrate the application of advanced optometric instruments for comprehensive eye examinations.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
<b>I</b>	<b>MOTOR SIGNS IN SQUINT –</b> <ul style="list-style-type: none"> <li>• Cover and uncovertest.</li> <li>• maddox wing to assess heterophoria</li> <li>•</li> </ul> <b>ASSESSMENT OF DEGREE OF SQUINT–</b> <ul style="list-style-type: none"> <li>• Prism bartest.</li> <li>• Krimskytest.</li> <li>• Synoptophorettests.</li> </ul>	6	Learn about squint and its assessments.	1,2,3,4,5					
<b>II</b>	<b>REFRACTIVE ERROR CORRECTION</b> Subjective and objective refraction	6	Learn about RE and its corrections.	2,3,4,5					
<b>III</b>	<b>DETAILED STUDY OF THE PRINCIPLES OF OPERATION, TYPES, OPTICAL PROPERTIES, CONSTRUCTION, ADJUSMENT</b>	6	Know about the principles and properties of	2,3,4,5					

	<b>AND APPLICATION OF THE FOLLOWING INSTRUMENTS AND DEVICES-</b> <ul style="list-style-type: none"> <li>• Pachymeter</li> <li>• IOL master</li> <li>• Specularmicroscopy</li> </ul>		different type of ophthalmic instruments.	
<b>IV</b>	<b>TONOMETER-</b> <ul style="list-style-type: none"> <li>• Principles,</li> <li>• Types</li> </ul> <b>CLINICAL IMPORTANCES AS ROUTINE PROCEDURE</b> <b>PERIMETER-</b> <ul style="list-style-type: none"> <li>• Basics of perimetry</li> <li>• Types,</li> <li>• Interpretation of normal glaucoma field of definition.</li> <li>• Amsler grid test</li> <li>• Confrontation test</li> </ul>	6	Learn about different types IOP and visual field assessments.	2,3,4,5
<b>V</b>	<b>ADVANCED INSTRUMENTS OF OPTOMETRY-</b> <ul style="list-style-type: none"> <li>• Ultrasonography (a-scan-b -scan) - principles and application.</li> <li>• F.F.A- principles and demonstration of film</li> <li>• Optical coherence tomography</li> </ul>	8	Know about the principles of instruments.	2,3,4,5
<b>PRACTICAL</b>	<ol style="list-style-type: none"> <li>1. Slit lamp examination</li> <li>2. Keratometer, Ophthalmoscope</li> <li>3. Tonometer, Devices for color vision testing, Auto perimeter-normal HFA, printout, A-scan:- normal print out &amp; analysis, B-scan:- normal print out &amp; analysis</li> </ol>	32	Learn about the procedure of different types of ophthalmic instruments.	1,2,3,4,5

**TEXT BOOKS:**

T1: Optics & refraction-l.p.Agarwal

**REFERENCE BOOKS:**

R1: Introduction to visual optics, alan h. Tumadiffe(1987)

R2: Clinical optics- 2nd ed (1991)- a.r.elington&h.j.frank

R3: Optics & refraction-l.p.agarwal.

R4: Clinical optics-borish

**OTHER LEARNING RESOURCES:**

- <https://www.youtube.com/watch?v=8MFvQE2BfBI>
- <https://www.youtube.com/watch?v=sXsl0HOX79s>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe various methods & techniques to access the degree of squint	<b>2,4,6,8</b>
<b>2</b>	Understand and implement subjective and objective refraction procedures for refractive errors correction	<b>4,6,8</b>
<b>3</b>	Understand the concept, working principle and application of different optometric instruments.	<b>4,6,8</b>
<b>4</b>	Explain various methods and instruments for the measurement of IOP and visual field abnormalities.	<b>2,4</b>
<b>5</b>	Demonstrate the application of advanced optometric instruments for comprehensive eye examinations.	<b>2,4</b>

SEMESTER – IV									
Course Title	DISPENSING OPTICS II								
Course code	22BOPT224R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 60T+30P	4	0	2	0	0	0	4+1=5
Pre-requisite	Compulsory	Co-requisite	DISPENSING OPTICS I						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	1. Gain knowledge of various spectacle frame designs and materials, and demonstrate the ability to measure frames using the boxing and datum system. 2. Identify facial measurements and analyze the fitting process for bifocal and progressive lenses, ensuring proper alignment and comfort for the wearer. 3. Understand the unique aspects of pediatric dispensing and assess occupational needs to recommend appropriate protective eyewear.								
CO1	Understand various spectacle frame designs and its materials.								
CO2	Demonstrate the frame measurements using the boxing and datum system.								
CO3	Identify the facial measurements and analyze the fitting process for bifocal and progressive lenses								
CO4	Comprehend the unique aspects of pediatric dispensing.								
CO5	Access the occupational needs and suggest protective eyewear accordingly								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	<b>SPECTACLE FRAME DESIGN AND ITS MATERIAL-</b> <ul style="list-style-type: none"> <li>Spectacle frame materials- plastic, metals frame types, combination of frames, half-eye frames, nylon-cordframe,</li> <li>Bifocal lens and its types Progressive lenses</li> </ul>	14	Learn about different designs and materials of frame.	1,2,3					
II	<b>SPECTACLE FRAME MEASUREMENTS AND SELECTION PROCEDURE-</b> <ul style="list-style-type: none"> <li>Frame measurements- the boxing system, the datum system, Comparison of two systems,</li> <li>Frame selection- fashion, function, feel, conflicting needs, Price, standard alignment</li> <li>Lens selection- ground rule for selection, selection criteria</li> </ul>	1	Learn about measurements of spectacle frame and its selection procedures.	1,2,3,4					
III	<b>IPD &amp; FITTING MEASUREMENTS-</b>		Learn about	3,4,5					

	<ul style="list-style-type: none"> <li>• Facial measurement-the pd,measuring inter pupillary distances,using PD ruler,</li> <li>• Measuring monocularPD,</li> <li>• Measuring nearPD</li> <li>• Bifocal lens fitting process</li> <li>• Progressive lens fitting process.</li> </ul>	14	IPD and fitting measurements.	
<b>IV</b>	<b>PEDIATRIC FRAME AND LENS SELECTION-</b> <ul style="list-style-type: none"> <li>• Pediatric dispensing- the changing image of spectacle, agedifferences.</li> <li>• Frame selection-technical criteria, fashion criteria, some tips on selection.</li> <li>• Lens selection- technical criteria,communicating withkids,</li> <li>• Facial measurements of the kids-PDs, centers,bi-focal.</li> </ul>	12	Learn about pediatric frame selection and lens selections.	3,4,5
<b>V</b>	<b>HOW WE DEALING DIFFERENT TYPES OF CLIENT PROBLEMS AND EYE PROTECTION IN DEFFERENT PLACE-</b> <ul style="list-style-type: none"> <li>• Dealing with common client’s problems and dealing with the laboratories, hazards in the work place, occupational healthsafety.</li> </ul> <b>EYE PROTECTION IN DEFFERENT PLACE-</b> <ul style="list-style-type: none"> <li>• <b>Industrial eye protection and</b> standards covering eye protection,lens materials &amp; impactresistance</li> <li>• Sports eye protection</li> </ul>	12	Learn about different client problems and eye protections.	1,2,3,5
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Datum and boxing system</li> <li>2. IPD measurement-monocular ,binocular and near PD</li> <li>3. Bifocal lens fitting and progressive lens fitting</li> <li>4. Pediatric pd and dispensing</li> </ol>	38	Learn the procedure for IPD measurements, also the fitting of lenses.	1,2,3,4,5

**TEXT BOOKS:**

T1: Brooks & Borish. Systems for Ophthalmic Dispensing. 2nd ed. The Professional Press, 1996.

**REFERENCE BOOKS:**

R1: Borish’sclinicalrefraction–i.M.Borish,w.J.Benjamin–w.B.Saundersco.

R2: Primary care optometry – theodore–butterworth-heinemann.

R3: Clinical procedures in optometry – eskridge, amos, bartlett.-j. B. Lippincottco.

R4: The ocular examination: measurement and findings – karlazadmik

**OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=NqR0j-ZGCXg>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand various spectacle frame designs and its materials.	<b>1,3,5,8</b>
<b>2</b>	Demonstrate the frame measurements using the boxing and datum system.	<b>5,8</b>
<b>3</b>	Identify the facial measurements and analyze the fitting process for bifocal and progressive lenses	<b>1,3</b>
<b>4</b>	Comprehend the unique aspects of pediatric dispensing.	<b>5,8</b>
<b>5</b>	Access the occupational needs and suggest protective eye ware accordingly	<b>1,3,5,8</b>

SEMESTER – IV									
Course Title	CLINICAL OPTICS & REFRACTION II								
Course code	22BOPT225R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 60T+30P	4	0	2	0	0	0	4+1=5
Pre-requisite	Compulsory	Co-requisite	CLINICAL OPTICS & REFRACTION I						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	1. Implement and evaluate various convergence tests to diagnose anomalies of convergence. 2. Explain and perform contrast sensitivity and color vision tests, and describe methods for the neutralization of ophthalmic lens power. 3. Demonstrate the use of ophthalmoscopy for fundus assessment and understand the application of electromagnetic energy and lasers in optometry.								
CO1	Evaluate anomalies of convergence by implementing various convergence tests								
CO2	Explain about contrast sensitivity and color vision tests								
CO3	Understand the application of electromagnetic energy and lasers.								
CO4	Describe the methods for the neutralization of ophthalmic lens power								
CO5	Demonstrate ophthalmoscopy and their applications in the assessment of the fundus.								
Unit-No.	Content		Contact Hour	Learning Outcome			KL		
I	CONVERGENCE-		14	Basics about convergences and its anomalies.			1,2,3,4,5		
	<ul style="list-style-type: none"> <li>Anomalies of convergence, tests for measuring near point of convergence: raf ruler, pencil push up test, positive fusional vergence, negative fusionalvergence.</li> </ul>								
II	COLOR VISION AND ITS ASSESSMENT-		12	Knowledge about colour vision and different types of color vision assessments.			1,2,3,4,5		
	<ul style="list-style-type: none"> <li>Contrast sensitivity and itsassessment</li> <li>Night – drivingglasses</li> </ul>								
III	ELECTROMAGNETIC ENERGY –		14	Basics about electromagnetic energy..			1,2,3,4,5		
	<ul style="list-style-type: none"> <li>Cosmic rays, x-rays and light, radarradio-waves.</li> <li>Laser – introduction, applications</li> <li>Types of glare and assessment ofglare.</li> </ul>								

<b>IV</b>	<b>NEUTRALIZATION OF OPHTHALMIC LENS POWER-</b> <ul style="list-style-type: none"> <li>• Manual and with help of lensometer</li> <li>• Subjective refraction</li> </ul>	12	Knowledge about neutralization of lens power.	<b>1,2,3,4,5</b>
<b>V</b>	<b>INVESTIGATION-</b> <ul style="list-style-type: none"> <li>• Measurements of intra papillary distance using pd ruler.</li> <li>• Direct ophthalmoscopy types and assessment of fundus.</li> </ul>	12	Learn about investigation of fundus.	<b>1,2,3,4,5</b>
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Direct ophthalmoscopy-normal fundus</li> <li>2. Subjective refraction– fogging, clock dial, fan, jcc, prism dissociation method, duochrome, cyclodermia, slit, Refraction.</li> <li>3. Measurement of amplitude of accommodation.</li> </ol>	34	Learn the procedures of ophthalmoscopy, subjective refractions, also amplitude of accommodation.	<b>1,2,3,4,5</b>

#### TEXT BOOKS:

T1: Clinical optics and refraction by Andrew Keirl

#### REFERENCE BOOKS:

R1: w.B.Saundersco.

R2: Borish's clinical refraction – i.M. Borish, w.J. Benjamin – Primary care optometry – theodore – butterworth-heinemann.

R3: Clinical procedures in optometry – eskridge, amos, bartlett. -j. B. Lippincottco.

R4: The ocular examination : measurement and findings – karlazadmik

#### OTHER LEARNING RESOURCES:

- <https://www.youtube.com/watch?v=FYT-vpQpniY>
- <https://www.youtube.com/watch?v=ObKHkYYgPrs>

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome



<b>1</b>	Evaluate anomalies of convergence by implementing various convergence tests	<b>2,3</b>
<b>2</b>	Explain about contrast sensitivity and color vision tests	<b>3,4</b>
<b>3</b>	Understand the application of electromagnetic energy and lasers.	<b>6,8</b>
<b>4</b>	Describe the methods for the neutralization of ophthalmic lens power	<b>4,6,8</b>
<b>5</b>	Demonstrate ophthalmoscopy and their applications in the assessment of the fundus.	<b>4,6,8</b>

SEMESTER – IV									
Course Title	PERSONALITY DEVELOPMENT SKILL FOR EMPLOYABILITY (COMMUNICATIVE ENGLISH & SOFTSKILLS)								
Course code	22UBPD221R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 60P	0	0	4	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	1. To enable the students for effective presentation. 2. To presentations to find new, innovative ways of developing and managing people. 3. To boost their confidence through self-reflection and mockinview techniques.								
CO1	It will prepare the learners to speak with greater control and charisma in front of others.								
CO2	It will have a positive impact in the thought process and problem-solving skills.								
CO3	It will enable students to prepare a professional resume and present themselves in an effective manner								
CO4	It will boost the leadership and management qualities of the students.								
CO5	It will enable students to prepare for interview and present themselves in an effective manner								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	Presentation Skills i. Introduction ii. Essential characteristics of ago presentation iii. Preparation of ago of presentation •		8	Introduction to skills			1,3,5		
II	PublicSkills i. Fear of Public Speaking, ii. Understanding and Overcoming Fear of Public Speaking iii. Confidence and Control, iv. Tips for Presentations and Public Speaking, v. Tips for Using Visual Aids in Presentations, vi. Delivering Presentations Successfully vii. Doubt Clearing and Summary of Main Points		8	Learn about public skills			1,3,5		

<b>III</b>	<p>Practical session on Resume, Curriculum Vitae, Writing cover letter &amp; Linked In Profile</p> <ol style="list-style-type: none"> <li>i. Preparation, submission &amp; screening of Resume.</li> <li>ii. Practical session on cover letter screening session</li> <li>iii. Creating profile in LinkedIn</li> <li>iv. How to utilize it</li> </ol>	8	Know about Preparation, submission & screening of Resume	1,3,5
<b>IV</b>	<p>Leadership &amp; Management Skills</p> <ol style="list-style-type: none"> <li>i. Concepts of Leadership</li> <li>ii. Leadership Styles</li> <li>iii. Manager VS Leader</li> <li>iv. How to be an Effective Leader</li> <li>v. Doubt Clearing Session.</li> </ol>	10	Know about Concepts of Leadership	1,3,5
<b>V</b>	<p>Interview Skills &amp; Dress Code Ethics</p> <ol style="list-style-type: none"> <li>i. Types of interview - telephonic, virtual &amp; face to face</li> <li>ii. Online interview, personal interview</li> <li>iii. Panel interview</li> <li>iv. Group interview</li> <li>v. Types of interview questions - traditional / common interview questions</li> <li>vi. General strategies for answering questions,</li> <li>vii. Preparation before the interview,</li> <li>viii. How to dress up for an interview,</li> <li>ix. How to maintain eye contact and positive body language</li> <li>x. Interview do's and don'ts,</li> <li>xi. Introduction to Dress Code Ethics,</li> <li>xii. Purpose and Importance</li> <li>xiii. What to wear during interview Any Other Formal Meetings - Male &amp; Female</li> </ol>	10	Learn about interview skills	1,3,5

**TEXT BOOKS:**

T1: Wren,P.C and Martin,H. 1995. High School English Grammar and Composition, SChandPublishing.

T2: Barrett, Grant. 2016. Perfect English Grammar: The Indispensible Guide to ExcellentWritingandSpeaking,Zephyros Press.

### REFERENCE BOOKS:

R1: Patil, Shailesh. (2020) Handbook on Public Speaking, Presentation & Communication Skills:Principles&Practicestocreatehighimpactpresentations&meaningfulconversations,NotionPre ss

R2: Weiser, Ryan, (2021)Winning Interview: An Ultimate Guidebook of Tricks, Strategies andTipsonInterviewPreparationsandAnsweringQuestionstoGettheJobYouWant!:1(Job Interview), CharlieCreativeLabLtdPublisher

### OTHER LEARNING RESOURCES:

- <https://www.youtube.com/watch?v=YY2yjEEoB3U>
- <https://www.youtube.com/watch?v=ADJAcYTq1us>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	It will prepare the learners to speak with greater control and charisma in front of others.	5,7,8
2	It will have a positive impact in the thought process and problem-solving skills.	5,7,8
3	It will enable students to prepare a professional resume and present themselves in an effective manner	5,7,8
4	It will boost the leadership and management qualities of the students.	5,7,8
5	It will enable students to prepare for interview and present themselves in an effective manner	5,7,8

SEMESTER – IV										
Course Title	OPTOMETRY PROFESSIONAL SKILLS III									
Course code	22BOPT226R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/ F	C	
			0	0	2	0	0	0	1	
Pre-requisite	Compulsory	Co-requisite	Techno professional skill II							
Programme	Bachelor of Optometry									
Semester	fourth									
Course Objectives	1. Develop proficiency in applying various methods to assess vision and perform accurate refraction in diverse patient populations, ensuring effective optical correction. 2. Acquire skills to identify spectacle lens types, designate accurate lens power, and apply optical principles in dispensing, ensuring precise lens fitting and patient satisfaction. 3. Master fitting measurements for bifocal and progressive lenses, integrating theoretical knowledge with practical application to enhance optometric practice and patient care.									
CO1	Apply various methods of assessing vision and perform accurate refraction in all patients, demonstrating proficiency in optical examination and correction.									
CO2	Demonstrate the identification of spectacle lens types and accurately designate lens power, applying knowledge of optical principles and techniques in dispensing optics.									
CO3	Apply fitting measurements for bifocal and progressive lenses, integrating theoretical knowledge with practical skills in optometric practice.									
CO4	Demonstrate proficiency in slit lamp techniques, including direct and indirect illumination methods, for comprehensive examination and diagnosis in ophthalmic practice.									
CO5	Utilize ophthalmic instruments such as the keratometer and lensometer proficiently, demonstrating competence in accurate measurement and assessment of ocular parameters in clinical settings.									
Unit- No.	Content	Contact Hour	Learning Outcome	KL						
I	<b>Refraction</b> <ul style="list-style-type: none"> <li>An understanding of methods of assessing vision, Refraction in all Patients</li> </ul>	2	Learn about Refraction	2,3,4,5						
II	<b>Dispensing optics</b> <ul style="list-style-type: none"> <li>Identification of spectacle lens</li> <li>Designation of lens power</li> </ul>	2	Learn about Identification of spectacle lens	1,2,3,4,5						
III	<b>Fitting measurement</b> <ul style="list-style-type: none"> <li>Bifocal</li> </ul>	2	Learn about fitting measurement	1,2,3,4,5						

	<ul style="list-style-type: none"> <li>Progressive</li> </ul>			
<b>IV</b>	<b>Slit lamp techniques</b> <ul style="list-style-type: none"> <li>Direct illumination</li> <li>Indirect illumination</li> </ul>	2	Learn about slit lamp techniques	1,2,3,4,5
<b>V</b>	<b>Introduction to ophthalmic instruments</b> <ul style="list-style-type: none"> <li>Keratometer</li> <li>lensometer</li> </ul>	2	Learn about instruments	1,2,3,4,5

### TEXT BOOKS:

T1: Optics and Refraction by A.K.KHURANA.

### REFERENCE BOOKS:

R1: Optics for Optometry Students by P.C mukharjee.

### OTHER LEARNING RESOURCES:

<https://depisteo.com/blog/optical-tools-required-practice/>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply various methods of assessing vision and perform accurate refraction in all patients, demonstrating proficiency in optical examination and correction.	2,3,5,8
2	Demonstrate the identification of spectacle lens types and accurately designate lens power, applying knowledge of optical principles and techniques in dispensing optics.	2,3,5,8
3	Apply fitting measurements for bifocal and progressive lenses, integrating theoretical knowledge with practical skills in optometric practice.	2,3,5,8
4	Demonstrate proficiency in slit lamp techniques, including direct and indirect illumination methods, for comprehensive examination and diagnosis in ophthalmic practice.	2,3,5,8
5	Utilize ophthalmic instruments such as the keratometer and lensometer proficiently, demonstrating competence in accurate measurement and assessment of ocular parameters in clinical settings.	2,3,5,8

<b>SEMESTER – IV</b>									
<b>Course Title</b>	<b>CO-CURRICULAR</b>								
<b>Course code</b>	<b>22UBCC221</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Pre-requisite</b>	<b>Compulsory</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>fourth</b>								
<b>Course Objectives</b>	Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.								
<b>CONTENT</b>									
The institute provides the opportunity to the teacher trainees to participate in various activities for their overall development. The institute conducts Seminars and Workshops, Guest Lectures, Essay writing, projects, general knowledge debates, quiz and discussion on current affairs, Discussion on social justice, National Days Celebrations, Assembly, Weekly meetings and Value Education programme, and also organize Dance, Dramatics, Singing competitions. Games and Sports are compulsory for all the students. Provision has, therefore been made for games and sports in college. The college will have unit of N.S.S.and will also give the opportunity to students to participate in it.									

SEMESTER – IV									
Course Title	EXTRA-CURRICULAR								
Course code	22UBEC221	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to earn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.								
CONTENT									
<p>AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.</p>									



SEMESTER – IV									
Course Title	ENVIRONMENTAL STUDIES								
Course code	22UBES201R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	<p>1.To prepare students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective.</p> <p>2.To develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, Skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and prevention of new ones.</p>								
CO1	Discuss the ethical, cross-cultural, and historical context of environmental issues.								
CO2	Identify natural resource, its importance and environmental impacts of Human activities.								
CO3	Discuss about environment and ecosystem.								
CO4	Understand the concept of biodiversity.								
CO5	Discuss the concepts of conservation of biodiversity, problems of environmental pollution, its impact on human and ecosystem.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	<b>Multidisciplinary nature of environmental studies:</b> Definition, scope and importance Need for public awareness.	2	Learn about Multidisciplinary nature of environmental studies	1,2					
II	<b>Natural Resources: Renewable and non-renewable resources:</b> Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man	6	Learn about Natural Resources: Renewable and non-renewable	1,2					

	induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.			
<b>III</b>	<b>Ecosystems Concept of an ecosystem:</b> Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the Following ecosystem: - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	<b>6</b>	<b>Learn about Ecosystems Concept</b>	1,2
<b>IV</b>	<b>Biodiversity and its conservation:</b> Introduction – Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a megadiversity nation• Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity	<b>8</b>	Learn about Biodiversity and its conservation	1,2
<b>V</b>	<b>Environmental Pollution:</b> Definition Cause, effects and control measures of:-Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.	<b>8</b>	Learn about Environmental Pollution	1,2
<b>VI</b>	<b>Social Issues and the Environment:</b> From Unsustainable to Sustainable development. Urban problems related to energy. Water	<b>7</b>	Learn about Social Issues and the	1,2

	conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case Studies. Environmental ethics : Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Waste land reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.		Environment	
<b>VII</b>	<b>Human Population and the Environment:</b> Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Case Studies. (6 lectures)	<b>6</b>	Learn about Human Population and the Environment	1,2
<b>VIII</b>	<b>Field work:</b> Visit to a local area to document environmental assets river/forest/grassland/hill/mountain. Visit to a local polluted site- Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc.	<b>5</b>	Learn about Field work	1,2

**Text Books:**

- T1: Harucha E. B, Textbook of Environmental Studies, Orient Blackswan Publishing  
T2: Tiwari V. K A Textbook of Environmental Studies, Himalaya Publishing House  
T3: Chatwal G. R. •&Sharma H. Environmental Studies, Himalaya Publishing House

**Reference Books:**

- R1: Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadards, Vol I and II, Enviro Media (R)  
R2: Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)  
R3: Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner. Bharucha Erach,

R4: The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)

R5: Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p Clark R.S.,

R6: Marine Pollution, Clanderson Press Oxford (TB)

**Other Learning Resources:**

The students will be able to appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems. Students will be able to understand the concept of biodiversity and respect them.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss the ethical, cross-cultural, and historical context of environmental issues.	<b>7,8</b>
<b>2</b>	Identify natural resource, its importance and environmental impacts of Human activities.	<b>7,8</b>
<b>3</b>	Discuss about environment and ecosystem.	<b>7,8</b>
<b>4</b>	Understand the concept of biodiversity.	<b>7,8</b>
<b>5</b>	Discuss the concepts of conservation of biodiversity, problems of environmental pollution, its impact on human and ecosystem.	<b>7,8</b>

<b>SEMESTER – IV</b>									
<b>Course Title</b>	<b>GENERIC ELECTIVE</b>								
<b>Course code</b>	<b>22BOPTGE01</b>	<b>Total credits:</b> <b>Total hours:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
			<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Pre-requisite</b>		<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>fourth</b>								
<b>Course Objectives</b>	Provide students with a broad, interdisciplinary foundation that enhances their critical thinking, analytical, and problem-solving skills. It aims to expose students to diverse fields of knowledge beyond their major area of study, fostering a well-rounded educational experience. The course encourages intellectual curiosity and flexibility, preparing students to adapt to various professional and academic challenges.								

SEMESTER – IV									
Course Title	Mooc/ online (self study mode on prescribed online platforms)								
Course code	MOBOPSW241/2/3	Total credits:	L	T	P	S	R	O/ F	C
Total hours:		0	0	0	4	0	0	1	
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	Fourth								
Course Objectives	MOOCs (Massive Open Online Courses) have been around us since 2008, when around 2,300 students took part in a course called "Connectives and Connective Knowledge", organized by the University of Manitoba (Canada). However, 2012 was widely recognized as The year of the MOOC, because some MOOC initiatives, such as Coursera, Udacity, or edX, gained a world-wide popularity.								
CONTENT									
Course Contents:									
<ul style="list-style-type: none"> <li>• The common duration of a MOOC is from 6 to 12 weeks. A MOOC is accessible 24 hours a day, 7 days a week. The majority of the content is delivered asynchronously (meaning students can access it in their own time and at their own pace). However, sometimes there can be optional synchronous events such as 'live' webinars (interactive sessions) which require participants to join in at specific dates/times.</li> <li>• A standard class becomes in a MOOC a set of videos of 5-10 minutes each.</li> <li>• The learning of students in a MOOC is usually assessed by multiple-choice questions.</li> <li>• An important component of MOOCs is assignments. Student has to upload assignment solutions into the MOOC platform. Assignments can be evaluated and graded: <ul style="list-style-type: none"> <li>-Automatically when possible.</li> <li>-Peer-to-peer: students evaluate and grade themselves.</li> </ul> </li> <li>• Another component is the forum, where students post questions that other students can answer.</li> <li>• Usually, there are no pre-requisites for taking a MOOC, apart from having access to a computer with an internet connection. Most of the time, the educational or academic background of students isn't important.</li> <li>• Students usually don't need to buy any books for these courses, because all reading is either be provided within the MOOC content or is linked to open access texts.</li> </ul>									

SEMESTER – IV									
Course Title	BASIC LIFE SAVING SKILLS (BLSS)								
Course code	22UULS202R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/ F	C
			3	0	0	0	0	0	3
Pre-requisite	compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	The aim of the course is to provide the learners with basic knowledge and practical skills needed in an emergency fire situation, and to provide appropriate basic management and treatment for injuries.								
CO1	Able to recognize respiratory arrest/ cardiac arrest, and provide oxygen to the patients to sustain tissue viability.								
CO2	Understand the ability to perform the importance of early CPR on Adult, child and infants victims.								
CO3	Demonstrate the basic steps to relieve choking for responsive and unresponsive victims								
CO4	Able to prevent injury from getting worse, aiding recovery, relieving pain and protecting the victims from deterioration.								
CO5	Learn about the fire equipments requirements, methods of operation and getting out alive.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	<b>Basic Life Support ( BLS)</b> <ul style="list-style-type: none"> <li>• Introduction of BLS</li> <li>• Chain of survival</li> <li>• ABCs Assessment</li> <li>• CPR and Ventilation Technique</li> <li>• AED</li> <li>• Choking for adult and children</li> </ul>	4	Students will Know about basic life support	1, 2					
II	<b>First Aid</b> <ul style="list-style-type: none"> <li>• Golden rules of First aid</li> <li>• First aid Kits</li> </ul>	2	Students will be able to learn about first aid	3, 4					
III	<b>Trauma emergencies</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Priorities of Initial approach in pre-hospital care <ul style="list-style-type: none"> <li>a) Scene safety</li> <li>b) Primary assessment c) Bleeding control</li> <li>d) Extrication of victims and safe transfer</li> <li>e) Cervical spine stabilization and C-collar application</li> <li>f) Splinting of broken Limbs</li> </ul> </li> </ul>	4	Students will learn about the trauma emergencies	3, 4					

<b>IV</b>	<b>Triage system</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Flow chart approach of Triage</li> <li>• Triage of Single and Multiple Casualties in Pre-Hospital setting</li> </ul>	2	Students will understand the triage system	1, 2, 3
<b>V</b>	<b>Medical emergencies</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Victim centered approach and Management of :- <ul style="list-style-type: none"> <li>a) Seizures</li> <li>b) heart attack</li> <li>c) asthma</li> <li>d) diabetic emergencies e) emergency childbirth f) Respiratory distress and failure</li> </ul> </li> </ul>	4		1, 2, 3
<b>VI</b>	<b>Environmental Emergency</b> <ul style="list-style-type: none"> <li>• Recognizing and caring for heat related illness such as: Heat stroke, heat cramps, heat exhaustion, dehydration.</li> <li>• Recognizing and caring for cold related illness such as frostbite, hypothermia.</li> <li>• Poisoning, Snake bite.</li> </ul>	2		1, 2, 3
<b>VII</b>	<b>Safety of people in the event of fire</b> <ul style="list-style-type: none"> <li>• Recognition of possible fire sources and emergency procedures, construction techniques for eliminating fire.</li> <li>• Types of detecting devices and extinguishing agents and systems. Devising procedures in the event of fire and react to fire danger.</li> <li>• Safety goals and objectives, Identifying hazards and risks</li> </ul>	2		1, 2, 3

### TEXT BOOKS:

T1: Nancy Caroline'S Emergency Care in the streets eight edition by Jones and Bartlett

T2: First Aid book by LC Gupta; Publisher Jaypee Brothers, 7th Edition.

T3: Advance Cardiovascular life support and Basic life support provider manual @ American Heart Association(AHA)



T4: Nancy Caroline'S Emergency Care in the streets eight edition by Jones and Bartlett

T5: First Aid book by LC Gupta; Publisher Jaypee Brothers, 7th Edition.

T6: Advance Cardiovascular life support and Basic life support provider manual @ American Heart Association(AHA)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to recognize respiratory arrest/ cardiac arrest, and provide oxygen to the patients to sustain tissue viability.	<b>5,7,8</b>
<b>2</b>	Understand the ability to perform the importance of early CPR on Adult, child and infants victims.	<b>5,7,8</b>
<b>3</b>	Demonstrate the basic steps to relive choking for responsive and unresponsive victims	<b>5,7,8</b>
<b>4</b>	Able to prevent injury from getting worse, aiding recovery, relieving pain and protecting the victims from deterioration.	<b>5,7,8</b>
<b>5</b>	Learn about the fire equipments requirements, methods of operation and getting out alive.	<b>5,7,8</b>

SEMESTER – IV									
Course Title	INTRODUCTION TO FINANCIAL BUDGETING AND PLANNING								
Course code	22UUF201R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	fourth								
Course Objectives	<ol style="list-style-type: none"> <li>To create awareness among students about the need for possessing financial literacy education.</li> <li>Identification of money as a working asset.</li> <li>Impart the ability to make better financial decisions</li> </ol>								
CO1	Understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.								
CO2	Understand the need and various kind of banking institutions' instrument and their utilities.								
CO3	Describe the importance of insurance services as social security measures.								
CO4	Learn to manage the money and debt more effectively.								
CO5	Understand the Transformations in Digital Money market.								
Unit-No.	Content				Contact Hour	Learning Outcome		KL	
I	<b>Introduction:</b> <ul style="list-style-type: none"> <li>Meaning, need and importance of Financial Literacy;</li> <li>Different components of Financial Literacy;</li> <li>Prerequisites of financial literacy;</li> <li>Savings – Meaning and Difference between savings and investment;</li> <li>Types of Financial Institutions and the services provided - Banking and Non-Banking;</li> <li>Different investment avenues.</li> </ul>				12	Students will Know about Meaning, need and importance of Financial Literacy		1, 2	
II	<b>Financial Planning:</b> <ul style="list-style-type: none"> <li>Meaning, need and importance for financial planning,</li> <li>Economic needs, balancing between economic need and resources;</li> <li>Three pillars of investments-risk, return, liquidity;</li> <li>Budgeting and its importance in financial planning;</li> <li>Steps involved in Financial Planning Process;</li> <li>Preparation of personal budgets, budget surplus and budget deficit, avenues for savings from surplus, sources for meeting deficit.</li> <li>Informal Society funds and crowd funding</li> </ul>				12	Students will be able to learn about Financial Planning		3, 4	
III	<b>Banks &amp; Post Office - As financial service provider:</b> <ul style="list-style-type: none"> <li>Meaning and evolution of money,</li> </ul>					Students will learn about		3, 4	

	<ul style="list-style-type: none"> <li>• Banks – meaning, types &amp; functions; types of accounts; Formalities to open various accounts</li> <li>• Different types of Post Office saving schemes: Recurring deposit, savings, term deposit; NSC; Kisan Vikas Patra; Monthly Income scheme (MIS) Account,</li> <li>• Public Provident Funds (PPF), Senior citizen savings scheme (SCSS), Sukanya Samriddhi Accounts,</li> <li>• Indian Postal Order; International Money transfer service; Forex Services;</li> <li>• Money remittance services; Jansuraksha Scheme.</li> </ul>	12	Meaning and evolution of money	
<b>IV</b>	<p><b>Insurance - As financial service provider:</b></p> <ul style="list-style-type: none"> <li>• Different types of Risks and their Management, Diversification of risk;</li> <li>• Meaning, need and importance of Insurance; Types of Insurance – Life Insurance, Health Insurance, General Insurance, Term Insurance,</li> <li>• Pension and retirement policies;</li> <li>• Post office life insurance schemes, Postal life insurance and rural postal life insurance.</li> </ul>	10	Students will understand the Different types of Risks and their Management	1, 2, 3
<b>V</b>	<p><b>Transformations in Digital Money market:</b></p> <ul style="list-style-type: none"> <li>• Various functions &amp; innovative services of Banks; Mobile Banking, NEFT, IMPS, RTGS,</li> <li>• Money transfer, Different types of cards- Debit &amp; Credit, E-Banking, Unified payment interface (UPI),</li> <li>• Credit Scoring - CIBIL, Digital Banking, crypto currency and related transactions, Fintech, Block chain; Understanding Digital Payments.</li> </ul>	2	Students will understand the Transformations in Digital Money market	4, 5

**TEXT BOOKS:**

T1: The Young Adult's Guide to Financial Success- How To Manage Your Money & Live Better On Less By Edward M. Wolpert

T2: Financial Freedom with Financial Control by Jagmohan Singh Pendown Press

T3: The Richest Man in Babylon (Deluxe Hardbound Edition) by George S. Clason ixia Press Garden City, New York, Ships from and sold by MG BOOKS.

T4: Financial literacy to financial planning by Dr. Purvi Kothari and Mr. Keyur Mehta Nexus Publications Surat Gujarat

T5: Ernst & Young's Personal Financial Planning Guide: Take Control of Your Future and Unlock the Door to Financial Security by Ernst & Young, Robert J. Garner, Robert B. Coplan, Barbara J. Raasch, Charles L. Ratner

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.	<b>5,7,8</b>
<b>2</b>	Understand the need and various kind of banking institutions' instrument and their utilities.	<b>5,7,8</b>
<b>3</b>	Describe the importance of insurance services as social security measures.	<b>5,7,8</b>
<b>4</b>	Learn to manage the money and debt more effectively.	<b>5,7,8</b>
<b>5</b>	Understand the Transformations in Digital Money market.	<b>5,7,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1*</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BOPT221R</b>	<b>CONTACT LENS-I</b>			3		2	2		1
<b>22BOPT222R</b>	<b>OCULAR DISEASE I</b>		3			1	1		2
<b>22BOPT223R</b>	<b>INSTRUMENTATION AND INVESTIGATION II</b>		2		2		1		1
<b>22BOPT224R</b>	<b>DISPENSING OPTICS II</b>	1		3		2			1
<b>22BOPT225R</b>	<b>CLINICAL OPTICS &amp; REFRACTION II</b>		3	2	3		1		1
<b>22UBPD221R</b>	<b>PERSONALITY DEVELOPMENT SKILL FOR EMPLOYABILITY (COMMUNICATIVE ENGLISH &amp; SOFT SKILLS)</b>					3		2	2
<b>22BOPT226R</b>	<b>OPTOMETRY PROFESSIONAL SKILLS III</b>		2	3	3	2		1	2

<b>22UBCC221</b>	<b>CO-CURRICULAR</b>					3		2	2
<b>22UBEC221</b>	<b>EXTRA-CURRICULAR</b>					3		2	2
<b>22UBES201R</b>	<b>ENVIRONMENTAL STUDIES</b>							2	3
	<b>GENERIC ELECTIVE</b>						1	2	3
<b>MOBOPSW241/2</b>	<b>MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)</b>						1	2	3
<b>22UULS202R</b>	<b>BASIC LIFE SAVING SKILLS (BLSS)</b>					1		1	2
<b>22UUFL201R</b>	<b>INTRODUCTION TO FINANCIAL BUDGETING AND PLANNING</b>					1		1	2

SEMESTER – V									
Course Title	CONTACT LENS II								
Course code	22BOPT311R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 30T+30P	2	0	2	0	0	0	3
Pre-requisite	COMPULSORY	Co-requisite	CONTACT LENS I						
Programme	Bachelor of Optometry								
Semester	V semester of third year of the programme								
Course Objectives	1. To perform a basic contact lens (CL) history and examination, and to be aware of additional basic tests and questions that are required for CL patients with more complex needs 2. Recognize various types of fitting Identify and manage the adverse effects of contact lens. 3. The subject provides the student with suitable knowledge both in the oretical and practical aspects of contact lens								
CO1	Demonstrate various techniques of contact lens fitting.								
CO2	Discuss in details about extended wear, daily wear and disposable contact lenses.								
CO3	Demonstrate the important steps in the contact lens workup.								
CO4	Explain about prosthetic eye fitting procedures.								
CO5	Discuss various techniques of contact lens modifications.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>DIFERENT TYPES OF CONTACT LENS FITTING:</b> Contact lens fitting in astigmatism ; Contact lens fitting in keratokonus ; Contact lens fitting in children ; Rgp lenses ; Instruction regarding handling and care of lenses ; Cosmetic and prosthetic	10	Describe, illustrate and explain about different therapeutical contact lens fitting, cl fitting in children, care and maintenances of cl					1,2,3,5	
II	<b>SOME MORE BENEFICIAL CONTACT LENS AND ITS CONTACT LENS SOLUTION:</b> Extended wear lenses Vs daily wear ; Disposable lenses ; Contact lens-bifocal, multifocal ; Therapeutic and bondage contact lenses ; Contact lens solutions – principle of action, compositions	6	Describe, illustrate and explain various type of contact lens , therapeutic contact lens, contact lens solution and their composition					1,2	
III	<b>CONTACT LENS IMPORTANTS WORKUP:</b> Writing prescription to the lab for order cl ; Checking the parameters ; Follow up examination ; Contact lens complication and the management.	6	Describe and explain about contact lens different checking parameters ; follow up examination; complication and management					1,2,5	
IV	<b>OCULAR PROSTHETIC:</b> Prosthetic eye fitting procedures and conformers	6	Describe, illustrate and explain about prosthetic eye and their fitting procedure.					1,3,4,5	
V	<b>CONTACT LENS MODIFICATIONS:</b> Finger lishing ; Re-cn(cleaning) of the front surface edge ; Re-blending the posterior periphery ; Polishing of the front or back	4	Explain about learn about CL modifications					1,3,4,5	

	surfaces			
<b>Practical</b>	5. Soft contact lens fitting 6. RGP contact lens fitting 7. Do's and don'ts of contact lens 8. Basic designs of contact lens	<b>32</b>	Describe, illustrate and explain and apply about cl fitting and basic cl design.	1,2, 3,4, 5

### TEXT BOOKS:

T1: Textbook of contact lenses by R Sinha and V.K DADA

### REFERENCE BOOKS:

R1: Fitting guide for rigid and soft contact lenses – h. A. Stein, slatt, m. L. Freeman (mosby).

R2: Iacle module.

R3: Contact lenses (the clao guide to basic science and clinical practice). – kenddall/hunt publishing co.

### OTHER LEARNING RESOURCES:

<https://youtu.be/0pPVkAcwp7Q>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate various techniques of contact lens fitting.	3,5,8
2	Discuss in details about extended wear, daily wear and disposable contact lenses.	3,5,8
3	Demonstrate the important steps in the contact lens workup.	3,5,8
4	Explain about prosthetic eye fitting procedures.	3,5,8
5	Discuss various techniques of contact lens modifications.	3,5,8

SEMESTER – V									
Course Title	OCULAR DISEASE -II								
Course code	22BOPT312R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	COMPULSORY	Co-requisite	OCULAR DISEASE I						
Programme	Bachelor of Optometry								
Semester	V semester of third year of the programme								
Course Objectives	<p>1. To impart an understanding of the patho physiological processes underlying ocular disease. By better understanding these processes, participants can better recognise disease states and identify progression of disease.</p> <p>2. This course deals with ocular disease affecting various parts of the eyes.</p> <p>3. It covers clinical signs and symptoms, cause, pathological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.</p>								
CO1	Understand anomalies of vitreous and analyze the causes and implications of it								
CO2	Discuss congenital and developmental defects of the retina.								
CO3	Understand anomalies and injures of the optic nerve.								
CO4	Understanding various type of visual field and colour vision defect .								
CO5	Discuss about the various types of Neuro eye diseases.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>DISEASES OF THE VITREOUS HUMOR:</b> Congenital anomalies, vitreous opacities, hereditary vitreo–retinaldegeneration’s. Vitreous haemorrhage, detachment of vitreous humor,vitreous surgery.	6	Describe and explain about various vitreous abnormalities, diagnosis and management				1,2,5		
II	<b>DISEASE OF THE RETINA:</b> Congenital & dev, defects, inflammation of the retina (retinitis), retinal vasculitis .oedema of the retina. Haemorrhage of the retina, vascular occlusion, retinal arteriosclerosis, retinopathies. Retinal telangiectasia, degeneration’s of the retina. Detachment of the retina, surgical lprocedures for retinal detachment, tumours of the retina, phakomatoses, injuries of theretina.	8	Describe, illustrate and explain various abnormalities of retina, congenital defect, diagnosis criteria, various management procedures				1,2,5		
III	<b>DISEASE OF THE OPTIC NERVE:</b> Congenital anomalies. Papilloedema, inflammation of the optic nerve (optic-neuritis). Ischemic optic neuropathy, optic atrophy, tumors of theoptic nerve, injuries of the optic nerve.	6	Describe and learn about different Congenital anomalies, injuries of the optic nerve, inflammation of the optic nerve				1,2,5		



<b>IV</b>	<b>SYMPTOMATIC DISTURBANCES OF VISUAL FUNCTION :</b> Visual field defects, amblyopia, amaurosis, nightblindness, day blindness, defects in color vision, malingering.	<b>6</b>	Describe, illustrate and explain about Visual field defects, amblyopia, defects in color vision, malingering.	1,2, 5
<b>V</b>	<b>NEURO –EYE DISEASE:</b> Evaluation of optic nerve disease clinical features of optic nerve dysfunction, optic disc changes, optic atrophy. Classification and causes of optic neuritis, optic neuritis and demyelinationpara infectious optic neuritis. Infectious optic neuritis. Non-arteritic anterior ischaemic optic neuropathy, ischaemic optic neuropathy, hereditary optic atrophieskjer syndrome. Behr syndrome, wolfram syndrome, alcohol-tobacco amblyopia. Drug-induced optic neuropathies	<b>6</b>	Explain about learn about Evaluation of optic nerve disease clinical features of optic nerve dysfunction, optic disc changes, optic atrophy, Classification, causes and management	1,2, 5

#### **TEXT BOOKS:**

T1: Comprehensive ophthalmology by A K Khurana

#### **REFERENCE BOOKS:**

R1: Clinical Ophthalmology-A.K.Khurana.,Hand Book Of Ophthalmology-B.C.Chattterjee. R2: Clinical Ophthalmology-J.Kanski.

#### **OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=RtpjJg20FwQ>

#### **RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand anomalies of vitreous and analyze the causes and implications of it	<b>2,5</b>
<b>2</b>	Discuss congenital and developmental defects of the retina.	<b>2,6</b>
<b>3</b>	Understand anomalies and injures of the optic nerve.	<b>6,8</b>
<b>4</b>	Understanding various type of visual field and colour vision defect .	<b>5,6</b>
<b>5</b>	Discuss about the various types of Neuro eye diseases.	<b>6,8</b>

SEMESTER – V									
<b>Course Title</b>	<b>BINOCULAR VISION AND OCULAR MOTILITY</b>								
<b>Course code</b>	<b>22BOPT313R</b>	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 30T+30P	2	0	2	0	0	0	3
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	NIL						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>V semester of third year of the programme</b>								
<b>Course Objectives</b>	<p>1. This subject provides a conceptual and practical framework for understanding and examining the sensory and motor processes that mediate binocular vision. Students study the anatomical, physiological and optical principles underlying normal eye movements and single binocular vision.</p> <p>2. An understanding of how the coordination of the eyes may be modified by accommodation and associated accommodation/convergence relationships is acquired. Through this, students are led to discuss the diagnosis and management of common ocular conditions related to heterophoria, strabismus, amblyopia and accommodation and convergence defects.</p> <p>3. Learn fundamental orthoptic procedures used to demonstrate normal and defective binocular vision and for the diagnosis and measurement of ocular motility disorders.</p> <p>4. Provides essential knowledge and skills that forms a foundation for further studies in this area of orthoptic practice.</p>								
<b>CO1</b>	Explain about binocular vision and its grades.								
<b>CO2</b>	Discuss about the various anomalies of binocular vision, its investigations and management.								
<b>CO3</b>	Describe the diagnosis and treatment of the anomalies of convergence & accommodation.								
<b>CO4</b>	Discuss convergence insufficiency and other reading difficulties.								
<b>CO5</b>	Explain the gross anatomy & physiology of extra ocular muscles and its functions								
<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>GRADES OF BINOCULAR VISION:</b> Simultaneous perception, fusion, stereopsis advantages of binocular vision; Corresponding point and normal retinal correspondance; Physiological diplopia stereoacuity tests.	<b>6</b>	Describe and explain about grades of BV, Corresponding point and normal retinal correspondance, diplopia test					1,2,3	
<b>II</b>	<b>BINOCULAR DEFECTS:</b> Vision in anisometropia, treatment; Binocular optical defects; Aniseikonia symptoms; Clinical investigation; Treatment binocular muscular co-ordination, orthophoria, binocular vision; Causes of muscular imbalance – exophoria, esophoria, heterophoria, cyclophoria	<b>6</b>	Describe, illustrate and explain various binocular optical defects, cause, differential test and management					2,3,4	
<b>III</b>	<b>ACCOMMODATION AND CONVERGENCE ANOMALIES:</b> Symptoms of heterophoria & treatment	<b>8</b>	Describe and learn about different type of squint; Symptoms of heterophoria & treatment					2,3,4	

	strabismus & treatment; Vertical squint-dissociated vertical divergence.		strabismus & treatment.	
<b>IV</b>	<b>THE RELATION BETWEEN ACCOMMODATION AND CONVERGENCE AND OTHER READING DIFFICULTIES:</b> Insufficiency of convergence; Convergence through a spectacles lens; Prismatic effects in spectacle lenses.	<b>6</b>	Describe, illustrate and explain about the relation between accommodation and convergence and other reading difficulties, prismatic effect of spectacle, treatment	2,3,4
<b>V</b>	<b>EYE MOVEMENT:</b> The orbit anatomy of the extra-ocular muscles. Intraocular dynamics & orbital mechanisms and neurophysiology; Physiology of ocular movement – basic kinematics; Ocular movement-monocular movement & binocular movement	<b>6</b>	Explain and learn about the anatomy of EOM, physiology of ocular movement	2,3,4
<b>Practical</b>	1. Demonstration of following orthoptic instruments/method and their uses- <ul style="list-style-type: none"> <li>prism bar, synoptophore, maddox wing, maddox rod, red green goggles, raf gauge, flipper</li> </ul> 2. Orthoptic investigative- <ul style="list-style-type: none"> <li>Accommodative evaluation ; squint evaluation</li> </ul> 3. Case records	<b>32</b>	Describe, explain, evaluation and apply different orthoptics evaluation, squint evaluation, accommodative evaluation. Discuss about different case studies.	1,2,3,4,5

**TEXT BOOKS:**

T1: Clinical Management of Binocular Vision 5th Edition 2020 by Mitchell Scheiman

**REFERENCE BOOKS:**

R1: Modern System of Ophthalmology Disorders of Cornea and Ocular Surface 2020 By AK Khurana

**OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=K3txN1Kv0CU>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain about binocular vision and its grades.	<b>2,3,5,8</b>
<b>2</b>	Discuss about the various anomalies of binocular vision, its investigations and management.	<b>5,8</b>
<b>3</b>	Describe the diagnosis and treatment of the	<b>3,5</b>

	anomalies of convergence & accommodation.	
<b>4</b>	Discuss convergence insufficiency and other reading difficulties.	<b>5,8</b>
<b>5</b>	Explain the gross anatomy & physiology of extra ocular muscles and its functions	<b>3,5</b>

SEMESTER – V									
Course Title	LOW VISION AID AND VISUAL REHABILITATION								
Course code	22BOPT314R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 30T+30P	2	0	2	0	0	0	3
Pre-requisite	COMPULSORY	Co-requisite	NIL						
Programme	Bachelor of Optometry								
Semester	V semester of third year of the programme								
Course Objectives	<p>1. The main objective of this program is to give the optometrist a basic understanding of low vision and to assess and examine the low vision patients. Prescribing low vision devices for better visual function.</p> <p>2. It is important to assist in counselling and rehabilitating the low vision patient.</p> <p>3. This course deals with general and ocular physiological changes of ageing, common geriatric systemic and ocular diseases, and clinical approach in geriatric patients, pharmacological aspects of ageing and spectacle dispensing.</p> <p>4. This course also deals with the definition of low vision, visual impairment, types of low vision devices, art of prescribing low vision devices and training the patients and other rehabilitation measures.</p>								
CO1	Explain low vision, its grades and causes								
CO2	Identify different types of optical & non-optical devices.								
CO3	Apply the knowledge and skills to do clinical examination by using low vision devices.								
CO4	Proficient in assessing low vision patients, prescribing suitable devices and provide counseling for improve quality of life.								
CO5	Explain and apply vision rehabilitation services to low vision patients.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>DEFINITION:</b> Old, new, proposed, grades of low vision, statistics / epidemiology, relation between disorder, impairment & handicapped <ul style="list-style-type: none"> <li>Causes of low vision</li> </ul>		6	Describe and explain about definition and causes of LV, grades of LV				1,2	
II	<b>LOW VISION OPTICS-</b> <ul style="list-style-type: none"> <li><b>MAGNIFICATION-</b> relative distance / relative size/ angular/electrooptical</li> <li><b>OPTICAL LOW VISION AIDS –</b> Galilian &amp; keplarian telescope- advantage/disadvantage, spectacle magnifier-disadvantage /advantage, stand magnifier-advantage and disadvantage, hand held magnifier-advantage and disadvantage, significance of equivalent viewing distance &amp; calculations.</li> <li><b>TELESCOPE-</b> Distance/ near, prism/ half eye/ prism correction/</li> </ul>		8	Describe, illustrate and explain various optical non optical devices, uses of magnification , telescope.				1,2, 3,5	

	<p>cctv/ magni-cam/ v-max / implantable miniature telescope</p> <ul style="list-style-type: none"> <li>• <b>NON OPTICAL LOW VISION AIDS</b> - Larger assistive devices, glare– contrast devices, posture and comfort maintenance devices, hand writing and written communication devices, medical management devices, orientation and mobility devices, sensory Substitution devices.</li> </ul>			
<b>III</b>	<p><b>LOW VISION EXAMINATION-</b></p> <ul style="list-style-type: none"> <li>• Task/ goal oriented history-medical/ visual/ psychological history/ task analysis/ mobility/distance vision / near vision / daily living/ illumination/ work &amp; school.</li> <li>• Visual acuity measurement-distance/ near/ use of log mar chart (distance &amp; near)/ lighthouse, picture chart/ visual field test/contrast sensitivity/ overview of glare testing.</li> <li>• Low vision refraction.</li> </ul>	<b>6</b>	Describe and learn about different low vision examination, low vision examination tool	1,2, 3,4, 5
<b>IV</b>	<p><b>ASSESSMENT &amp; PRESCRIPTION OF LOW VISION DEVICES-OPTICAL/ NON-OPTICAL / REHABILITATION SERVICES-</b></p> <ul style="list-style-type: none"> <li>• Non-optical devices-pen/typoscope/ boldline note book/ illumination/ letter writing guide/environmental modification/ signature guide/ needle threader/ eccentric viewing strategies/cane/sightedguide</li> <li>• Counseling of low vision patient/ parents/guardians/relatives</li> </ul>	<b>6</b>	Describe, illustrate and explain about assessment & prescription of low vision devices-optical/ non-optical / rehabilitation services	1,2, 3,4, 5
<b>V</b>	<p><b>OVERVIEW OF REHABILITATION SERVICES-</b></p> <ul style="list-style-type: none"> <li>• Definition/ implementation/ vocational guidance/educational guidance / mobility &amp; orientation training / special teacher/ special school/ braillesystem / integrated system/referral center- activity/ support/ loan.</li> <li>• Overview of systematic / retinal diseases in relation to low vision: - acromatopsia/lmbbsyndrome/labersco ngenitalanomaly/downsyndrome/</li> </ul>	<b>6</b>	Explain and learn about the definition , implementation , different of rehabilitation services. Learn about overview of different low vision causes diseases	1,2, 3,4, 5

	retinitis pigmentosa/ diabeticretinopathy/ optic atrophy/ albinism/ aniridia.			
<b>Practical</b>	<ul style="list-style-type: none"> <li>• <b>LVA-</b></li> <li>• Casehistory.</li> <li>• Assessment.</li> <li>• Application of devices.</li> <li>• <b>Rehabilitation</b></li> </ul>	<b>32</b>	Describe,explain, evaluation and apply different low vision assessment,application of LVA. Discuss about different case studies.	1,2, 3,4, 5

### TEXT BOOKS:

T1: Low Vision Aids Practice 2nd Edition 2007 By Bhootra

T2: Low Vision Aids 1st Edition 2010 By Monica Chaudhry

### REFERENCE BOOKS:

T1: The art & practice of low vision, by freeman &jose, butterwortpub.

T2: Understanding low vision, afbpublication.

T3: Low vision, by fayeae.e.

### OTHER LEARNING RESOURCES:

<https://www.youtube.com/watch?v=Sm6d4t873oI>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain low vision, its grades and causes	2,3
2	Identify different types of optical & non-optical devices.	7,8
3	Apply the knowledge and skills to do clinical examination by using low vision devices.	4,5
4	Proficient in assessing low vision patients, prescribing suitable devices and provide counseling for improve quality of life.	2,3
5	Explain and apply vision rehabilitation services to low vision patients.	7,8

SEMESTER – V									
Course Title	BIOSTATISTICS								
Course code	22BOPT315R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	COMPULSORY	Co-requisite	NIL						
Programme	Bachelor of Optometry								
Semester	V semester of third year of the programme								
Course Objectives	1. To provide the knowledge about biostatistics and its importance in health sciences studies. 2. To provides a comprehensive concept of statistical tools related to paramedical sciences 3. This course deals with the probability of business houses. To take rational decision in the face of uncertain situation prevailing in the optical business world.								
CO1	Explain the fundamental concepts of biostatistics, and methods for collecting primary and secondary data								
CO2	Discuss the data classification and presentation techniques including frequency distribution, bar diagram, histogram etc.								
CO3	Discuss sampling methods and descriptive statistics.								
CO4	Understand conditional probability and analyze normal distribution.								
CO5	Explain the concepts of null hypothesis, types of errors in hypothesis testing and statistical tests.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>INTRODUCTION ABOUT BIOSTATISTICS:</b> Variables, data; Population sample; Parameter statistics; Data, methods of collecting primary data, sources of collecting secondary data	6	Describe and explain about statistics variable data calculation, method of data collection					1,2,4	
II	<b>CLASSIFICATION &amp; PRESENTATION OF DATA:</b> Frequency distribution, frequency polygon; Bar diagram, histogram, Ogive; Percentile & quartiles.	6	Describe, illustrate and explain about different types of data; classification, bar diagram, histogram					1,2,4	
III	<b>DESCRIPTIVE STATISTICS-</b> <ul style="list-style-type: none"> <li>Descriptive Statistics: Measures of location, Measures of Dispersion, Coefficient of variation, Introduction to Correlation</li> <li>Sampling statistics: sampling &amp; sampling distribution, errors is sample survey-sampling and non-sampling.</li> </ul>	6	Describe and learn about descriptive statistics, sampling statistics					1,2,4	
IV	<b>PROBABILITY DISTRIBUTION:</b> Classical definition, conditional probability, probability in continuous, joint distribution of random variables. Probability distribution: Random Variable, Binomial distribution, Poisson distribution, Normal distribution and their properties	6	Describe, illustrate and explain about probability distribution and their properties; definition					1,2,4	
V	<b>TESTING OF HYPOTHESIS-</b> <ul style="list-style-type: none"> <li>Testing of hypothesis- Null hypothesis, alternative hypothesis,</li> </ul>	8	Explain and learn about testing hypothesis, types of error, introduction and uses of statistical					1,2,4	



	<ul style="list-style-type: none"> <li>Types of errors</li> <li>Introduction and uses of statistical tests-Chi-square test, Student's t-test, F-test etc.</li> </ul>		test	
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### TEXT BOOKS:

T1: Biostatistics, P. N. Arora and P.L. Malhan

T2: Mahajan's Methods in Biostatistics, Mahajan.

T3: Biostatistical Analysis, J. H. Zar

T4: Introductory biostatistics, Chap T. Le. John Wiley, USA

### REFERENCE BOOKS:

R1: Fundamentals of Statistics by S.C.Gupta.

R2: Statistical Methods in Biology, N. T. J. Bailey

### OTHER LEARNING RESOURCES:

ERP, Youtube links, Google etc

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain the fundamental concepts of biostatistics, and methods for collecting primary and secondary data	1,2,8
2	Discuss the data classification and presentation techniques including frequency distribution, bar diagram, histogram etc.	1,2,8
3	Discuss sampling methods and descriptive statistics.	1,2,8
4	Understand conditional probability and analyze normal distribution.	1,2,8
5	Explain the concepts of null hypothesis, types of errors in hypothesis testing and statistical tests.	1,2,8

SEMESTER – V									
Course Title	CLINICAL EXAMINATION OF EYE I								
Course code	22BOPT316R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 60T+30P	4	0	2	0	0	0	5
Pre-requisite	COMPULSORY	Co-requisite	NIL						
Programme	Bachelor of Optometry								
Semester	V semester of third year of the programme								
Course Objectives	<p>1.An eye exam helps detect eye problems at their earliest stage — when they're most treatable. Regular eye exams give eye care professional a chance to help you correct or adapt to vision changes and provide you with tips on caring for the eyes</p> <p>2.Interpretation o the findings of the various clinical optometry procedures</p> <p>3. This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment examination, neurophthalmic examination, glaucoma evaluation.</p>								
CO1	Identify the ocular symptoms, color vision in clinical settings and develop ability to perform visual acuity testing								
CO2	Describe various ocular structures by using slit lamp examination.								
CO3	Describe various ocular structures by using slit lamp examination.								
CO4	Recognize techniques for examining intraocular pressure.								
CO5	Identify the investigative techniques for assessing squint.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>HISTORY OF THE OPHTHALMIC SUBJECTS-</b> <ul style="list-style-type: none"> <li>Ocular symptoms</li> <li>Visual acuity testing- distance and near vision</li> <li>Colour vision- methods of testing, significance</li> </ul>		12	Describe and explain about <i>ophthalmic subjects, VA Testing, colour vision testing</i>				1,2	
II	<b>SLIT LAMP EXAMINATION-</b> <ul style="list-style-type: none"> <li>Examination of eyelids, conjunctiva and sclera</li> <li>Examination of cornea</li> <li>Examination of iris, ciliary body and pupil</li> <li>Examination of lens</li> </ul>		14	Describe, illustrate and explain about different types of illumination technique, overall eye examination				3,5	
III	<b>CLINICAL OPTOMETRY-</b> <ul style="list-style-type: none"> <li>Color coding in optometry workup</li> </ul>		12	Describe and learn about dry eye assessment,color coding in optometry workup, Abbreviation				2,3,5	

	<ul style="list-style-type: none"> <li>• Abbreviation in optometry</li> <li>• Eye related headache</li> <li>• Dry eye assessment test</li> <li>• Examination of near point of convergence</li> </ul>		in optometry	
<b>IV</b>	<b>INVESTIGATION OF GLAUCOMA-</b> <ul style="list-style-type: none"> <li>• Examination of intraocular pressure</li> <li>• Examination of angle of anterior chamber</li> </ul>	<b>12</b>	Describe, illustrate and explain about differential diagnosis of glaucoma	1,2,3,4,5
<b>V</b>	<b>INVESTIGATION OF SQUINT-</b> <ul style="list-style-type: none"> <li>• Examination of muscle</li> <li>• Hirschberg test &amp; krimsky</li> <li>• Perks three steps test.</li> <li>• Diplopia charting</li> </ul>	<b>14</b>	Explain and learn about differential diagnosis of squint.	1,2,3,4,5
<b>Practical</b>	<b>1. HISTORY WRITING-</b> <ul style="list-style-type: none"> <li>• Recording VA</li> <li>• Practice of streak retinoscopy</li> <li>• Direct ophthalmoscopy -normal fundus</li> </ul> <b>2. SUBJECTIVE REFRACTION –</b> <ul style="list-style-type: none"> <li>• Fogging, clock dial, fan, jcc, binocular balancing, duochrome, slit refraction</li> <li>• Measurement of amplitude of accommodation.</li> <li>• Presbyopic add power calculation</li> <li>• Writing prescription</li> </ul> <b>3. SOME IMPORTANT INVESTIGATION-</b> <ul style="list-style-type: none"> <li>• Paediatric optometry- assessment of children vision &amp; paediatric evaluation, diagnosis &amp; dispensing.</li> <li>• Strabismus &amp; amblyopia</li> <li>• Non- strabismic binocular disorders.</li> </ul>	<b>32</b>	Evaluation and apply comprehensive test of patient like history taking, subjective and objective refraction, paediatric vision assessment	1,2,3,4,5

**TEXT BOOKS:**

T1: Clinical Examination in Ophthalmology 2nd edition 2016 by PK Mukherjee.

**REFERENCE BOOKS:**

R1: Paediatric Optometry, By Jerome Rosner

R2: Vision development, By ILG & Bullis.

R3: Management of special population, by Dominique maino

**OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=YqL6IMGE5os>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Identify the ocular symptoms, colour vision in clinical settings and develop ability to perform visual acuity testing	<b>2,3</b>
<b>2</b>	Describe various ocular structures by using slit lamp examination.	<b>4,5,7,8</b>
<b>3</b>	Describe various ocular structures by using slit lamp examination.	<b>7,8</b>
<b>4</b>	Recognize techniques for examining intraocular pressure.	<b>7,8</b>
<b>5</b>	Identify the investigative techniques for assessing squint.	<b>4,5,7,8</b>

SEMESTER – V									
Course Title	OPTOMETRY PROFESSIONAL SKILLS IV								
Course code	22BOPT317R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	COMPULSORY	Co-requisite	TECHNO PROFESSIONAL SKILLS III						
Programme	Bachelor of Optometry								
Semester	V semester of third year of the programme								
Course Objectives	1.This course covers optometric instruments, its basic principle, description, and usage in clinical practice. 2.This course deals with the concept of ophthalmic patient education system, history taking, visual acuity test, basics of eye examination etc. 3. This course provides a comprehensive understanding of the clinical examination techniques for the eye.								
CO1	Knowledge about the ophthalmic patient education system which includes communication of the patient and proper handling techniques of optometric instruments								
CO2	Learn proper history taking part of a clinical investigation.								
CO3	Acquire knowledge about proper visual acuity recording process.								
CO4	Demonstrate the basics of eye examination which includes torch light examination, IPD measurement etc.								
CO5	Introduction to ophthalmic instruments like retinoscope and ophthalmoscope								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Comprehensive eye care:</b> <ul style="list-style-type: none"> <li>The ability to identify and manage ocular abnormalities</li> <li>The ability to identify sight threatening eye diseases</li> <li>Recognizes common ocular abnormalities referred when appropriate</li> <li>Recognizes adverse ocular reactions to medication</li> <li>Assess symptoms and signs of neurological significance</li> </ul>	2	Learn and practice about Comprehensive eye care, recognition of common ocular abnormalities					1,2,3,4,5	
II	<b>Soft contact lens</b> <ul style="list-style-type: none"> <li>Fitting parameters</li> <li>Fitting assessment</li> <li>Insertion and removal</li> </ul>	2	Learn about Soft contact lens fitting assessment					1,2,3,4,5	

<b>III</b>	<b>RGP contact lens</b> <ul style="list-style-type: none"> <li>• Fitting parameters</li> <li>• Fitting assessment</li> <li>• Insertion and removal</li> </ul>	<b>2</b>	Learn about RGP contact lens fitting, assessment	1,2,3,4,5
<b>IV</b>	<b>Keratometer</b> <ul style="list-style-type: none"> <li>• Uses</li> <li>• Procedure</li> </ul>	<b>2</b>	Learn about Keratometer uses and procedure	1,2,3,4,5
<b>V</b>	<b>Lensometer</b> <ul style="list-style-type: none"> <li>• Uses</li> <li>• Procedure</li> </ul>	<b>2</b>	Learn about hands on practice on Lensometer	1,2,3,4,5

**TEXT BOOKS:**

T1: Optics and Refraction by A.K.KHURANA.

**REFERENCE BOOKS:**

R1: Optics for Optometry Students by P.C mukharjee.

**OTHER LEARNING RESOURCES:**

<https://depisteo.com/blog/optical-tools-required-practice/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Knowledge about the ophthalmic patient education system which includes communication of the patient and proper handling techniques of optometric instruments	<b>2,3</b>
<b>2</b>	Learn proper history taking part of a clinical investigation.	<b>4,5,7,8</b>
<b>3</b>	Acquire knowledge about proper visual acuity recording process.	<b>7,8</b>
<b>4</b>	Demonstrate the basics of eye examination which includes torch light examination, IPD measurement etc.	<b>7,8</b>
<b>5</b>	Introduction to ophthalmic instruments like retinoscope and ophthalmoscope	<b>4,5,7,8</b>

<b>SEMESTER – V</b>									
<b>Course Title</b>	<b>CO-CURRICULAR</b>								
<b>Course code</b>	22UBCC311	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>V semester of third year of the programme</b>								
<b>Course Objectives</b>	Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.								
<b>Course Outcome</b>	Co-curricular activities facilitate in the development of various domains of mind and personality such as intellectual development, emotional development, social development, moral development and aesthetic development. Creativity, Enthusiasm, and Energetic, Positive thinking are some of the facets of personality development and the outcomes of extracurricular activities.								
<b>Content</b>									
The institute provides the opportunity to the teacher trainees to participate in various activities for their overall development. The institute conducts Seminars and Workshops, Guest Lectures, Essay writing, projects, general knowledge debates, quiz and discussion on current affairs, Discussion on social justice, National Days Celebrations, Assembly, Weekly meetings and Value Education programme, and also organize Dance, Dramatics, Singing competitions. Games and Sports are compulsory for all the students. Provision has, therefore been made for games and sports in college. The college will have unit of N.S.S. and will also give the opportunity to students to participate in it.									

<b>SEMESTER – V</b>									
<b>Course Title</b>	<b>EXTRA-CURRICULAR</b>								
<b>Course code</b>	22UBEC311	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>V semester of third year of the programme</b>								
<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners								
<b>Course Outcome</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to earn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.								
<b>Content</b>									
AdtU encourages a range of activities outside the regular curriculum intended to meet learner’s interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.									



<b>SEMESTER – V</b>									
<b>Course Title</b>	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)								
<b>Course code</b>	MOBOPSW351/2/3	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>V semester of third year of the programme</b>								
<b>Course Objectives</b>	MOOCs (Massive Open Online Courses) have been around us since 2008, when around 2,300 students took part in a course called "Connectives and Connective Knowledge", organized by the University of Manitoba (Canada). However, 2012 was widely recognized as The year of the MOOC, because some MOOC initiatives, such as Coursera, Udacity, or edX, gained a world-wide popularity.								
<b>Course Outcome</b>	A massive open online course (MOOC) is an online course aimed at large-scale interactive participation and open access via the web. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for the students, professors, and teaching assistants (TAs). MOOCs are a recent development in distance education.								
<b>Content</b>									
<ul style="list-style-type: none"> <li>• The common duration of a MOOC is from 6 to 12 weeks. A MOOC is accessible 24 hours a day, 7 days a week. The majority of the content is delivered asynchronously (meaning students can access it in their own time and at their own pace). However, sometimes there can be optional synchronous events such as 'live' webinars (interactive sessions) which require participants to join in at specific dates/times.</li> <li>• A standard class becomes in a MOOC a set of videos of 5-10 minutes each.</li> <li>• The learning of students in a MOOC is usually assessed by multiple-choice questions.</li> <li>• An important component of MOOCs is assignments. Student have to upload assignment solutions into the MOOC platform. Assignments can be evaluated and graded: <ul style="list-style-type: none"> <li>- Automatically when possible.</li> <li>- Peer-to-peer: students evaluate and grade themselves.</li> </ul> </li> <li>• Another component is the forum, where students post questions that other students can answer.</li> <li>• Usually, there are no pre-requisites for taking a MOOC, apart from having access to a computer with an internet connection. Most of the time, the educational or academic background of students isn't important.</li> <li>• Students usually don't need to buy any books for these courses, because all reading is either be provided within the MOOC content or is linked to open access texts.</li> </ul>									

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BOPT311R	CONTACT LENS II			3		2			1
22BOPT312R	OCULAR DISEASE -II		3			1	1		2
22BOPT313R	BINOCULAR VISION AND OCULAR MOTILITY		2	3	3	2		1	2
22BOPT314R	LOW VISION AID AND VISUAL REHABILITATION		2	3	3	2		1	2
22BOPT315R	BIOSTATISTICS	2	1						1
22BOPT316R	CLINICAL EXAMINATION OF EYE I		2	3	3	2		1	2
22BOPT317R	OPTOMETRY PROFESSIONAL SKILLS IV		2	3	3	2		1	2
22UBCC311	CO-CURRICULAR					3		2	2
22UBEC311	EXTRA-CURRICULAR					3		2	2
MOBOPSW351/2/3	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)						1	2	3

SEMESTER – VI									
Course Title	SYSTEMIC CONDITIONS AND THE EYE								
Course code	22BOPT321R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	VI semester of third year of the programme								
Course Objectives	1. Describe hypertension and its ocular manifestations, and understand the impact of acquired heart diseases on the eye. 2. Discuss the diagnosis, pathophysiology, classification, and management of diabetes mellitus, emphasizing its ocular complications 3. Explain the diagnosis, physiology, and classification of thyroid disorders and their ocular manifestations, and discuss the influence of diseases such as tuberculosis, leprosy, syphilis, and malaria on the eye.								
CO1	Describe the hypertension and its ocular manifestations.								
CO2	Discuss the diagnosis, pathophysiology, classification and management of diabetes mellitus.								
CO3	Understand various acquired heart diseases and its impact on eye.								
CO4	Explain the diagnosis, physiology, classification of thyroid and its ocular manifestations.								
CO5	Discuss tuberculosis, leprosy, syphilis, malaria and its influence on eye.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	<b>ARTERIALHYPERTENSION-</b> Pathophysiology, classification, clinical examination, diagnosis, complications, management. Hypertension and the eye		6	Describe, illustrate and explain about hypertension.					1,2
II	<b>DIABETES MELLITUS-</b> <input type="checkbox"/> Pathophysiology, classification, clinical features, diagnosis, complications, management. <input type="checkbox"/> Diabetes mellitus and the eye. Vitamin deficiency and the eye		8	Describe, illustrate and explain about the types, diagnosis, complication and management of diabetes mellitus.					1,2
III	<b>ACQUIRED HEART DISEASE–</b> <ul style="list-style-type: none"> <li>• Embolism</li> <li>• Rheumatic heart disease</li> <li>• Sub acute bacterial endocarditic.</li> </ul> Heart disease & the eye.		6	Describe, illustrate and explain about the understanding pathophysiology, diagnostic and prognosis of acquired heart disease.					1,2
IV	<b>THYROIDDISEASE-</b> <input type="checkbox"/> Anatomy and physiology of the thyroid gland. <input type="checkbox"/> Classification of thyroid disease		6	Describe, illustrate and explain the types, diagnosis, complication and management of thyroid disease.					1,2

	Diagnosis, complications, clinical features, management of thyroid disease involving eye.			
V	<b>TUBERCULOSIS-</b> <ul style="list-style-type: none"> <li>Etiology,pathology,clinicalfeatures, pulmonarytb,diagnosis,complications,treatment of</li> <li>Tuberculosis involving the eye.</li> </ul> <b>TROPICALDISEASEANDTHEEYE-</b> <ul style="list-style-type: none"> <li>Leprosy.</li> <li>Syphilis.</li> <li>Malaria.</li> </ul>	6	Describe, illustrate and explain the types, diagnosis, complication and management of tuberculosis.	1,2

#### TEXT BOOKS:

T1: Manual of Ophthalmology Clinical Diagnosis and Treatment of Eye Disease 2016 by Nema H.V

T2: Parsons Diseases of the Eye, 23rd Edition 2019 By Sihota

#### REFERENCE BOOKS:

R1: Clinical ophthalmology – Jack J. Kanski (Butterworth-Heinemann)

R2: Systemic disease and the eye – do.

#### OTHER LEARNING RESOURCES:

<https://www.youtube.com/watch?v=Z6s5- Docoy>

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe the hypertension and its ocular manifestations.	2,7,8
2	Discuss the diagnosis, pathophysiology, classification and management of diabetes mellitus.	2,7,8
3	Understand various acquired heart diseases and its impact on eye.	2,7,8
4	Explain the diagnosis, physiology, classification of thyroid and its ocular manifestations.	2,7,8
5	Discuss tuberculosis, leprosy, syphilis, malaria and its influence on eye.	2,7,8

SEMESTER – VI									
Course Title	PUBLIC HEALTH AND COMMUNITY OPTOMETRY								
Course code	22BOPT322R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	VI semester of third year of the programme								
Course Objectives	1. Identify and differentiate between different levels of health care and explain epidemiological concepts of blindness and visual impairment. 2. Explain various initiative programs aimed at eliminating the causes of avoidable blindness and discuss the components of health economy, including the role of Third Party Administrators (TPA) 3. Explain the process of handling ocular emergencies and managing different types of eye injuries.								
CO1	Identify and differentiate between different levels of health care.								
CO2	Explain the epidemiological concepts of blindness and visual impairment								
CO3	Explain the various initiative programs sought to eliminate the causes of avoidable blindness								
CO4	Discuss about the components of health economy and the role of Third Party Administrators (TPA).								
CO5	Explain the process of handling ocular emergencies in different types of eye injuries.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>CONCEPT OF PUBLIC HEALTH-</b> <ul style="list-style-type: none"> <li>Principles of primary, secondary and tertiary care.</li> <li>Dimension, determinants and indicators of health</li> </ul>		6	Describe, illustrate and explain about Introduction to public health				1,2	
II	<b>EPIDEMIOLOGY OF BLINDNESS –</b> <ul style="list-style-type: none"> <li>Defining blindness and visual impairment</li> <li>Vision screening</li> </ul>		6	Describe, illustrate and explain about the basic principles of epidemiology.				1,2	
III	<b>VISION 2020-</b> <ul style="list-style-type: none"> <li>The right to sight</li> <li>NPCB and refer active blindness – optometrist's role in primary health care provides..</li> </ul>		6	Describe, illustrate and explain about the vision 2020				1,2	
IV	<b>HEALTH ECONOMICS-</b> <ul style="list-style-type: none"> <li>Health system</li> </ul> Health care's in service including role of TPA (Third Party Administrator).		6	Describe, illustrate and explain about health economics				1,2	
V	<b>OCULAR EMERGENCIES –</b>			Describe, illustrate and explain about eye emergencies				1,2	

	<ul style="list-style-type: none"> <li>• Foreign body</li> <li>• Eye pain</li> <li>• Watering</li> </ul> Injuries-perforating, on perforating & chemical	<b>8</b>		
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**TEXT BOOKS:**

T1: Global optometry resources by Brien Holden

**REFERENCE BOOKS:**

R1: Global optometry resources by Brien Holden

**OTHER LEARNING RESOURCES:**

[https://www.youtube.com/watch?v=\\_jkq8FDgc8](https://www.youtube.com/watch?v=_jkq8FDgc8)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Identify and differentiate between different levels of health care.	<b>1,5,7,8</b>
<b>2</b>	Explain the epidemiological concepts of blindness and visual impairment	<b>1,5,7,8</b>
<b>3</b>	Explain the various initiative programs sought to eliminate the causes of avoidable blindness	<b>1,5,7,8</b>
<b>4</b>	Discuss about the components of health economy and the role of Third Party Administrators (TPA).	<b>1,5,7,8</b>
<b>5</b>	Explain the process of handling ocular emergencies in different types of eye injuries.	<b>1,5,7,8</b>

SEMESTER – VI									
Course Title	PROFESSIONAL PRACTICE MANAGEMENT								
Course code	22BOPT323R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	2
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	VI semester of third year of the programme								
Course Objectives	1. Describe the legal and ethical frameworks governing medical and paramedical professions, ensuring compliance with professional standards and regulations. 2. Explain the fundamentals of accounting principles, practices, and taxation concepts, and discuss the functions and importance of public relations in a healthcare setting. 3. Understand and implement visual rehabilitation services, and discuss the essential requirements necessary to facilitate the eye donation process, promoting eye health and support for visually impaired individuals.								
CO1	Describe the legal and ethical framework governing medical and paramedical professions.								
CO2	Explain the fundamentals of accounting principles, practices, and taxation concepts.								
CO3	Discuss about public relations and its functions								
CO4	Understand and implement the visual rehabilitation services								
CO5	Discuss the essential requirements necessary to facilitate the eye donation process.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	LAWSANDOPTOMETRY-		6	Describe, illustrate and explain about laws and optometry					1,2
	<ul style="list-style-type: none"> <li>• Laws governing medical and paramedical professions.</li> <li>• International optometry</li> <li>• Ethics</li> </ul>								
II	BASICACCOUNTANCY–		6	Describe, illustrate and explain about accountancy.					1,2
	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Principles of accountancy</li> <li>• Journal and ledger</li> <li>• Trial balance</li> <li>• Subsidiary book.</li> <li>• Petty cash book.</li> <li>• Sales books.</li> <li>• Purchase register.</li> <li>• Stock register.</li> <li>• Bank reconciliation and banking procedures</li> <li>• Balance sheet (profit &amp; loss accounts)</li> <li>• General ideas about income</li> </ul>								

	tax and sales tax			
<b>III</b>	<b>PUBLICRELATION (PR)-</b> <ul style="list-style-type: none"> <li>• Definitions</li> <li>• PR-its function from publicity &amp; advertising</li> <li>• Internal and external aspects</li> <li>• PR-analysis, promotion of product.</li> <li>• Public relation with press relation (media).</li> </ul> Public relation with printed work media	<b>6</b>	Describe, illustrate and explain public relation.	1,2
<b>IV</b>	<b>VISUALREHABILITATION-</b> <ul style="list-style-type: none"> <li>• Rehabilitation services-definition,</li> <li>• Implementation-mobility &amp; orientation training</li> </ul>	<b>6</b>	Describe, illustrate and explain about visual rehabitee.	1,2
<b>V</b>	<b>EYEBANKING AND EYE DONATION</b>	<b>4</b>	Illustrate and explain about eye banking.	1,2

### TEXT BOOKS:

T1: Practice management in optometry by Neil Gailmard

### REFERENCE BOOKS:

R1: Optometry practice management by Irving Bennett

### OTHER LEARNING RESOURCES:

<https://www.youtube.com/watch?v=ZMQvjJY2lfA>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe the legal and ethical framework governing medical and paramedical professions.	5,6,7,8
2	Explain the fundamentals of accounting principles,	5,6,7,8



	practices, and taxation concepts.	
<b>3</b>	Discuss about public relations and its functions	<b>5,6,7,8</b>
<b>4</b>	Understand and implement the visual rehabilitation services	<b>5,6,7,8</b>
<b>5</b>	Discuss the essential requirements necessary to facilitate the eye donation process.	<b>5,6,7,8</b>

SEMESTER – VI									
Course Title	APPLIED OPTOMETRY AND ORTHOPTICS								
Course code	22BOPT324R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 45T+30P	4	0	2	0	0	0	5
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	VI semester of third year of the programme								
Course Objectives	1.Demonstrate the use of various orthoptic instruments in clinical settings for accurate assessment and treatment of eye conditions. 2.Evaluate motor signs in squint, implement methods to assess the degree of squint, and determine the visual sensory status for effective management. 3.Discuss the clinical features of amblyopia and its management, and demonstrate the use of various charts to assess ocular motility status.								
CO1	Demonstrate the use of various orthoptic instruments in clinical settings								
CO2	Evaluate the motor signs in squint, understand and implement the methods in assessing the degree of squint.								
CO3	Demonstrate various types of charts to assess ocular motility status								
CO4	Determine the visual sensory status of squint and its management.								
CO5	Discuss the clinical features of amblyopia and its management.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
<b>I</b>	<b>ORTHOPTICINSTRUMENTS-</b> <ul style="list-style-type: none"> <li>Prism bar</li> <li>Synoptophore</li> <li>Maddox wing</li> <li>Maddox rod</li> <li>Red &amp; green goggles</li> <li>Hess screen</li> <li>Risley prisms</li> <li>Non strabismic binocular vision anomalies</li> </ul> <b>ASSESSMENTOFDEGREEOFSQUINT-</b> <ul style="list-style-type: none"> <li>Hirschbag test.</li> <li>Prismbar test.</li> <li>Krimskey test</li> </ul> <b>SYNOPTOPHORETEST</b>		<b>14</b>	Describe, illustrate and explain about orthoptic instruments					1,2,3,4,5
<b>II</b>	<b>MOTORSIGNSINSQUINT-</b> <ul style="list-style-type: none"> <li>Head position: faceturn, chinposition, head tilt.</li> <li>Cover test &amp;cover-uncover tests</li> <li>Maddox wing to assess heterophoria</li> </ul>		<b>12</b>	Describe, illustrate and explain the clinical, diagnostic and management of the squint.					1,2,3,4,5

	<ul style="list-style-type: none"> <li>Alphabetical patterns</li> </ul>			
<b>III</b>	<b>ASSESSMENT OF OCULAR MOTILITY STATUS-</b> <ul style="list-style-type: none"> <li>Hess chart</li> <li>Diplopia testing</li> <li>Bielschowsky's head tilting test</li> </ul>	<b>12</b>	Describe, illustrate and explain clinical and management of ocular motility.	1,2,3,4,5
<b>IV</b>	<b>MECHANISMS LEADING TO SQUINT-TYPES OF SQUINT-</b> <ul style="list-style-type: none"> <li>Latent/manifest</li> <li>Horizontal/vertical paralytic/concomitant</li> </ul> <b>ASSESSMENT OF VISUAL SENSORY STATUS IN SQUINT.</b> <ul style="list-style-type: none"> <li>Amblyopia</li> <li>Suppression</li> <li>Binocular single vision-SMP, fusion, stereopsis.</li> </ul> <b>MANAGEMENT OF-</b> <ul style="list-style-type: none"> <li>Convergence insufficiency</li> <li>Amblyopia</li> <li>Suppression</li> <li>ARC</li> <li>Use of prism - For exercise &amp; correction</li> </ul>	<b>14</b>	Describe, illustrate and explain about clinical, diagnostic and management of squint.	1,2,3,4,5
<b>V</b>	<b>AMBLYOPIA</b> <ul style="list-style-type: none"> <li><b>Definition. Neuropathology. Classification. Clinical features.</b></li> </ul> <b>TREATMENT-</b> <ul style="list-style-type: none"> <li><b>Occlusion.</b></li> <li><b>Penalisation.</b></li> <li><b>Role of drugs</b></li> </ul>	<b>12</b>	Describe and explain about the amblyopia.	1,2,3,4,5
<b>Practical</b>	<b>DEMONSTRATION OF FOLLOWING ORTHOPTIC-</b> Instruments/method and their uses- Cover test, Hirschberg test, Krimsky test, diploia charting, Hess charting, visuoscopy, Bagolini straited glasses, synoptophore Therapeutic procedure Case records	<b>32</b>	Describe, demonstrate and explain the orthoptic evaluation.	1,2,3,4,5

**TEXT BOOKS:****T1: Clinical management of binocular vision by Mitchell schimen****REFERENCE BOOKS:****R1: Theory and practice of squint and orthoptics by A K Khurana****OTHER LEARNING RESOURCES:****ERP, GOOGLE AND YOUTUBE.****RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate the use of various orthoptic instruments in clinical settings.	<b>2,3</b>
<b>2</b>	Evaluate the motor signs in squint, understand and implement the methods in assessing the degree of squint.	<b>5,7,8</b>
<b>3</b>	Demonstrate various types of charts to assess ocular motility status	<b>5,7,8</b>
<b>4</b>	Determine the visual sensory status of squint and its management.	<b>3,5,7</b>
<b>5</b>	Discuss the clinical features of amblyopia and its management.	<b>3,5,7</b>

SEMESTER – VI									
Course Title	CLINICAL EXAMINATION OF EYE II								
Course code	22BOPT326R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 60T+60P	4	0	4	0	0	0	6
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	VI semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. Master the techniques of ophthalmoscopy and develop skills to effectively examine the fundus.</li> <li>2. Understand and apply various clinical investigation techniques, accurately interpreting results for ocular diagnosis.</li> <li>3. Perform neuro-ophthalmological examinations, including ptosis evaluation and visual field charting, and understand their clinical implications.</li> </ol>								
CO1	Identify the techniques of ophthalmoscopy and apply the skills in examining the fundus.								
CO2	Discuss the various clinical investigations techniques and interpretation of result								
CO3	Discuss neuro-ophthalmological examination techniques, and demonstrate ptosis evaluation and visual field charting.								
CO4	Describe different color codes associated with ocular diseases and medications.								
CO5	Discuss headache and its relation to the eye.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	<b>POSTERIOR SEGMENT EXAMINATION-</b> <ul style="list-style-type: none"> <li>• Ophthalmoscopy-direct and indirect</li> <li>• Examination of fundus</li> <li>• Examination of vitreous</li> <li>• Examination of optic disc</li> <li>• Examination of choroid</li> </ul>		14	Describe, illustrate and explain about examination of fundus.					1,2,3,5
II	<b>CLINICAL INVESTIGATION-</b> <ul style="list-style-type: none"> <li>• Examination of lacrimal system</li> <li>• Examination of the orbit</li> <li>• Macular function test</li> <li>• Contrast sensitivity test</li> </ul> <b>INTERPRETATION OF FOLLOWING INSTRUMENTS-</b> <ul style="list-style-type: none"> <li>• FFA</li> <li>• OCT</li> <li>• ICG</li> <li>• Fundus photo</li> <li>• Humphrey visual field</li> </ul>		16	Describe, illustrate and explain the FFA and OCT.					1,2,3,4,5
III	<b>NEUROLOGICAL INVESTIGATION-</b> <ul style="list-style-type: none"> <li>• Neuro-ophthalmological examination</li> <li>• Ptosis evaluation</li> </ul>		12	Describe, illustrate about the investigation					1,2,3,5

	<ul style="list-style-type: none"> <li>• Visual field charting</li> </ul>			
<b>IV</b>	<p><b>COLOR CODING IN OPHTHALMOLOGY-</b></p> <ul style="list-style-type: none"> <li>• Different color code in ocular diseases</li> <li>• Different color code in ocular medications</li> </ul>	<b>10</b>	Describe, illustrate and explain about colour coding.	1,2,3,5
<b>V</b>	<p><b>OCULAR INVESTIGATION AND HEADACHE-</b></p> <ul style="list-style-type: none"> <li>• Introduction of headache</li> <li>• Headache in relation with eye</li> <li>• Investigation</li> </ul>	<b>12</b>	Describe, illustrate and explain about headache and ocular investigation.	1,2,3,4,5
<b>Practical</b>	<p>1. Evaluation, diagnosis &amp; optometric management Of children with mental retardation c.p.dyslexia, Multiple sensory motor handicaps. Visual disorders in senior citizens, evaluation, diagnosis.</p> <p>2. Refraction in special cases (pseudophakia, aphakia, irregular corneal astigmatism, coloboma of iris, choroids, retina, nystagmus, post r.k., prk, lasik, congenital cataract, glaucoma).</p> <p>3. Sports vision.</p>	<b>64</b>	Demonstrate, diagnose and evaluate all the management of children with special cases.	1,2,3,4,5

**TEXT BOOKS:**

T1: Clinical Examination in Ophthalmology 2nd edition 2016 by PK Mukherjee.

**REFERENCE BOOKS:**

R1: Paediatric Optometry, By Jerome Rosner

R2: Vision development, By ILG & Bullis.

R3: Management of special population, by Dominique maino

**OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=YqL6IMGE5os>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Identify the techniques of ophthalmoscopy and apply the skills in examining the fundus.	<b>2,3</b>
<b>2</b>	Discuss the various clinical investigations techniques and interpretation of result	<b>4,5</b>
<b>3</b>	Discuss neuro-ophthalmological examination techniques, and demonstrate ptosis evaluation and visual field charting.	<b>7,8</b>
<b>4</b>	Describe different color codes associated with ocular diseases and medications.	<b>4,5</b>
<b>5</b>	Discuss headache and its relation to the eye.	<b>7,8</b>

<b>SEMESTER – VI</b>									
<b>Course Title</b>	<b>CO-CURRICULAR</b>								
<b>Course code</b>	22UBCC321	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>VI semester of third year of the programme</b>								
<b>Course Objectives</b>	Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.								
<b>Course Outcome</b>	Co-curricular activities facilitate in the development of various domains of mind and personality such as intellectual development, emotional development, social development, moral development and aesthetic development. Creativity, Enthusiasm, and Energetic, Positive thinking are some of the facets of personality development and the outcomes of extracurricular activities.								
<b>Content</b>									
The institute provides the opportunity to the teacher trainees to participate in various activities for their overall development. The institute conducts Seminars and Workshops, Guest Lectures, Essay writing, projects, general knowledge debates, quiz and discussion on current affairs, Discussion on social justice, National Days Celebrations, Assembly, Weekly meetings and Value Education programme, and also organize Dance, Dramatics, Singing competitions. Games and Sports are compulsory for all the students. Provision has, therefore been made for games and sports in college. The college will have unit of N.S.S. and will also give the opportunity to students to participate in it.									



<b>SEMESTER – VI</b>									
<b>Course Title</b>	<b>EXTRA-CURRICULAR</b>								
<b>Course code</b>	22UBEC321	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>VI semester of third year of the programme</b>								
<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners								
<b>Course Outcome</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc. The students will participate in regular club activities like workshops, competitions as per their interest and hobbies. The students will be trained to represent ADTU in various inter university, state and national level competitions. The students will be given a platform to earn from invited experts in their respective fields. The students will get an exposure of 360 degree learning methodology considering the overall growth along with the academics.								
<b>Content</b>									
AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest, These activities are aimed to develop the social and soft skills and promote a holistic development of the learners, Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc., The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies, The student members of the club are trained represent AdtU in various inter University student and national level competitions, Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.									

<b>SEMESTER – VI</b>									
<b>Course Title</b>	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)								
<b>Course code</b>	MOBOPSW361/2/3	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>VI semester of third year of the programme</b>								
<b>Course Objectives</b>	MOOCs (Massive Open Online Courses) have been around us since 2008, when around 2,300 students took part in a course called "Connectives and Connective Knowledge", organized by the University of Manitoba (Canada). However, 2012 was widely recognized as The year of the MOOC, because some MOOC initiatives, such as Coursera, Udacity, or edX, gained a world-wide popularity.								
<b>Course Outcome</b>	A massive open online course (MOOC) is an online course aimed at large-scale interactive participation and open access via the web. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for the students, professors, and teaching assistants (TAs). MOOCs are a recent development in distance education.								
<b>Content</b>									
<ul style="list-style-type: none"> <li>• The common duration of a MOOC is from 6 to 12 weeks. A MOOC is accessible 24 hours a day, 7 days a week. The majority of the content is delivered asynchronously (meaning students can access it in their own time and at their own pace). However, sometimes there can be optional synchronous events such as 'live' webinars (interactive sessions) which require participants to join in at specific dates/times.</li> <li>• A standard class becomes in a MOOC a set of videos of 5-10 minutes each.</li> <li>• The learning of students in a MOOC is usually assessed by multiple-choice questions.</li> <li>• An important component of MOOCs is assignments. Student have to upload assignment solutions into the MOOC platform. Assignments can be evaluated and graded: <ul style="list-style-type: none"> <li>- Automatically when possible.</li> <li>- Peer-to-peer: students evaluate and grade themselves.</li> </ul> </li> <li>• Another component is the forum, where students post questions that other students can answer.</li> <li>• Usually, there are no pre-requisites for taking a MOOC, apart from having access to a computer with an internet connection. Most of the time, the educational or academic background of students isn't important.</li> <li>• Students usually don't need to buy any books for these courses, because all reading is either be provided within the MOOC content or is linked to open access texts.</li> </ul>									

SEMESTER – VI									
Course Title	BINOCULAR VISION ASSESSMENT								
Course code	22BOPT327R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	VI semester of third year of the programme								
Course Objectives	This subject provides a conceptual and practical framework for understanding and examining the sensory and motor processes that mediate binocular vision. Students study the anatomical, physiological and optical principles underlying normal eye movements and single binocular vision. An understanding of how the coordination of the eyes may be modified by accommodation and associated accommodation/convergence relationships is acquired. Inquiry-based learning emphasising the development of basic clinical reasoning informed by research evidence, is applied to clinical case studies. Through this, students are led to discuss the diagnosis and management of common ocular conditions related to heterophoria, strabismus, amblyopia and accommodation and convergence defects. In this context, students learn fundamental orthoptic procedures used to demonstrate normal and defective binocular vision and for the diagnosis and measurement of ocular motility disorders. This subject provides essential knowledge and skills that forms a foundation for further studies in this area of orthoptic practice.								
CO1	Analyze and evaluate various diagnostic tests for suppression, to determine the presence and extent of visual suppression in patients.								
CO2	Demonstrate and interpret the use of the synoptophore to assess simultaneous macular perception, fusion, and stereopsis in patients.								
CO3	Explain the Amblyopia and its management								
CO4	Learn the diagnosis of strabismus								
CO5	Understand the management of strabismus								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Suppression</b> <ul style="list-style-type: none"> <li>Worth four dot test</li> <li>Bagolini test</li> <li>Four prism base out test</li> <li>Red filter test</li> <li>FRIEND test</li> </ul>	14	Describe, illustrate and explain about suppression.					1,2,3,4,5	
II	<b>Synoptophore</b> <ul style="list-style-type: none"> <li>Simultaneous macular perception</li> <li>Fusion</li> <li>stereopsis</li> </ul>	12	Describe, illustrate and explain the synaptophore.					1,2,3,4,5	
III	<b>Amblyopia</b> <ul style="list-style-type: none"> <li>occlusion therapy</li> <li>prism therapy</li> </ul>	12	Describe, illustrate about the amblyopia					1,2,3,4,5	

<b>IV</b>	<b>Strabismus</b> <ul style="list-style-type: none"> <li>• diagnosis of strabismus anomalies</li> <li>• nystagmus</li> </ul>	<b>14</b>	Describe, illustrate and explain about strabismus.	1,2,3,4,5
<b>V</b>	Strabismus management strategies <ul style="list-style-type: none"> <li>• management of esotropia</li> <li>• management of exotropia</li> </ul>	<b>12</b>	Describe, illustrate and explain <b>about</b> strabismus management strategies.	1,2,3,4,5

### TEXTBOOKS:

T1: Clinical Management of Binocular Vision 5th Edition 2020 by Mitchell Scheiman

### REFERENCE BOOK

R1: Modern System of Ophthalmology Disorders of Cornea and Ocular Surface 2020 By AK Khurana

### OTHER LEARNING RESOURCES:

<https://www.youtube.com/watch?v=K3txN1Kv0CU>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Analyze and evaluate various diagnostic tests for suppression, to determine the presence and extent of visual suppression in patients.	2,3
2	Demonstrate and interpret the use of the synoptophore to assess simultaneous macular perception, fusion, and stereopsis in patients.	4,5
3	Explain the Amblyopia and its management	7,8
4	Learn the diagnosis of strabismus	4,5
5	Understand the management of strabismus	7,8

SEMESTER – VI									
Course Title	CONTACT LENS ASSESSMENT								
Course code	22BOPT328R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Pre-requisite	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	VI semester of third year of the programme								
Course Objectives	To perform a basic contact lens (CL) history and examination, and to be aware of additional basic tests and questions that are required for CL patients with more complex needs								
CO1	Understanding of the concept of contact lens and its design								
CO2	Learn the parameters and fitting of contact lens								
CO3	Demonstrate the types of contact lenses								
CO4	Learn the fitting procedure of various CL								
CO5	Learn the care and maintenance of CL								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Introduction to contact lens</b> <ul style="list-style-type: none"> <li>Contact lens terminology</li> <li>Design of contact lens</li> </ul>		10	Describe, illustrate and explain about Contact Lens.				1,2,3,4,5	
II	<b>Parameter and assessment</b> <ul style="list-style-type: none"> <li>Soft contact lens fitting</li> <li>RGP contact lens fitting</li> </ul>		6	Describe, illustrate and explain the parameters and assessment.				1,2,3,4,5	
III	Different types of contact lens <ul style="list-style-type: none"> <li>Contact lens fitting in astigmatism</li> <li>Contact lens fitting in keratoconus</li> <li>Extended wear contact lens</li> </ul>		6	Describe, illustrate about the different types of contact lens.				1,2,3,4,5	
IV	<b>Fitting procedure of Contact lens</b> <ul style="list-style-type: none"> <li>Soft</li> <li>RGP</li> <li>Push up</li> <li>Taco test</li> </ul>		6	Describe, illustrate and explain about the fitting procedure of contact lens.				1,2,3,4,5	
V	<b>Care and maintenance</b> <ul style="list-style-type: none"> <li>Do's and Don't of contact lens</li> <li>Follow up</li> <li>care</li> </ul>		4	Describe, illustrate and explain <b>about</b> care and maintenance of contact lens.				1,2,3,4,5	

**TEXTBOOKS:**

**T1: Textbook of contact lenses by R Sinha and V.K DADA**

**REFERENCE BOOK**

**R1: Fitting guide for rigid and soft contact lenses – h. A. Stein, slatt, m. L. Freeman (mosby).**

**R2: Iacle module.**

**R3: Contact lenses (the clao guide to basic science and clinical practice). – kenddall/hunt publishing co.**

**OTHER LEARNING RESOURCES:**

<https://youtu.be/0pPVkAcwp7Q>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding of the concept of contact lens and its design	<b>2,3</b>
<b>2</b>	Learn the parameters and fitting of contact lens	<b>4,5</b>
<b>3</b>	Demonstrate the types of contact lenses	<b>7,8</b>
<b>4</b>	Learn the fitting procedure of various CL	<b>4,5</b>
<b>5</b>	Learn the care and maintenance of CL	<b>7,8</b>

<b>SEMESTER – VI</b>									
<b>Course Title</b>	<b>PROJECT WORK</b>								
<b>Course code</b>	22BOPT329R	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	6	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>VI semester of third year of the programme</b>								
<b>Course Objectives</b>	Students designing, developing, and constructing hands-on solutions to a problem								
<b>Course Outcome</b>	Offers students rigorous academic experiences that take them beyond the boundaries of textbooks and lectures								
<b>Content</b>									
<ul style="list-style-type: none"> <li>• Introduction to basics of project work</li> <li>• Types of project work</li> <li>• Project planning</li> <li>• Monitoring of the project which includes different group of students for different topics</li> <li>• Data analysis</li> </ul>									

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1*</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
22BOPT321R	SYSTEMIC CONDITIONS AND THE EYE		3					1	1
22BOPT322R	PUBLIC HEALTH AND COMMUNITY OPTOMETRY	3				3		2	1
22BOPT323R	PROFESSIONAL PRACTICE MANAGEMENT					1	3	2	1
22BOPT324R	APPLIED OPTOMETRY AND ORTHOPTICS		2	3	3	2		1	2
22BOPT326R	CLINICAL EXAMINATION OF EYE -II		2	3	3	2		1	2
22UBCC321	CO-CURRICULAR					3		2	2
22UBEC321	EXTRA-CURRICULAR					3		2	2
MOBOPSW361/2/3	MOOC/ ONLINE (SELF STUDY MODE ON PRESCRIBED ONLINE PLATFORMS)						1	2	3
22BOPT327R	BINOCULAR VISION ASSESSMENT		2	3	3	2		1	2
22BOPT328R	CONTACT LENS ASSESSMENT			3		2			1
22BOPT329R	PROJECT WORK						3	2	3



<b>SEMESTER – VII</b>									
<b>Course Title</b>	<b>CLINICAL OBSERVATION -I (HOSPITAL POSTING)</b>								
<b>Course code</b>	22BOPT411R	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	36	0	0	0	18
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>VII semester of fourth year of the programme</b>								
<b>Course Objectives</b>	The clinical observation time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis.								
<b>Course Outcome</b>	Skills/knowledge to be acquired at the end of this course- Wide academic & clinical exposure to different departments of eye. Receive opportunities to practice independently in outreach camps. Receive scope to learn from renowned ophthalmologists and experienced optometrists.								
<b>Content</b>									
General OPD(Historytaking-DO)	150cases		Weekly 1 casereport to besubmitted						
ContactLens	10 cases (5RGP+5Soft)		Minimum3differentcasereports To besubmitted at theend of the Postings						
Optical	50cases		Weekly1 casereport To besubmitted						
LowVisioncareClinic	5cases		Minimum3differentcasereports to be submitted at the end of thePostings						
BinocularVisionclinic	5cases		Minimum3differentcasereports to be submitted at the end of thePostings						
Ophthalmologyclinic (Commoneyeconditions)	25cases		Minimum3differentcasereports to be submitted at the end of thePostings						

<b>SEMESTER – VII</b>										
<b>Course Title</b>	<b>OPTOMETRY ETHICS</b>									
<b>Course code</b>	22BOPT412R	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C	
			0	0	2	0	0	0	1	
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>							
<b>Programme</b>	<b>Bachelor of Optometry</b>									
<b>Semester</b>	<b>VII semester of fourth year of the programme</b>									
<b>Course Objectives</b>	The clinical observation time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis.									
<b>Course Outcome</b>	Wide academic & clinical exposure to different departments of eye. Receive opportunities to practice independently in outreach camps. Receive scope to learn from renowned ophthalmologists and experienced optometrists.									

#### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BOPT411R	CLINICAL OBSERVATION -I (HOSPITAL POSTING)	3	3	3	2	3	2		2
22BOPT412R	OPTOMETRY ETHICS	3	3	3	2	3	2		2

<b>SEMESTER – VIII</b>									
<b>Course Title</b>	<b>CLINICAL OBSERVATION -II (HOSPITAL POSTING)</b>								
<b>Course code</b>	22BOPT421R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours:	0	0	36	0	0	0	18
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>VIII semester of fourth year of the programme</b>								
<b>Course Objectives</b>	The clinical observation time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis.								
<b>Course Outcome</b>	Skills/knowledge to be acquired at the end of this course- Wide academic & clinical exposure to different departments of eye. Receive opportunities to practice independently in outreach camps. Receive scope to learn from renowned ophthalmologists and experienced optometrists.								
<b>Content</b>									
General OPD(Historytaking-DO)	150cases				Weekly 1 casereport to besubmitted				
ContactLens	10 cases (5RGP+5Soft)				Minimum3differentcasereports To besubmitted at theend of the Postings				
Optical	50cases				Weekly1 casereport To besubmitted				
LowVisioncareClinic	5cases				Minimum3differentcasereports to be submitted at the end of thePostings				
BinocularVisionclinic	5cases				Minimum3differentcasereports to be submitted at the end of thePostings				
Ophthalmologyclinic (Commoneyeconditions)	25cases				Minimum3differentcasereports to be submitted at the end of thePostings				

<b>SEMESTER – VIII</b>									
<b>Course Title</b>	<b>OCCUPATIONAL BEHAVIOURS OF OPTOMETRY</b>								
<b>Course code</b>	22BOPT422R	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
<b>Pre-requisite</b>	<b>COMPULSORY</b>	Co-requisite	NIL						
<b>Programme</b>	<b>Bachelor of Optometry</b>								
<b>Semester</b>	<b>VIII semester of fourth year of the programme</b>								
<b>Course Objectives</b>	The clinical observation time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis.								
<b>Course Outcome</b>	Wide academic & clinical exposure to different departments of eye. Receive opportunities to practice independently in outreach camps. Receive scope to learn from renowned ophthalmologists and experienced optometrists.								

#### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BOPT421R	CLINICAL OBSERVATION -II (HOSPITAL POSTING)	3	3	3	2	3	2		2
22BOPT422R	OCCUPATIONAL BEHAVIOURS OF OPTOMETRY	3	3	3	2	3	2		2



# Assam down town University

## Curriculum and Syllabus

### Bachelor of Radiography and Advanced Imaging Technology

OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**

July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022



*Chairperson  
Board of Studies*



*Member Secretary  
Academic Council*



## ***Vision***

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## ***Missions***

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community

# Programme Details

## Programme Overview

The Bachelor of Radiography & Advanced Imaging Technology programme offers a holistic approach to prepare students for careers in medical imaging. Through a blend of theoretical coursework, practical laboratory sessions, and supervised clinical practicum experiences, students gain a comprehensive understanding of Radiographic principles and techniques. Emphasizing the importance of patient care, safety, and ethical considerations, a programme instils critical thinking skills essential for interpreting imaging results and collaborating effectively with healthcare teams. The students emerge as skilled radiographers ready to conduct various imaging procedures, in X-rays, CT scan, MRI and USG imaging in diverse healthcare settings.

### I. Specific Features of the Curriculum

The duration of the certified course for Bachelor of Radiography & Advanced Imaging Technology degree under Assam down town University shall extend over a period of six academic semesters (three years). Students also undergo clinical posting in 5<sup>th</sup> & 6<sup>th</sup> semester in hospitals and diagnostic centres. After completion of course, students undergo clinical internship for a period of 6 months. The curriculum also provides skill enhancement and value-added courses along with the core papers.

### II. Eligibility Criteria:

- He/she has passed the Higher Secondary (10+2) with Science (PCB) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks in Physics, Chemistry, and Biology.
- Minimum percentage of marks: 45% aggregate. 5% relaxation for SC/ST, EWS and specially abled students.
- Eligibility Criteria for lateral Entry: Candidates with 10+2 with 2 years diploma and 10 with 3 years of diploma in Radiography & Imaging qualification with three months of clinical internship are eligible for the admission to Undergraduate Program for direct admission in the Third semester.



### **III. Program Educational Objectives (PEOs):**

**PEO-1:** AdtU BRAIT graduates will be well prepared for establishing successful careers as Radiographers and medical imaging specialists in the hospitals, diagnostic centres and other healthcare units.

**PEO-2:** AdtU BRAIT graduates will be academically prepared in operating and maintaining various radiographic equipments and imaging modalities by following AERB guidelines.

**PEO-3:** AdtU BRAIT graduates will actively engage in professional development practices to continually enhance their skills and expertise within Radio-imaging field.

### **IV. Program Specific Outcomes (PSOs):**

#### **V. Program Specific Outcomes (PSOs):**

**PSO1:** Practice-In-Industry: Demonstrate scanning proficiency and clinical practice efficiency during clinical posting and internship in the healthcare industry.

**PSO2:** International Competency: Apply comprehensive understanding to excel in the profession with global competency through international and industry-oriented certification courses.

**PSO3:** Global Competency: Demonstrate global competency in addressing interdisciplinary Biotechnological issues through international certification courses.

### **VI. Program Outcome:**

**PO1: Professional Knowledge:** Apply the knowledge of physics fundamentals and the functioning principles of diagnostic imaging modalities in relevance to human anatomy, physiology, and biochemistry in healthcare.

**PO2: Procedures and Techniques:** Identify the radiographic techniques and formulate procedures to meet specified imaging of the human body ensuring the safety of patients and personnel.

**PO3: Modern Equipment Use:** Operate and maintain modern imaging equipment efficiently ensuring the quality of the images.

**PO4: Documentation:** Effectively prepare and maintain patient information, procedural details and other relevant data confidentially, both in manual and digital forms.

**PO5: Professional Ethics:** Exhibit confidentiality in conducting standardized radiological procedures and hospital practices within the realm of ethical guidelines in medicolegal issues and radiation safety boards.

**PO6: Communications:** Communicate effectively with all stakeholders, like the healthcare professionals, TPAs and prepare adequate reports and presentations.

**PO7: Individual and teamwork:** Perform efficiently as an individual or as a member of the multidisciplinary healthcare team.

**PO8: Lifelong learning:** Ability to engage in self-directed lifelong learning comprehensively with technological advancements, and sustainable environment practices for the cause of humanity.

## **VII. Total Credits to be earned: 123**

### **VIII. Career Prospects:**

- Diagnostic Radiographers & technologist are employed in hospitals in both private and Government as the demand are increasingly within local community healthcare settings.
- Radiographers are now expanding their roles in a range of advanced practice and position with responsibility for patient management and image interpretation.
- Potential career routes include Trauma and Emergency, General Radiography, Interventional Imaging, Pediatrics, and Image reporting as well as specialist imaging modalities such as Ultrasound, CT scan, MRI and Radionuclide Imaging.

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 40% or as prescribed by the programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Sem Exam – I (ISE-I) (Written Examination)*	30
2.	In-Sem Exam – II (ISE-II) (Written Examination)*	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*Are compulsory*

**Note:** Total Internal assessment should be out of 40

### INSTRUCTION

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.
2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.
3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the

program to the Controller of Examinations before the start of the End-semester examination.

## **B. SEMESTER END EXAMINATION:**

Time table for end semester examination is published at least 25 days prior to the start of Examination.

### **i. Pre-Examination:**

### **Eligibility Criteria for a student to appear in University Examinations:**

The student shall only be allowed to appear in a University Examination, if: i) He/ She is a registered student of the University; ii) He/ She is of good conduct and character;

iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

### **ii. Admit Card:**

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds.

### **iii. Pattern of Question Papers:**

The question paper shall follow the principles of Bloom's Taxonomy. Table

<b>S. N.</b>	<b>Level</b>	<b>Questions /verbs for test</b>
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify
4	Analyze	Classify, outline, categorize, analyze, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.

6	Create	Design, Formulate, Modify, Develop, integrate, etc.
---	--------	-----------------------------------------------------

**Note:** No course is to be evaluated on basis of **all 6 knowledge levels**.

The format of the question paper across all the program follow a unique pattern and the total marks is 60

**Table 1: Question paper pattern for End semester examination**

Sl no	Question pattern	Total marks
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

**iv. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

**v. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

**vi. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in- Charge. The Office-in-Charge of the center may take appropriate decisions as per the rules and procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

**vii. Instruction to the Students:**

- i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination- room.
- iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer- script.
- viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

**viii. Provision for an Amanuensis (writer):**

- i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.

- ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.
- iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process. **C. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times CR$

### **i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

### **ii. Grade Point:**

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

### **iii.**

#### **Letter**

#### **Grade**

:

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

Letter Grade	Grade Points	Description
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

**iv. Grade Point Average:**

**a. SGPA (Semester Grade Point Average)**

The SGPA of a student in a Semester shall be the weighted average of the Grade

Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades ‘O’ to ‘F’ as given in Table 1.

$$SGPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$$

(1.1)

The SGPA of a student in a Semester shall be calculated on a 10-point scale using

Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester, Gi is the Grade Point secured in the i<sup>th</sup> registered Course and Ci is the Credit (weight) of that Course.



## b. CGPA (Cumulative Grade Point Average)

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrollment in the Programme. In other words, taking into account all the Courses graded with 'O' to 'P' as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrollment.
- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i$ th completed Course and  $C_i$  is the Credit (weight) of that Course.

$$CGPA = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

- (iii) The CGPA shall be convertible into equivalent percentage of marks using Equation Conversion of CGPA to percentage marks: = CGPA\*10

## D. Post-Examination

### i. Transcript or Grade Card or Certificate:

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### ii. Grievance Readdress Mechanism:

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.
- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite proforma available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.
- (vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.
- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.
- (ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# **INSTRUCTION TO TEACHERS AND STUDENTS**

## **(Teaching and Learning Methods)**

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

### **1. Student- centric / Constructivist Approach:**

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer and discuss in the successive class. This

will help in the preparation for various competitive examination and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student- centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

### **The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures 20%

Student-centric Approach, Students present and deliver lectures in the presence of teacher and supervised by teacher 60%

Students visit fields or perform experiments or teachers perform demonstration 05% .

Flipped Classroom approach 10%

Cooperative learning approach 05%

**Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned approaches and prepare a lesson plan for execution and maintain a file.

### Curriculum Framework

#### **Breakdown of Credits (for 2022-23 Syllabus)**

<b>Sl. No</b>	<b>Category</b>	<b>Total number of Credits</b>
1	University Core (UC)	21
2	University Elective (UE)	4
3	Program Core (PC)	82
4	Program Elective (PE)	9
5	Faculty Elective (FE)	7
<b>Total number of credits</b>		<b>123</b>

#### **Breakdown by categories of courses**

<b>Sl no</b>	<b>Category</b>	<b>Credits</b>	<b>%</b>
1	Paramedical Science	114	92.6%
2	FOE	2	1.72%
3	Commerce and Management	1	0.81%
4	Faculty of Humanities and Social Sciences	6	4.87%
<b>Total</b>		<b>123</b>	<b>100%</b>

**PCI, INC, AICTE regulated programs shall have to follow the regulating body**

### SEMESTER WISE COURSE DISTRIBUTION

	S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			Total
					L	T	P	S	R	O	C	IA*	SEE*	PE*	
<b>Semester I</b>	1.	22BRIT111R	Anatomy I	FC	3	0	4	0	0	0	5	40	60	100	200
	2	22BRIT112R	Physiology I	FC	3	0	4	0	0	0	5	40	60	100	200
	3	22BRIT113R	Biochemistry I	FC	3	0	4	0	0	0	5	40	60	100	200
	4	22BRIT114R	Hospital Duty and Patient care I	FC	2	0	0	0	0	0	2	40	60	0	100
	5	22UBPD111R	Basic English	UE	1	0	0	0	0	0	1	0	100	0	100
	6	22UBEC111	Extra- curricular	UC	0	0	0	4	0	0	1	0	0	100	100
	7														
<b>Total</b>											19				900
<b>Semester II</b>	S. No.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			Total
					L	T	P	S	R	O	C	IA*	SEE*	PE*	
	1.	22BRIT121R	Anatomy II	FC	3	0	4	0	0	0	5	40	60	100	200
	2	22BRIT122R	Physiology II	FC	3	0	4	0	0	0	5	40	60	100	200
	3	22BRIT123R	Biochemistry II	FC	2	1	2	0	0	0	4	40	60	100	200
	4	22BRIT124R	Hospital duty And patient care II	FC	2	0	0	0	0	0	2	40	60	0	100
	5	22UBPD121R	Effective English	UC	0	0	4	0	0	0	2	0	0	100	100
	6	22UUDL101R	Basic Digital Literacy	UC	0	0	2	0	0	0	1	0	0	100	100
	7 / 2/3	MOBATSW121	Moocs	UC	0	0	0	4	0	0	1	100	0	0	100
	8	22UUHV104R	Universal Human Value(uhv)+ Professional Ethics	UC	2	0	0	0	0	0	2	40	60	0	100
9	22BRIT125R	Techno Professional Skills I	PC	0	0	2	0	0	0	1	0	0	100	100	
10	22UBCC121	Co-curricular	UE	0	0	0	4	0	0	1	0	0	100	100	

	11	22UBEC121	Extra- curricular	UE	0	0	0	4	0	0	1	0	0	100	100
	Total										25				1400
Semester III	S. No.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
	1.	22BRIT211R	Radiation physics	FC	2	1	0	0	0	0	3	40	60	0	100
	2	22BRIT212R	Darkroom Techniques	FC	3	0	0	0	0	0	3	40	60	0	100
	3	22BRIT213R	Electronics and Instrumental Physics	FC	2	1	4	0	0	0	5	40	60	100	200
	4	22UBES201 R	Environmental Science	UC	2	0	0	0	0	0	2	40	60	0	100
	5	22BRIT214R	Techno professional Skills II	PC	0	0	2	0	0	0	1	0	0	100	100
	6	22BRITGE01/02/03	Generic elective	FE	2	0	0	0	0	0	2	0	100	0	100
	7	22UBPD211 R	Executive English	UC	0	0	2	0	0	0	1	0	0	100	100
	8	22UULS211 R	Basic acclimatizing Skills	UC	0	0	2	0	0	0	1	0	0	100	100
	9	22BRITMO01/02/03	Moocs	FE	1	0	0	0	0	0	1	0	100	0	100
	10	22UBCC211	Co-curricular	UC	0	0	0	4	0	0	1	0	0	100	100
11	22UBEC211	Extra- curricular	UC	0	0	0	4	0	0	1	0	0	100	100	
	Total										21				1200
Semester IV	S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
	1.	22BRIT221R	Physics of radiology	FC	2	1	4	0	0	0	5	40	60	100	200
	2	22BRIT222R	Clinical Radiography	FC	3	0	4	0	0	0	5	40	60	100	200
	3	22BRIT223R	Radiation protection	FC	2	1	0	0	0	0	3	40	60	0	100
	4	22BRIT224R	Digital Imaging Technology	FC	3	0	0	0	0	0	3	40	60	0	100
	5	22BRIT225R	Techno Professional skills III	PC	0	0	2	0	0	0	1	0	0	100	100
	6	22BRITGE21/22/23	Generic elective	FE	2	0	0	0	0	0	2	0	100	0	100
	7	22BRITMO21/22/23	Moocs	FE	1	0	0	0	0	0	1	0	100	0	100
	8	22UBPD221 R	Personality Development Program	UC	0	0	2	0	0	0	1	0	0	100	100
	9	22UUF201 R	Introduction to Financial Budgeting And planning	UC	0	0	2	0	0	0	1	0	0	100	100
	10	22UULS202 R	Basic life-saving skills	UC	0	0	2	0	0	0	1	0	0	100	100
11	22UBCC221	Co-curricular	UC	0	0	0	4	0	0	1	0	0	100	100	
12	22UBEC221	Extra- curricular	UC	0	0	0	4	0	0	1	0	0	100	100	

		Total									25				1400
S. N.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total	
				L	T	P	S	R	O		IA*	SEE*	PE*		
1.	22BRIT311R	Image Processing Techniques	FC	3	0	0	0	0	0	3	40	60	0	100	
2	22BRIT312R	Contrast and Special Radiography	FC	3	0	4	0	0	0	5	40	60	100	200	
3	22BRIT313R	Ultrasound and mammography	FC	2	1	0	0	0	0	3	40	60	0	100	
4	22BRIT314R	Techno Professional Skills IV	PC	0	0	2	0	0	0	1	0	0	100	100	
5	22BRITDE31/32/33	General Principles of Hospital training And Management/ Recent Advancement in Medical imaging Technology	DE	3	0	0	0	0	0	3	40	60	0	100	
6	22BRITMO31/32/33	Moocs	FE	1	0	0	0	0	0	1	0	100	0	100	
7	22UBCC311	Co-curricular	UC	0	0	0	4	0	0	1	0	0	100	100	
8	22UBEC311	Extra-Curricular	UC	0	0	0	4	0	0	1	0	0	100	100	
Total										18				900	
Semester V															
S. N.	Course Code	Course Title	Course Category	Engagement						C	Maximum Marks for			Total	
				L	T	P	S	R	O		IA*	SEE*	PE*		
1.	22BRIT321R	Magnetic Resonance Imaging	FC	3	0	0	0	0	0	3	40	60	0	100	
2	22BRIT322R	Computed Tomography	FC	3	0	0	0	0	0	3	40	60	0	100	
3	22BRIT323R	Interventional Radiology and Nuclear Medicine	FC	2	1	0	0	0	0	3	40	60	0	100	
4	22BRIT324R	Bone mineral Densitometry/ Techniques in Advanced Radiography	DE	0	0	0	12	0	0	3	0	0	100	100	
5	22BRIT325R	Lab-based Research project	PE	2	0	0	0	18	0	3	0	0	100	100	
Total										15				500	
Semester VI															



SEMESTER – I									
Course Title	Anatomy I								
Course code	22BRIT111R	Total credits: 5 Total hours: 45T+30P	L	T	P	S	R	O/ F	C
			3	0	4	0	0	0	5
Prerequisite	Knowledge about the systems of human body along with their function	Co-requisite	Knowledge about the mechanism of action of different system of the human body.						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To study the basic anatomical structure of human body</li> <li>To recognize and differentiate between different types of tissues under a microscope.</li> <li>To provide a comprehensive concept of all the anatomical systems of the human body.</li> </ol>								
CO1	Describe the organization of the human body in relation to anatomical axes and planes.								
CO2	Understanding the Musculo-skeletal system with a focus on classification, structure, functions, and anatomical relationships.								
CO3	Demonstrate the essential anatomical structures and divisions within the thorax.								
CO4	Comprehensive understanding of the digestive system including its functions, and importance.								
CO5	Explain the composition, role, and importance of tissue in preserving the integrity and general health of the body.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>INTRODUCTION TO ANATOMICAL TERMS:</b> Organization of human body, Anatomical positions, axis and planes, common anatomical terminology.	6	Knowledge about Anatomical Position and planes of the body				1,2,3		
II	<b>MUSCULO-SKELETAL SYSTEM:</b> Bones: Classification & types according to morphology& development structure and functions, description of bones of human body, blood supply of bones. Cartilage: Description. Joints: Definition, classification, structure and movements. Muscles: Types and structure of Muscles, name of the muscles of the body with some important muscle's attachments.	18	Knowledge about Musculo- skeletal system.				1,2,3		

<b>III</b>	<b>THORAX:</b> Mediastinum – division and contents. Structure of heart and blood vessels. Full description of Respiratory tract and lungs. Paranasal sinuses.	<b>16</b>	To understand about Cardio- thoracic system	1,2,3
<b>IV</b>	<b>DIGESTIVE SYSTEM:</b> Structure of Gastro Intestinal tract and accessory organs of digestion.	<b>15</b>	To understand about Digestive system	1,2,3
<b>V</b>	<b>TISSUE:</b> Classification and description of the basic tissues of the body. Histology: Epithelium, compact bone muscles, connective tissue, nervous tissue, artery, vein and lymphatic tissue.	<b>5</b>	To understand about the Tissues and its classification.	1,2,3
<b>Practical</b>	<b>1.</b> Study of anatomical planes and positions. <b>2.</b> Study of Skelton and bones of human body. (Skull, Vertebrae, Ribs and bone of upper limb)	<b>30</b>	To apply the knowledge of anatomy in the practical fields	1,2,3,4

**TEXT BOOKS:**

T1: Ross and Wilson Anatomy and Physiology in Health & Illness- 14th Edition.  
T2: B.D.

Chaurasia: Volume I - Upper limb & Thorax, Volume II-Lower limb, Abdomen & Pelvis, Volume III - Head, Neck, Face , Volume IV- Brain-Neuro-anatomy.

T3: Vishram Singh : Textbook of Anatomy Upper limb & Thorax, Textbook of Anatomy Abdomen & Lower limb, Textbook of Head, neck and Brain

**REFERENCE BOOKS:**

- R1: Peter L. Williams and Roger Warwick:- Gray's Anatomy Descriptive and Applied, 36th Ed; Churchill Livingstone.  
R2: T.S. Ranganathan: Textbook of Human Anatomy 6. Inderbir singh, GP Pal : Human Embryology.  
R3: Text book of Histology, A practical guide :-J.PG unasegar.

**OTHER LEARNING RESOURCES:**

<https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy-and-physiology>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe the organization of the human body in relation to anatomical axes and planes.	<b>1,7,8</b>
<b>2</b>	Understanding the Musculo-skeletal system with a focus on classification, structure, functions, and anatomical relationships.	<b>1,7,8</b>
<b>3</b>	Demonstrate the essential anatomical structures and divisions within the thorax.	<b>1,7,8</b>
<b>4</b>	Comprehensive understanding of the digestive system including its functions, and importance.	<b>1,7,8</b>
<b>5</b>	Explain the composition, role, and importance of tissue in preserving the integrity and general health of the body.	<b>1,7,8</b>

SEMESTER – I									
Course Title	PHYSIOLOGY I								
Course code	22BRIT112R	Total credits: 5 Total hours: 60T+30P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Knowledge about the systems of human body along with their function	Co-requisite	Knowledge about the mechanism of action of different system of the human body						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To provide concrete idea about the different physical system of human body.</li> <li>To understand the underlined mechanism that work to keep the human body alive and functioning.</li> <li>To demonstrate foundational knowledge necessary for further studies in health sciences and related fields.</li> </ol>								
CO1	Understand the basic structure and function of cells.								
CO2	Comprehend the fluid composition and distribution in the body.								
CO3	Describe the composition of the human digestive system and their specific functions.								
CO4	Explain respiratory system and classify various respiratory disorders.								
CO5	Understand the physiology of the cardiovascular system.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>GENERAL PHYSIOLOGY-</b> •Organization of human body. •Cell structure and organelle. •Tissues and functions.	6	Students will be able to know about general physiology of the human body.				1,2		
II	<b>BLOOD-</b> Blood volume and body fluids. Composition and functions of blood. Structure and formation and function of RBC, WBC and platelets. Haemoglobin. Plasma, blood coagulation. Blood groups.	18	Students will understand nd about the Blood and its composition.				3,4		
III	<b>DIGESTIVE SYSTEM-</b> General introduction, organizational plan of digestive system. Movement of G.I. Tract and functions of various components. Composition, functions and regulation of salivary, gastric, pancreatic, intestinal and biliary secretion. Functions of liver, gallbladder and pancreas. Digestion and absorption of carbohydrate, protein and fat.	16	Students will understand about the physiology of human digestive system.				1,2,3,4		

<b>IV</b>	<b>RESPIRATORY SYSTEM:</b> <ul style="list-style-type: none"> <li>•General organization.</li> <li>•Mechanics of respiration.</li> <li>•Regulation of respiration.</li> <li>•Gaseous exchange in lung and tissues.</li> <li>•Pulmonary ventilation, volumes and capacities.</li> <li>•Effect of exercise on respiration, hypoxia.</li> </ul>	<b>10</b>	Students will understand about the respiratory system and its mechanism.	1,2,3,4
<b>V</b>	<b>CARDIOVASCULAR SYSTEM:</b> General organization, structure and properties of cardiac muscles. Cardiac output, cardiac cycle, conducting system of heart. Heart sounds, regulation of H.R, pulse, blood pressure and its regulation. Systemic circulation, pulmonary circulation and coronary circulation. ECG, cardiorespiratory changes during exercise.	<b>10</b>	Students will understand about the cardiovascular system-chambers of the heart, circulatory system.	1,2,3,4
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Study of compound Microscope.</li> <li>• Arterial pulse</li> <li>• Measurement of blood pressure</li> <li>• Haemoglobin</li> <li>• Blood group</li> </ul>	<b>30</b>	To apply the knowledge of basic human physiology in the practical fields.	

**TEXT BOOKS:**

T1: A book of Physiology, Dr. Khurana.

**REFERENCE BOOKS:**

R1: Review of Medical Physiology–Ganong William F.

R2: Physiological basis of Medical practice – Best & Taylor

**OTHER LEARNING RESOURCES:**

<https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy-and-physio>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the basic structure and function of cells.	<b>1,7,8</b>
<b>2</b>	Comprehend the fluid composition and distribution in the body.	<b>1,7,8</b>
<b>3</b>	Describe the composition of the human digestive system and their specific functions.	<b>1,7,8</b>
<b>4</b>	Explain respiratory system and classify various respiratory disorders.	<b>1,7,8</b>
<b>5</b>	Understand the physiology of the cardiovascular system.	<b>1,7,8</b>

SEMESTER – I									
Course Title	BIOCHEMISTRY I								
Course code	22BRIT113R	Total credits: 4 Total hours: 42T+30P	L	T	P	S	R	O/F	C
			2	1	2	0	0	0	4
Prerequisite	Knowledge about the different bio molecules and their functions.	Co-requisite	Knowledge about structure and chemical properties of bio-molecules						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	1. To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites. 2. To explain the energy flow in the form on ATP in the human body and cells. 3. To demonstrate a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids.								
CO1	Understand the sources, functions and metabolism process of Carbohydrates								
CO2	Identify various classification of amino-acids and recognize the significance of Protein.								
CO3	Describe the significance, classification and functions of lipids.								
CO4	Comprehend the structure and functions of Nucleic Acids.								
CO5	Explain the fundamentals and importance of acid, base and buffers								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>CARBOHYDRATES-</b> Definition and classification of carbohydrates. Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) and their sources. Biological significance of Carbohydrate.	<b>10</b>	To understand the knowledge about Carbohydrates and its classification				1,2,3		
II	<b>PROTEINS-</b> Definition of Proteins along with the biological significance. Amino acids and its classification. Essential and non-essential amino acids.	<b>8</b>	To understand the knowledge about Proteins, and its classification				1,2,3		
III	<b>LIPIDS-</b> Definition and classification of lipids. Classification of Fatty Acids. Examples and functions of some common lipids (Phospholipids, Glycolipids, Steroids).	<b>8</b>	To understand the knowledge about Lipids, it's classification and functions.				1,2,3		
IV	<b>NUCLEIC ACIDS-</b> Basic idea of the structure of DNA and RNA. Function of DNA and RNA.	<b>8</b>	To understand the knowledge about DNA and RNA				1,2,3,4		

<b>V</b>	<b>ACID-BASE BUFFERS</b> Basic idea of acids, bases, Ph, buffer. Acid base balance.	<b>8</b>	To understand the knowledge about acids, base and buffers	5,6
	<b>Practical</b>			
<b>Practical</b>	<ul style="list-style-type: none"> <li>• To identification and demonstration of biochemistry laboratory glassware's and apparatus.</li> <li>• To identification and demonstration of biochemistry laboratory instruments (Principle and Applications). Qualitative test for carbohydrates:</li> <li>• To perform Molisch's test for determination of sugar in an unknown sample.</li> <li>• To perform Fehling's test for determination of reducing and nonreducing sugar in an unknown sample.</li> <li>• To perform Benedict's test for determination of reducing and nonreducing sugar in an unknown sample</li> </ul>	<b>30</b>	To apply the knowledge of basic biochemistry in the practical fields.	1,2,3

### **TEXT BOOKS:**

T1: Text book of Medical Biochemistry by Chatterjee and Shinde

T2: Text of Medical Laboratory Technology By Prafula Godkar

T3: Text book of Biochemistry by Dr. D.M.Vasudevan, Sreekumari S.Jaypee Publishers, New Delhi.

### **REFERENCE BOOKS:**

R1: Biochemistry by V.Satyanarayan, Books and Allied Pvt. Ltd. Calcutta

### **OTHER LEARNING RESOURCES:**

<https://www.khanacademy.org/science/biology/human-biology>  
<https://open.oregonstate.education/>



## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	CARBOHYDRATES-Definition and classification of carbohydrates. Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) and their sources. Biological significance of Carbohydrate.	<b>1,7,8</b>
<b>2</b>	PROTEINS-Definition of Proteins along with the biological significance. Amino acids and its classification. Essential and non-essential amino acids.	<b>1,7,8</b>
<b>3</b>	LIPIDS-Definition and classification of lipids. Classification of Fatty Acids. Examples and functions of some common lipids (Phospholipids, Glycolipids, Steroids).	<b>1,7,8</b>
<b>4</b>	NUCLEIC ACIDS-Basic idea of the structure of DNA and RNA. Function of DNA and RNA.	<b>1,7,8</b>
<b>5</b>	ACID-BASE BUFFERS Basic idea of acids, bases, Ph, buffer. Acid base balance.	<b>1,7,8</b>

SEMESTER – I									
Course Title	HOSPITAL DUTY AND PATIENT CARE I								
Course code	22BRIT114 R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 42T	2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To impart the knowledge in patient in a holistic approach for the overall wellbeing of the patient.</li> <li>To impart a comprehensive knowledge on medical ethics and the quality and functions of medical professionals.</li> <li>To provide a gross knowledge on the legal hazardous of medical profession.</li> <li>To give a comprehensive knowledge on how to be a first aider in handling emergency situations poisoning, shock, hyper and hypo glycaemia.</li> <li>To incorporate a gross knowledge about laboratory investigation and laboratory set up.</li> </ol>								
CO1	Understand different functions, process of record keeping, reporting and essential components of hospital management.								
CO2	Comprehend the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.								
CO3	Understand and apply fundamental knowledge of patient safety and care to ensure basic care needs of patients.								
CO4	Assessment of common laboratory accidents and its effective management.								
CO5	Assess vital signs and effectively manage the abnormalities.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>HOSPITAL AND RECORDS &amp; REPORTS</b> <ul style="list-style-type: none"> <li>Definition and Functions of Hospitals</li> <li>Classification, Organization and Departments of Hospitals</li> <li>Management of Hospitals</li> <li>Definition of Records and Reports</li> <li>Different types of Records and Reports • Values, Objectives and Maintenance of records</li> <li>Principle of good record writing</li> <li>Difference of records &amp; reports</li> </ul>	10	To understand the knowledge about the hospitals, it's functions and record writing& record keeping.				1,2,3		

<b>II</b>	<b>FIRST AID</b> <ul style="list-style-type: none"> <li>• Aims &amp; objectives of first aid</li> <li>• Priorities of first aid</li> <li>• Golden rules of first aid</li> <li>• Qualities &amp; responsibilities of first aider</li> <li>• Simple first aid measures in selected conditions like–</li> <li>• Food poisoning</li> <li>• Snake bite</li> <li>• Scorpion bite</li> <li>• Dog bite</li> <li>• Foreign bodies in various organs</li> <li>• Burns &amp; scald</li> <li>• Haemorrhage</li> </ul>	<b>8</b>	Understand the knowledge about the aims and objectives of first aid.	1,2,3
<b>III</b>	<b>HYGIENE AND BASIC CARE</b> Need of patients, Personal Hygiene and Maintenance of Hygiene. Maintaining therapeutic environment. Safety factors for patients such as safety from mechanical injury, thermal & chemical injury, radiation & bacteriological injury, safety from allergens. Different positions of the body: Supine position, Prone Position, Cardiac position, Lateral Position, Fowler’s position.	<b>8</b>	Understand the knowledge about maintaining the hygiene and safety in the hospitals.	1,2,3
<b>IV</b>	<b>SAFETY IN THE LABORATORY</b> Common laboratory accidents from - Physical injuries Electrical shock Chemical injury Bleeding Burn Eye accidents biological hazards	<b>8</b>	To understand the knowledge about the safety uses of equipment’s in the laboratory	1,2,3 ,4
<b>V</b>	<b>VITAL SIGNS OF PATIENTS</b> Body temperature–Maintenance of body temperature, Factors influencing body temperature, Different types off ever, Stages of rigor, Management of pyrexia. Pulse - Common pulse sites, Factors influencing pulse rate, Characteristics of Pulse, Abnormal pulse, reading of pulse Blood Pressure–Definition, Factors influencing B.P, Abnormalities of B.P, Recording of B.P. Respiration - Regulation of respiration, Factors causing variations in respiration, Abnormal respirations, Reading of respiratory rate, Different methods of Artificial Respiration	<b>8</b>	Determine the knowledge about the vital signs	5,6

**TEXT BOOKS:**

T1: Fundamentals of Hospital Practice and Patients care by Vyakarnam Nageshwer

**REFERENCE BOOKS:**

R1: Primary Health Care People, Practice, Place by Valorie A. Crooks, Gavin J. Andrews. Ashgate, Farnham, United Kingdom

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand different functions, process of record keeping, reporting and essential components of hospital management.	<b>4,7</b>
<b>2</b>	Comprehend the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	<b>1,6,7</b>
<b>3</b>	Understand and apply fundamental knowledge of patient safety and care to ensure basic care needs of patients.	<b>1,6,7,8</b>
<b>4</b>	Assessment of common laboratory accidents and its effective management.	<b>1,5,7</b>
<b>5</b>	Assess vital signs and effectively manage the abnormalities.	<b>1,2</b>

SEMESTER – I									
Course Title	BASIC ENGLISH (Communicative English & Soft Skills)								
Course code	22UBPD111R	Total credits: 2 Total hours: 34T	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Prerequisite	COMPULSORY	Co-requisite	NIL						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To introduce the students to the basics of English grammar and their application.</li> <li>To enhance communication skills through listening and speaking exercises.</li> <li>To learn and understand the importance of pronunciation of words.</li> </ol>								
CO1	The application of grammatical rules will enable the students to improve the speaking and writing skills.								
CO2	It enables the learners to use the language effectively.								
CO3	It will strength both listening and speaking skills.								
CO4	It will strengthen their vocabulary and use of words.								
CO5	It will give an introduction on the concept of communication, its importance and barriers.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Module 1-</b> Grammar 1. Parts of Speech Articles 3. Affirmative and Negative Sentences	6	Learn about how to write speech, articles etc.					1,2,3,4,5	
II	<b>Module 2-</b> Grammar 1. Determiners 2. Sentence Construction from jumbled words 3. Types of Sentences (Assertive, Imperative etc.)	6	Learn about how to write the sentence.					1,2,3,4,5	
III	<b>Module 3-</b> Building Vocabulary 1. Synonyms 2. Antonyms	8	Learn about how to change the word.					1,2,3,4,5	
IV	<b>Module 4-</b> Speaking Skills 1. Introduction and greetings 2. Pronunciation 3. Asking and offering information 4. Video Recording for self-analyse	6	Learn about how to speak.					1,2,3,4,5	
V	<b>Module 5-</b> Communication Skills 1. Introduction to Communication, 2. Importance of Communications kills, 3. Purpose of Communication, 4. Types of Communication, 5. Barriers to Communication, 6. How to improve/ tips to improve Communication skills	8	Learn about how to communicate					1,2,3,4,5	

### TEXT BOOKS:

T1: Wren & Martin. (2017). High School English Grammar and Composition.S.

Chand Publishing.

T2: Pal, Rajendra. Suri, Premlata (2022). English Grammar & Composition.

SultanChand and Sons Publishing.

T3: Debnath, Adhir. (2018).A Textbook of English Grammar and Composition. Bina Library

### REFERENCE BOOKS:

R1: Mitra, Barun. (2016) Personality Development and Soft Skills 2/E, Oxford University Press.

R2: Murphy, Raymond,.(2012) English Grammar in Use Book with Answers: A Self-Study and Practice Book for Intermediate Learners of English, Cambridge University Press

### OTHER LEARNING RESOURCES:

1. <https://youtu.be/53SIKuCuHv0>
2. [https://youtu.be/Ljjiw9mC\\_Cg](https://youtu.be/Ljjiw9mC_Cg)
3. <https://youtu.be/xQfYiHbAjJo>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The application of grammatical rules will enable the students to improve the speaking and writing skills.	<b>1,6,8</b>
<b>2</b>	It enables the learners to use the language effectively.	<b>1,6,8</b>
<b>3</b>	It will strength both listening and speaking skills.	<b>1,6,8</b>
<b>4</b>	It will strengthen their vocabulary and use of words.	<b>1,6,8</b>
<b>5</b>	It will give an introduction on the concept of communication, its importance and barriers.	<b>1,6,8</b>

SEMESTER – I									
Course Title	EXTRA CURRICULAR ACTIVITIES								
Course code	22UBEC111	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Prerequisite	COMPULSORY	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	It is to develop the social and soft skills and to promote a holistic development of the learners.								
CO1	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.								
CO2	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.								
CO3	The students will be trained to represent ADTU in various university, state and national level competitions.								
CO4	The students will be given a platform to earn from invited experts in their respective fields.								
CO5	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.								
Unit No.	Content	Contact Hour	Learning Outcome					K L	
	AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest. These activities are aimed to develop the social and soft skills and promote a holistic development of the learners. Keeping in mind the 360-degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc. The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies. The student members of the club are trained represent AdtU in various inter University student and national level competitions. Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective field.								

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO4	PO5	PO6	PO7	PO8
22BRIT111R	Anatomy I	3							1	1
22BRIT112R	Physiology I	3							1	1
22BRIT113R	Biochemistry I	3							1	1
22BRIT114R	Hospital Duty And Patient Care I	2			3	3			1	2
22UBPD111R	Basic English (Communicative English & Soft Skills)	1						3		2
22UBEC111	Extra Curricular Activities							2	3	2



SEMESTER – II									
Course Title	Anatomy II								
Course code	22BRIT121R	Total credits: 5 Total hours: 45T+30P	L	T	P	S	R	O/ F	C
			3	0	4	0	0	0	5
Prerequisite	ANATOMY I	Co-requisite	PHYSIOLOGY II						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To study the basic anatomical structure of human body</li> <li>To provide a comprehensive concept of all the anatomical systems of the human body.</li> <li>To recognize and differentiate between different types of tissues under a microscope.</li> </ol>								
CO1	To have a fundamental knowledge on structural organization of the pelvis and its importance.								
CO2	The students will get acquainted with the structure of the human excretory system and the structure of a nephron.								
CO3	To have a comprehensive knowledge on the structure of the male and female reproductive systems.								
CO4	To have knowledge on the basic structural organization of the parts of Nervous system.								
CO5	To acquire fundamental knowledge on the structural organization of the lymphatic system, sensory reception and processing in photo, olfactory, gustatory, and skin receptor.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>URINARY SYSTEM-</b> Structure of kidney, ureter, urinary bladder, male and female urethra.	10	Knowledge about Anatomy of Urinary system and associated organs.				1,2,3		
II	<b>REPRODUCTIVE SYSTEM-</b> •Structure of male and female reproductive system •Structure of breast. •PELVIS: General description of pelvic organs.	16	Knowledge about reproductive system				1,2,3		
III	<b>NERVOUS SYSTEM-</b> •Classification of Nervous system. •Central Nervous system – Brain and Spinal cord, blood supply of brain. •Spinal nerves and Cranial nerves. •Autonomic nervous System.	18	To understand about Nervous System				1,2,3		
IV	<b>SENSORY ORGAN-</b> •Skin	18	To understand about				1,2,3		
	•Eye •Ear •Nose •Tongue		Sensory organs						

<b>V</b>	<b>LYMPHATIC SYSTEM-</b> • Lymphatic vessels and lymph, lymph nodes, spleen.	<b>4</b>	To understand about the Lymphatic System	1,2,3
<b>Practical</b>	Study of bones of human body (Pelvic bones and bones of lower limb) Study of organs: Brain, heart, lung, liver, kidney, spleen.	<b>30</b>	To apply the knowledge of anatomy in the practical fields	1,2,3,4

### **TEXT BOOKS:**

T1: Ross and Wilson Anatomy and Physiology in Health & Illness-14th Edition.

T2: B.D. Chaurasia: Volume I - Upper limb & Thorax, Volume II-Lower limb, Abdomen

&Pelvis, Volume III - Head, Neck, Face , Volume IV- Brain-Neuro-anatomy.

T3: Vishram Singh : Textbook of Anatomy Upper limb &Thorax, Textbook of Anatomy Abdomen& Lower limb, Textbook of Head, neck and Brain

### **REFERENCE BOOKS:**

R1: Peter L. Williams and Roger Warwick:- Gray's Anatomy Descriptive and Applied, 36th Ed; Churchill Livingstone.

R2: T.S. Ranganathan: Textbook of Human Anatomy 6. Inderbir singh, GP Pal : Human Embryology.

R3: Text book of Histology, A practical guide :-J.PG unasegar.

### **OTHER LEARNING RESOURCES:**

<https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomyandphysiology>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM  
OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe the organization of the human body in relation to anatomical axes and planes.	<b>1,7,8</b>
<b>2</b>	Understanding the Musculo-skeletal system with a focus on classification, structure, functions, and anatomical relationships.	<b>1,7,8</b>
<b>3</b>	Demonstrate the essential anatomical structures and divisions within the thorax.	<b>1,7,8</b>
<b>4</b>	Comprehensive understanding of the digestive system including its functions, and importance.	<b>1,7,8</b>
<b>5</b>	Explain the composition, role, and importance of tissue in preserving the integrity and general health of the body	<b>1,7,8</b>

SEMESTER – II									
Course Title	PHYSIOLOGY II								
Course code	22BRIT122R	Total credits: 5 Total hours: 60T+30P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	PHYSIOLOGY I	Co-requisite	ANATOMY II						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
Course Objectives	To provide concrete idea about the different physical system of human body. To understand the underlined mechanism that work to keep the human body alive and functioning. To demonstrate foundational knowledge necessary for further studies in health sciences and related fields.								
CO1	To have a comprehensive knowledge on hormones secreted by the endocrine system and their function.								
CO2	To have a fundamental knowledge on excretory system and their function								
CO3	To have an insight knowledge male and female reproductive system.								
CO4	To have a descriptive knowledge on classification nervous system and function of special sense.								
CO5	To get acquainted with different types of immune cells in the boy and their function								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>ENDOCRINE SYSTEM-</b> Structure and hormones of endocrine glands, pituitary, thyroid, parathyroid, Pancreas, Adrenal, testes and ovary. Functions and regulation of secretion of hormones.	10	Students will be able to know about general physiology of endocrine system.				1,2		
II	<b>EXCRETORY SYSTEM-</b> Structure and functions of kidneys, nephron, ureter, urinary bladder and urethra. Urine formation. Renal function tests.	16	Students will understand about excretory system.				3,4		
III	<b>REPRODUCTIVE SYSTEM-</b> Male and female reproductive organs and changes during puberty. Menstrual cycle, ovulation. Physiological changes during pregnancy, Placenta and placental circulation.	18	Students will understand about the physiology of human reproductive system.				1,2,3,4		

<b>IV</b>	<b>NERVOUS SYSTEM AND MUSCLE-</b> Organization of nervous system. Structure and function of muscle and nerve cells. Functions of brain, Spinal cord, cranial and spinal nerves Motor system. Sensory system. ANS Synapse, neuromuscular Cerebro spinal fluid <b>SPECIAL SENSES:</b> Functions of skin, eye, ear, nose, tongue	<b>18</b>	Students will understand about the nervous system and muscles of the body.	1,2,3,4
<b>V</b>	<b>LYMPHATIC AND IMMUNOLOGICAL SYSTEM:</b> Lymph glands and circulation of lymph Spleen structure and function Immunity – Formation of T-cells and B- cells, Antigen, Antibody, and Immune response.	<b>4</b>	Students will understand about Lymphatic and immunological system.	1,2,3,4
<b>Practical</b>	•Blood Group •ESR •DLC •Total count of RBC and WBC (Demonstration)	<b>30</b>	To apply the knowledge of basic human physiology in the practical fields.	

**TEXT BOOKS:**

T1: A book of Physiology, Dr. Khurana.

**REFERENCE BOOKS:**

R1: Review of Medical Physiology–Ganong William F.

R2: Physiological basis of Medical practice – Best & Taylor

**OTHER LEARNING RESOURCES:**

<https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy-and-physio>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the basic structure and function of cells.	<b>1,7,8</b>
<b>2</b>	Comprehend the fluid composition and distribution in the body.	<b>1,7,8</b>
<b>3</b>	Describe the composition of the human digestive system and their specific functions.	<b>1,7,8</b>
<b>4</b>	Explain respiratory system and classify various respiratory disorders.	<b>1,7,8</b>
<b>5</b>	Understand the physiology of the cardiovascular system.	<b>1,7,8</b>

SEMESTER – II									
Course Title	BIOCHEMISTRY II								
Course code	22BRIT123R	Total credits: 4 Total hours: 48T+30P	L	T	P	S	R	O/F	C
			2	1	2	0	0	0	4
Prerequisite	BIOCHEMISTRY I	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ I semester of first year of the Programme								
Course Objectives	<ol style="list-style-type: none"> <li>To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites.</li> <li>To explain the energy flow in the form on ATP in the human body and cells.</li> <li>To demonstrate a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids.</li> </ol>								
CO1	To have insight knowledge on classification of enzymes, coenzymes, isoenzymes mechanism of enzyme action and factor affecting enzyme action								
CO2	Comprehensive knowledge on metabolism of carbohydrates, protein and lipids.								
CO3	To get acquainted with function of vitamins and minerals and its role in causing deficiency disease.								
CO4	Comprehend the structure and functions of Nucleic Acids.								
CO5	Explain the fundamentals and importance of acid, base and buffers								
Unit No.	Content		Contact Hour	Learning Outcome					KL
I	<b>ENZYMES-</b> Definition and classification of enzyme. Basic idea of co-enzyme, iso-enzyme. Mechanism of enzyme action. Factors affecting enzyme action		6	To understand the knowledge about Enzymes					1,2,3
II	<b>CARBOHYDRATES METABOLISM-</b> Glycolysis Krebs's cycle Gluconeogenesis Glycogenesis Glycogenolysis		10	To understand the knowledge about carbohydrates and its metabolism.					1,2,3
III	<b>PROTEIN METABOLISM-</b> Transamination Deamination Urea cycle and its significance		10	To understand the knowledge about protein, it's classification and functions.					1,2,3
IV	<b>LIPID METABOLISM-</b> $\beta$ oxidation of fatty acids. Ketone bodies Ketosis and keto acidosis		10	To understand the knowledge about lipid, it's classification and functions.					1,2,3,4

<b>V</b>	<b>VITAMINS AND MINERALS</b> Definition and classification of vitamins according to solubility. Sources and functions of individual vitamins. Deficiency. Individual minerals (calcium, phosphorus, iron, magnesium flu slide, copper, selenium, molybdenum etc.) – their sources, function and properties. Liver function test Renal function test	<b>12</b>	To understand the knowledge about Vitamins and Minerals.	5,6
	<b>Practical</b>			
<b>Practical</b>	Identification test for mono and disaccharides Identification test for proteins Precipitation reaction heller’s test, heat and acidic test Identification test for lipids (solubility test)	<b>30</b>	To apply the knowledge of basic biochemistry in the practical fields.	1,2,3

#### **TEXT BOOKS:**

T1: Text book of Medical Biochemistry by Chatterjee and Shinde

T2: Text of Medical Laboratory Technology By Prafula Godkar

T3: Text book of Biochemistry by Dr. D.M.Vasudevan, Sreekumari S.Jaypee Publishers,  
New Delhi.

#### **REFERENCE BOOKS:**

R1: Biochemistry by V.Satyanarayan, Books and Allied Pvt. Ltd. Calcutta

#### **OTHER LEARNING RESOURCES:**

<https://www.khanacademy.org/science/biology/human-biology>  
<https://open.oregonstate.edu/>



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	CARBOHYDRATES-Definition and classification of carbohydrates. Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) and their sources. Biological significance of Carbohydrate.	<b>1,7,8</b>
<b>2</b>	PROTEINS-Definition of Proteins along with the biological significance. Amino acids and its Classification. Essential and non-essential amino acids.	<b>1,7,8</b>
<b>3</b>	LIPIDS-Definition and classification of lipids. Classification of Fatty Acids. Examples and functions of some common lipids (Phospholipids, Glycolipids, Steroids).	<b>1,7,8</b>
<b>4</b>	NUCLEIC ACIDS-Basic idea of the structure of DNA and RNA. Function of DNA and RNA.	<b>1,7,8</b>
<b>5</b>	ACID-BASE BUFFERS Basic idea of acids, bases, Ph, buffer. Acid base balance.	<b>1,7,8</b>

SEMESTER – II									
Course Title	HOSPITAL DUTY AND PATIENT CARE II								
Course code	22BRIT124 R	Total credits: 2 Total hours: 46T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
Course Objectives	<ol style="list-style-type: none"> <li>To impart the knowledge in patient in a holistic approach for the overall wellbeing of the patient.</li> <li>To impart a comprehensive knowledge on medical ethics and the quality and functions of medical professionals.</li> <li>To provide a gross knowledge on the legal hazardous of medical profession.</li> <li>To give a comprehensive knowledge on how to be a first aider in handling emergency situations poisoning, shock, hyper and hypo glycaemia.</li> <li>To incorporate a gross knowledge about laboratory investigation and laboratory set up.</li> </ol>								
CO1	To have a comprehensive knowledge about the common poisonings, signs and symptoms, and its immediate management.								
CO2	To understand medical ethics and its importance in the fundamental for apprehending the approach to ethical assessment in healthcare.								
CO3	To have an experiential learning in the immediate management of shock								
CO4	The scholars after this course should be able to identify the signs and symptoms of diabetes mellitus and its complications with special reference to hyper and hypoglycemia including the immediate management.								
CO5	To have extensive knowledge on the preparation of patient and equipment in a laboratory, the different types of specimens and their ways of collection								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>POISONING</b> Definition Causes of poisoning Sources of Poisoning Symptoms of poisoning First aid & Management Antidotes Common drugs poisoning Carbon monoxide poisoning	4	To get the knowledge about poisoning, first aid and management of antidot.					1,2,3	

<b>II</b>	<b>MEDICAL PROFESSIONAL AND LEGAL HAZARDS OF MEDICAL PROFESSION</b> Qualities and Function of medical Professional Ethics of Medical Profession Malpractice Civil negligence Clinical negligence corporate negligence Consumer protection Act for medical Professional Act of commission, rashness, negligence & damage Advantage & disadvantage of the act	<b>12</b>	Understand about medical professional and legal hazards of medical profession	1,2,3
<b>III</b>	<b>SHOCK</b> Definition Types of shock General Features of shock Investigations of shock Initial management & first aid of shock	<b>6</b>	To get the knowledge about shock and its management.	1,2,3
<b>IV</b>	<b>HYPERGLYCEMIA AND HYPOGLYCEMIA</b> Definition Clinical features Diabetes laboratory tests for diabetes Different types of glycosuria Ketone bodies Glucose tolerance est. Definition, Etiology, Clinical Features, Investigation and Management for Hypoglycaemia.	<b>12</b>	To understand the knowledge about hyperglycemia and hypoglycemia	1,2,3 ,4
<b>V</b>	<b>LABORATORY INVESTIGATION AND LABORATORY SETUP</b> Preparation of patients and equipment's Collection of specimens of urine, stool, sputum, blood, CSF, Pericardial fluid, Peritoneal fluid, Pleural fluid, etc. Laboratory designing and management Different laboratories Disposal of wastes Reporting of tests of laboratory Quality control and accreditation Control of fire, infection, corrosive chemicals, toxic fumes, broken glasses, carcinogen. Legal and ethical regulation	<b>12</b>	Determine the knowledge about laboratory investigation and laboratory setup.	5,6

**TEXT BOOKS:**

T1: Fundamentals of Hospital Practice and Patients care by Vyakarnam Nageshwer

**REFERENCE BOOKS:**

R1: Primary Health Care People, Practice, Place by Valorie A. Crooks, Gavin J. Andrews.  
Ashgate, Farnham,  
United Kingdom

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand different functions, process of record keeping, reporting and essential components of hospital management.	<b>4,7</b>
<b>2</b>	Comprehend the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	<b>1,6,7</b>
<b>3</b>	Understand and apply fundamental knowledge of patient safety and care to ensure basic care needs of patients.	<b>1,6,7,8</b>
<b>4</b>	Assessment of common laboratory accidents and its effective management.	<b>1,5,7</b>
<b>5</b>	Assess vital signs and effectively manage the abnormalities.	<b>1,2</b>

SEMESTER – II									
Course Title	EFFECTIVE ENGLISH (Communicative English & Soft Skills)								
Course code	22UBPD121R	Total credits: 2 Total hours: 34T	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Prerequisite	BASIC ENGLISH	Co-requisite	NIL						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
Course Objectives	1. To introduce the students to the basics of English grammar and their application. 2. To enhance communication skills through listening and speaking exercises. 3. To learn and understand the importance of pronunciation of words.								
CO1	The learner will be able to analyse and use the techniques in language use								
CO2	Communication and behavioural skills will boost their self-reliance.								
CO3	Students will learn the effective and efficient utilization of the time.								
CO4	It will strengthen their vocabulary and use of words.								
CO5	It will give an introduction on the concept of communication, its importance and barriers.								
Unit No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Module 1-</b> Grammar Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences Types of Tenses Common Errors		6	Learn about how to write a sentence with proper Grammar.				1,2,3,4,5	
II	<b>Module 2 - Vocabulary</b> Homonyms Homophones		6	Learn about vocabulary				1,2,3,4,5	
III	<b>Reading Skills</b> Techniques of Effective Reading Gathering ideas and information from a text		8	Learn about the reading skills				1,2,3,4,5	
IV	<b>Module 4 - Conflict Management</b> <b>Definition</b> Type of Conflict Management Effects of Conflict Management		6	Learn about conflict management				1,2,3,4,5	
V	<b>Module 5 - Time-Management Skills</b> Introduction To Time Management, Importance of Time Management, Basic Tips to Maintain Time.		8	Learn about the time management skills				1,2,3,4,5	

**TEXT BOOKS:**

T1: Wren & Martin. (2017). High School English Grammar and Composition.S.Chand Publishing.

T2: Pal, Rajendra. Suri, Premlata (2022). English Grammar & Composition. SultanChand and Sons Publishing.

T3: Debnath, Adhir. (2018).A Textbook of English Grammar and Composition. Bina Library

**REFERENCE BOOKS:**

R1: Swan, Michael., (2014) Practical English Usage, Cambridge University Press

R2: Taylor J.and Wright, J., IELTS Advantage Reading Skills: A step-by-step guide to a highIELTS reading score, Delta Publishing by Klett.

**OTHER LEARNING RESOURCES:**

1. <https://clockify.me/time-management-techniques>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The application of grammatical rules will enable the students to improve the speaking and writing skills.	<b>1,6,8</b>
<b>2</b>	It enables the learners to use the language effectively.	<b>1,6,8</b>
<b>3</b>	It will strength both listening and speaking skills.	<b>1,6,8</b>
<b>4</b>	It will strengthen their vocabulary and use of words.	<b>1,6,8</b>
<b>5</b>	It will give an introduction on the concept of communication, its importance and barriers.	<b>1,6,8</b>

SEMESTER – II									
Course Title	BASIC DIGITAL LITERACY								
Course code	2UUDL101R	Total credits: 2 Total hours: 15T	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	NIL						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
Course Objectives	<ol style="list-style-type: none"> <li>To introduce the students to identify and analyze computer hardware, software and their uses.</li> <li>To able to use MS-Office suite for various purposes.</li> <li>To use the Internet efficiently for required information as well as for digital financial transactions.</li> </ol>								
CO1	Students will understand Computer Hardware, Software and Computer handling.								
CO2	Students will be able to solve basic information management issues using MS-Office Products.								
CO3	Students will be able to efficiently search the Internet for required information.								
CO4	Students will be able to use computing technically ethically, safely, securely and legally for day-to-day use.								
CO5	Students will be able to use MS-Office for various purposes.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	Fundamentals of Computer Systems Components of a Computer and their functions. Different Types of Computers and their Applications.	3	To learn about the basic fundamentals of computer and their applications.				1,2,3,		
II	Introduction to MS-Office Components of the MS-Office suite. Creating documents with MS-Word. Creating Presentations with MS- PowerPoint. Creating Spreadsheets with MS-Excel.	3	To learn about the uses of MS word				1,2,,4,		
III	Introduction to Internet & Cyber World Introduction to Computer Networks and Internet. World Wide Web, Websites and Web portals, Web browsing. Web Searching, Search engines, Introduction to Google Search Engine; How to search using Keywords, topics of Interest, etc. Creation and use of Email Accounts. Cyber Crimes.	3	To acquire knowledge about the internet and its uses				1,3,4,5		
IV	Introduction to Social Media The Power of social media, Relevance	3	To learn about the social media/social platforms				2,3,4,5		

	of social media in present scenario. Creating accounts and using some popular social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, LinkedIn. Social Media Etiquettes.			
<b>V</b>	Digital Payments Introduction to Digital Payment Systems. Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, UPI.	<b>3</b>	To acquire knowledge on the digital payments	1,2,3,

### **TEXT BOOKS:**

T1: Sinha Pradeep K. and Priti Sinha. Computer Fundamentals: Concepts Systems & Applications. 3rd ed. New Delhi: BPB Publications.

T2: Goel, A, 2010. Computer Fundamentals, Pears on India

### **REFERENCE BOOKS:**

R1: Balaguruswamy, E. 2009 Fundamentals of Computers, Tata Mc Graw-Hill Education.

R2: Balaguruswamy, 2014. E. Fund of Comp & Programming (Updated Ed Sem. I, Au) Tata Mc Graw- Hill Education.

R3: Lawson, C. 2022. Introduction to social media, Oklahoma State University.

### **OTHER LEARNING RESOURCES:**

1. <https://www.w3schools.com>
2. <https://edu.gcfglobal.org>
3. <https://www.tutorialspoint.com>
4. <https://www.javatpoint.com/>



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM  
OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Students will understand Computer Hardware, Software and Computer handling.	<b>1,6,8</b>
<b>2</b>	Students will be able to solve basic information management issues using MS-Office Products.	<b>1,6,8</b>
<b>3</b>	Students will be able to efficiently search the Internet for required information.	<b>1,6,8</b>
<b>4</b>	Students will be able to use computing technically ethically, safely, securely and legally for day-to-day use.	<b>1,6,8</b>
<b>5</b>	Students will be able to use MS-Office for various purposes.	<b>1,6,8</b>

SEMESTER – II									
Course Title	UNIVERSAL HUMAN VALUES (UHV) + PROFESSIONAL ETHICS								
Course code	22UUHV104R	Total credits: 2 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	NIL						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.</li> <li>2. It is free from any dogma or value prescriptions.</li> <li>3. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.</li> <li>4. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution.</li> <li>5. This self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs.</li> </ol>								
CO1	To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.								
CO2	To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way								
CO3	To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature								
CO4	Thus, this course is intended to provide a much needed orientation input in value education to the young enquiring minds.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Introduction-</b> Need, Basic Guidelines, Content and Process for Value Education. Understanding the need, basic guidelines, content and process for Value Education Self-Exploration–what is it?-its content and process; ‘Natural Acceptance’ and Experiential Validation-as the mechanism for self-exploration Continuous Happiness and Prosperity-A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities-the basic	3	Students will learn to achieve happiness and prosperity through value education and self-exploration, aligning their aspirations with harmony at various levels.				1,2,3,		

	requirements for fulfilment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly-A critical appraisal of the current scenario Method to fulfil the above human aspirations: understanding and living in harmony at various levels.			
<b>II</b>	<p><b>Understanding Harmony in the Human Being-</b> Harmony in Myself! Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body'- Sukhand Suvidha Understanding the Body as an instrument of 'I'(I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail Programs to ensure Sanyam and Swasthya - Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>	<b>3</b>	Students will learn to achieve personal harmony by balancing the needs of the self and body through self-control and health practices.	1,2,,4,
<b>III</b>	<p><b>Understanding Harmony in the Family and Society-Harmony in Human Relationship:</b> Understanding Harmony in the family–the basic unit of human interaction Understanding values in human human relationship; meaning of Nyaya and program for its fulfilment to ensure Ubhay-Triпти; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman Difference between respect and differentiation the others alien values in relationship. Understanding the harmony in the Society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order</p>		Students will learn to apply principles of trust, respect, and universal goals to achieve harmony in family and society.	

	in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!-Practice Exercises and Case Studies will be taken up in Practice Sessions.			
<b>IV</b>	<p><b>Understanding Harmony in the Nature and Existence-</b></p> <p>Whole existence as Coexistence</p> <p>Understanding the harmony in the Nature Interconnectedness and mutual fulfilment among the four order so naturerecyclability and self- regulation in nature Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space Holistic perception of harmony at all levels of Existence-Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>		Students will grasp the harmony and interconnectedness in nature and existence through practical exercises and case studies.	
<b>V</b>	<p><b>Understanding of Harmony on Professional Ethics</b></p> <p>Natural acceptance of human values</p> <p>Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order.</p> <p>Competence in professional Ethics:</p> <p>Ability to utilize the professional competence for augmenting universal human order Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems Strategy for transition from the present state to Universal Human Order:</p> <p>At the level of individual: as socially and ecologically responsible engineers, technologists and managers<sup>11</sup>.At the level of society: as mutually enriching institutions and organizations.</p>		Students will learn to apply professional ethics and human values to promote responsible and sustainable practices in technology and management.	

SEMESTER – II									
Course Title	TECHNO PROFESSIONAL SKILLS I								
Course code	22UBRIT125R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 15T	1	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	NIL						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
Course Objectives	To have knowledge about radiological anatomy and its terminology by studying the radiographic films and interpretation of reports.								
CO1	Describe and identify cross-sectional anatomy in the sagittal, coronal, and axial planes on CT and MR Images.								
CO2	Describe the proper diagnostic anatomy.								
CO3	Students will be able to efficiently search the Internet for required information.								
CO4	Differentiate normal anatomy, and build a personal resource system for future study.								
Unit No.	Content	Contact Hour	Learning Outcome	KL					
I	Radiological anatomy of upper limbs and its blood supply: Shoulder Bones- Scapula, Clavicle, Acromion process, Coracoid Process Glenoid Cavity Arm Bones - Humerus Forearm bones- Radius & Ulna Elbow Joint Wrist Bones Hand and Finger Bones	3	To learn about the Radiological anatomy of upper limbs.	1,2,3,					
II	Radiological anatomy of lower limbs and its blood supply: Femur.Patella.Tibia. Fibula. Tarsal Bones. Metatarsal Bones. Phalanges. Arches of the Foot	3	To learn about the Radiological anatomy of lower limbs.	1,2,,4,					

#### TEXT BOOKS:

T1: Gray's Anatomy for Students by Richard Drake

T2:Diagnostic and Surgical Imaging Anatomy: Brain, Head and Neck, Spine by Anne G. Osborn and H. Ric

Harnsberger

#### REFERENCE BOOKS:

R1: Human Anatomy ( Part 1, 2 and 3 ) by B.D Chaurasia

R2: Textbook of Anatomy – Head, Neck and Brain by Vishram Singh R3: Anatomy and Physiology by Ross and Wilson

#### OTHER LEARNING RESOURCES:

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe and identify cross-sectional anatomy in the sagittal, coronal, and axial planes on CT and MR Images.	<b>1,6,8</b>
<b>2</b>	Describe the proper diagnostic anatomy.	<b>1,6,8</b>
<b>3</b>	Students will be able to efficiently search the Internet for required information.	<b>1,6,8</b>
<b>4</b>	Differentiate normal anatomy, and build a personal resource system for future study.	<b>1,6,8</b>

<b>SEMESTER – II</b>									
<b>Course Title</b>	<b>EXTRA CURRICULAR ACTIVITIES</b>								
<b>Course code</b>	<b>22UBEC121</b>	<b>Total credits:</b>	<b>L</b>	<b>I</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>COMPULSORY</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>BACHELOR OF RADIOGRAPHY &amp; ADVANCED IMAGING TECHNOLOGY</b>								
<b>Semester</b>	<b>Autumn/ II semester of first year of the Programme</b>								
<b>Course Objectives</b>	It is to develop the social and soft skills and to promote a holistic development of the learners.								
<b>CO1</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.								
<b>CO2</b>	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.								
<b>CO3</b>	The students will be trained to represent ADTU in various university, state and national level competitions.								
<b>CO4</b>	The students will be given a platform to learn from invited experts in their respective fields.								
<b>CO5</b>	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>					
<b>I</b>	<p>AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</p> <p>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</p> <p>Keeping in mind the 360-degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</p> <p>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</p> <p>The student members of the club are trained represent AdtU in various inter University student and national level competitions.</p> <p>Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective field.</p>								

## MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BRIT121R	Anatomy II	5						5	5
22BRIT122R	Physiology II	5						5	5
22BRIT123R	Biochemistry II	5						5	5
22BRIT124 R	Hospital Duty And Patient Care II	4	1			1	2	4	1
22UBPD121R	Effective English (Communicative English & Soft Skills)	5					5		5
2UUDL101R	Basic Digital Literacy	5					5		5
22BRITMO01/02/03	MOOC/Online (Self Study Mode On Prescribed Online Platforms)	3					3		3
22UUHV104R	Universal Human Values (UHV) + Professional Ethics								
22UBRIT125R	Techno Professional Skills I	2	2	1	1				
22UBEC121	Extra Curricular Activities						5	5	5



SEMESTER – III																	
Course Title	Radiation Physics																
Course code	22BRIT211R	Total credits:	3	L	2	T	1	P	0	S	0	R	0	O/F	0	C	3
Total hours:	45T			Nil													
Prerequisite	Nil	Co-requisite									Nil						
Programme	Bachelor of Radiography & Advanced Imaging Technology																
Semester	Fall/ III semester of second of the programme																
Course Objectives	1. To understand fundamentals of physics and its application in medical imaging. 2. To understand about x-ray and its properties. 3. To understand about the equipment's used in diagnostic radiology.																
CO1	Enhancing the knowledge about the physics related to diagnostic imaging.																
CO2	Understanding the equipment's, circuit and fundamental properties of X-ray, its units and quantities																
CO3	Knowledge on fundamental physical laws to analyse behaviour and properties of variety of physical system.																
CO4	Utilize various radiation detection and measurement instruments.																
CO5	Describe the mechanisms of radiation interaction with different types of matter.																
Unit No.	Content	Contact Hour	Learning Outcome	KL													
1	<b>BASIC CONCEPT:</b> Heat, Acoustics, power, work, force, energy • Einstein's formula • Electronics, Electricity & Magnetism, electromagnetic waves – SI units • Units and measurements • temperature and heat • Structure of matter-Atomic structure, Periodic table, Ionization and excitation Electromagnetic induction: Electric charges and electric induction • Ohm's law • Circuit laws • Heating effect of current • Magnetism and Magnetic effect of an electric current • Electro-magnetic induction • Laws of mutual induction and self-induction • Alternating current- transformers theory and losses	7	Learn about the basic concepts of Physics	1,2													

<p><b>II</b></p>	<p><b>X-RAY CIRCUITS:</b>  Energy bands in solids • Semiconductors and semiconductor devices. • P-n junction diode as a rectifier. • Logic gates. • Self-rectifying circuits. • Fuses, switches and interlocks • Cathode ray oscilloscopes • mA – kVp, mAs • High tension Transformer</p>	<p><b>10</b></p>	<p>Learn about the x-ray circuits</p>	<p><b>1,2</b></p>
<p><b>III</b></p>	<p><b>X RAYS:</b>  History • Nature of X-rays • Sources of X-rays • Electromagnetic waves • Interaction of electrons with target-spectra of x-rays • Properties of X- rays • Production of X-rays • Bremsstrahlung radiation • Characteristics radiation • factors affecting X-Ray-emission spectra  • - X-ray Quantity and quality • Heel effect • Filtration – added, inherent  X-ray Tube: General features of X-ray tube • Types – Fixed and rotating • Rating and faults in X-ray tubes • Characteristics of X-ray tube • X-ray tube for mammography • Tube stand and ceiling tube support • Generator</p>	<p><b>10</b></p>	<p>Learn about the History, production and properties of x-rays</p>	<p><b>1,2</b></p>
<p><b>IV</b></p>	<p><b>INTERACTION OF RADIATION WITH MATTER:</b>  Attenuation, attenuation co-efficient, absorption and scattering Photo electric absorption • Compton scattering • Coherent scattering • Photoelectric disintegration • Pair production • interaction of charged particle and neutrons with matter • Interaction of X- and Gamma rays in body-fat-soft-tissue- bone contrast medium •  <b>HVT – TVT RADIOACTIVITY :</b>  • Unstable atoms • Radioactive series • Radioactive transformation • Decay constant • Half-life • Average life • Radioactive elements</p>	<p><b>8</b></p>	<p>Knowledge about interaction of x-rays with matter and about the history and basic nuclear physics</p>	<p><b>1,2</b></p>
<p><b>V</b></p>	<p><b>X- RAY EQUIPMENT'S :</b>  • X-ray table and types • Grids and its types • Cassette and intensifying screens  • Fluoroscopy and its equipment</p>	<p><b>10</b></p>	<p>Knowledge on x-ray machine and its components</p>	<p><b>1,2</b></p>

**TEXT BOOKS:**

T1: Thomas S Curry “Christensen’s Physics of Diagnostic Radiology”, 4th Edition August (1990)

T2: Joseph Selmen, ‘The fundamentals of x-ray and radium physics’ 5th Edition (1994) T3: D. Noreen

Chesney “X-ray Equipment's for Student Radiographers” 3rd edition (1984 )

**REFERENCE BOOKS:**

R1. K. Thayalan ‘Basic radiological Physics 2nd Edition (2001)

R2. Satish K Bhargava ‘Textbook of Radiology for Residents and Technicians’ 6th Edition (2022)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Enhancing the knowledge about the physics related to diagnostic imaging.	<b>1,2</b>
<b>2</b>	Understanding the equipment's, circuit and fundamental properties of X-ray, its units and quantities	<b>1,2</b>
<b>3</b>	Knowledge on fundamental physical laws to analyse behaviour and properties of variety of physical system.	<b>1,2</b>
<b>4</b>	Utilize various radiation detection and measurement instruments.	<b>1,2</b>
<b>5</b>	Describe the mechanisms of radiation interaction with different types of matter.	<b>1,8</b>

SEMESTER – III									
Course Title		Darkroom Techniques							
Course code	22BRIT212R	Total credits: 3	L 3	T 0	P 0	S 0	R 0	O/F 0	C 3
Prerequisite		Co-requisite	Nil						
Programme		Bachelor of Radiography & Advanced Imaging Technology							
Semester		Fall/ III semester of second of the programme							
Course Objectives		<ol style="list-style-type: none"> <li>To learn the basic principle of darkroom, its design and layout and its approach in imaging techniques.</li> <li>To educate the students in detail about various photographic processes, image standard, radiographic quality, imaging standard, quality.</li> <li>To develop exposed film into negatives using proper darkroom techniques.</li> </ol>							
CO1		Describe the construction and the accessories used in the darkroom.							
CO2		Demonstrate the methods & techniques of X-ray film processing and effective storage techniques for films.							
CO3		Proficient in preparation of chemicals and effective storage techniques for processing chemicals.							
CO4		Understand the construction and maintenance of cassettes, X-ray film and intensifying screens.							
CO5		Demonstrate the factors affecting radiographic images and its quality.							
Unit No.	Content					Contact Hour	Learning Outcome		KL
I	Dark room Planning & Activity: Dark Room: Layout and planning. Dark room construction – Nature of floor, walls, ceiling and radiation protection. • Dark room equipment and its layout. Location of pass-through boxes or cassette hatches • The photographic process: Introduction, visible light, images produced by radiation, light sensitive photographic materials.					7	Learn about introduction of Darkroom		1,2
II	Dark room accessory & chemical: • Safelight, viewing box, cassette, hangers & X-ray cassette. • The constitution of developing solutions & Fixer both in manual and automatic processing and developing & fixing chemicals.					10	Knowledge about x-ray films, cassettes and hangers		1,2

III	Dry & Wet Bench: •Hopper, drawer, cupboard & types of hangers •Hatches & Dryer • Processing tanks •Storage of processing & processing film.	10	Learn about working of wet and dry bench	1,2
IV	Processing Method: •Preparation of solution •Manual Processing Apparatus Control of Temperature •Rapid Processing Automatic Processing	8	Learn about automatic processing	1,2
V	Image formation, Quality image & artifacts • Chemistry of image formation • Formation of latent image • Photographic effect • Factors affecting radiographic image Film artifacts and its types	10	Learn about radiographic image formation	1,2

**TEXT BOOKS:**

T1: Chesney's Radiographic Imaging by John Ball & Tony Price, 6th edition

T2: Christensen's Physics of Diagnostic Radiology by Thomas S Curry, 4th Edition

**REFERENCE BOOKS:**

R1. Fundamental of X-Ray and Radiation Physics by Joseph Selman, 4th Edition  
R2. Radiologic Science for Technologists by Stewart C. Bhushong, 2nd Edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe the construction and the accessories used in the darkroom.	<b>1,2,3,5</b>
<b>2</b>	Demonstrate the methods & techniques of x-ray film processing and effective storage techniques for films.	<b>1,2,3,5</b>
<b>3</b>	Proficient in preparation of chemicals and effective storage techniques for processing chemicals.	<b>1,2,3,5</b>
<b>4</b>	Understand the construction and maintenance of cassettes, X-ray film and intensifying screens.	<b>1,2,3,5</b>
<b>5</b>	Demonstrate the factors affecting radiographic images and its quality.	<b>1,2,3,5</b>

<b>Course Title</b>	<b>ELECTRONICS AND INSTRUMENTAL PHYSICS</b>									
<b>Course code</b>	<b>22BRIT213R</b>	<b>Total credits:</b>	<b>5</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours:</b>		<b>2</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
		<b>45T+30P</b>								
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>							
<b>Programme</b>	<b>Bachelor of Radiography &amp; Advanced Imaging Technology</b>									
<b>Semester</b>	<b>Fall/ III semester of second of the programme</b>									
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>To provide an overview of electronic device components to BRAIT</li> <li>To provide an overview of Basic knowledge of Digital electronics</li> <li>To provide an overview of Transducers and Sensors</li> </ol>									
<b>CO1</b>	Understanding the logic system, power source and principles of amplifier.									
<b>CO2</b>	Improving technical abilities in digital electronics in Radiography.									
<b>CO3</b>	Enhancing the knowledge about circuits and switches theoretically and practically									
<b>CO4</b>	Analyze and design simple analog circuits, including amplifiers, oscillators, and filters.									
<b>CO5</b>	Understand the principles of digital electronics, including logic gates, flip-flops, counters, and microcontrollers.									
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>						
<b>I</b>	<b>Semiconductor Devices and Applications:</b> Introduction to P- N junction Diode and V-I characteristics, Half wave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator. Regulated power supply IC based on 78XX and 79XX series, Introduction to BJT, its input- output and transfer characteristics, BJT as a single stage CE amplifier, frequency response and bandwidth.	<b>7</b>	Learn about Introduction to basic electronics	<b>1,2</b>						
<b>II</b>	<b>Operational amplifier and its applications:</b> Introduction to operational amplifiers, Op-amp input modes and parameters, Op- amp in open loop configuration, op-amp with negative feedback, study of practical op-amp IC 741, inverting and non-inverting amplifier applications: summing and difference amplifier, unity gain buffer, comparator, integrator and differentiator	<b>10</b>	Learn about amplifiers and its applications	<b>1,2</b>						
<b>III</b>	<b>Timing Circuits and Oscillators:</b> RC-timing circuits, IC 555 and its applications as a stable and mono-stable multi-vibrators, positive feedback, Barkhausen's criteria for oscillation, R-C phase shift and Wein bridge oscillator.	<b>10</b>	Learn about timing Circuits and Oscillators	<b>1,2</b>						

IV	<b>Digital Electronics Fundamentals:</b> Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- map, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers, flip-flops, shift registers, counters, Block diagram of microprocessor/microcontroller and their applications.	8	Knowledge about digital electronics used in x-ray and ultrasound circuits	1,2
V	<b>Transducers and Instrumentation:</b> LVDT, A.C and D.C Tachometers, Capacitance transducers, Thermistor based thermometers, Strain gauge, Ultrasonic transducers and their electrical equivalent circuits. CRO, Phosphors, LED, LCD, and Plasma display, seven segment dot matrix system, Guest Host effect, Generation and Distribution of Electrical Energy, Earthing, Fuse, Circuit Breakers, Insulators, High Tension Cables, Discharge through Capacitors, Rectifiers (Half wave, Full wave and Self Rectifiers).	10	Knowledge about Rectifiers, capacitors, transistors etc.	1,2
Practical	<ol style="list-style-type: none"> <li>To study the behaviour of half wave, full wave and bridge rectifier,</li> <li>To study the behaviour of a filter circuit.</li> <li>To plot the graph of forward and reverse bias characteristics of a Si junction diode.</li> </ol>	30	Skill fully operate electronic instruments like oscilloscopes, signal generators, multimeters, and spectrum analyzers.	1,2,3,4

**TEXT BOOKS:**

T1. J.B Gupta “Electronic Device and Circuits” Katson Books 6th edition 2018 T2. Electrical and Electronic Measurement and Instrumentation by A.K Sawhney T3. Hand book of Medical Radiology by C Ramamohan.

**REFERENCE BOOKS:**

R1.Floyd,” Electronic Devices” Pearson Education 9th edition, 2012.

R2. R.P. Jain, “Modern Digital Electronics”, Tata Mc Graw Hill, 3rd Edition, 2007.

R3. Essential Physics for Radiology and Imagine by Akash Ganguly and Rezaul Karim. R4. Fundamental of X-Ray and Radiation Physics by Joseph Selma



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding the logic system, power source and principles of amplifier.	<b>1</b>
<b>2</b>	Improving technical abilities in digital electronics in Radiography.	<b>1</b>
<b>3</b>	Enhancing the knowledge about circuits and switches theoretically and practically	<b>1</b>
<b>4</b>	Analyze and design simple analog circuits, including amplifiers, oscillators, and filters.	<b>1</b>
<b>5</b>	Understand the principles of digital electronics, including logic gates, flip-flops, counters, and microcontrollers.	<b>1,3</b>

SEMESTER – III									
Course Title	ENVIRONMENTAL SCIENCE								
Course code	22UBES201R	Total credits: 2 Total hours: 45T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	NILL	Co-requisite	NILL						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ III semester of second of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To prepare students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective.</li> <li>To develop a world population that is aware of and concerned about the environment and its associated problems.</li> <li>To the knowledge, Skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and prevention of new ones.</li> </ol>								
CO1	The students will be able to appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.								
CO2	Students will learn about natural resource, its importance and environmental impacts of Human activities on natural resource								
CO3	Gain knowledge about environment and ecosystem								
CO4	Students will be able to understand the concept of biodiversity and respect them.								
CO5	Gain knowledge about the conservation of biodiversity and its importance. Aware students about problems of environmental pollution, its impact on human and ecosystem and control measures.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	Multidisciplinary nature of environmental studies; Definition, scope and importance (2 lectures) Need for public awareness. Social Issues and the Environment from Unsustainable to Sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case Studies. Environmental ethics; Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Waste land reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness	6	Learn about Introduction to Environment				1,2		

<p><b>II</b></p>	<p>Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. Human Population and the Environment Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Case Studies.</p>	<p>8</p>	<p>Learn about applications of natural resources</p>	<p>1,2</p>
<p><b>III</b></p>	<p>Ecosystems Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the Following ecosystem: - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)</p>	<p>8</p>	<p>Learn about Ecosystem</p>	<p>1,2</p>
<p><b>IV</b></p>	<p>Biodiversity and its conservation Introduction – Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega- diversity nation• Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex situ conservation of biodiversity</p>	<p>7</p>	<p>Knowledge about Biodiversity</p>	<p>1,2</p>
<p><b>V</b></p>	<p>Environmental Pollution Definition Cause, effects and control measures of:-Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste. Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in</p>	<p>5</p>	<p>Knowledge about various environmental pollutions.</p>	<p>1,2</p>

	prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides Field work Visit to a local area to document environmental assets river/forest/grassland/hill/mountain. Visit to a local polluted site- Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc.			
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**TEXT BOOKS:**

- T1. Harucha E. B, Textbook of Environmental Studies, Orient Blackswan Publishing.  
 T2. Tiwari V. K A Textbook of Environmental Studies, Himalaya Publishing House T3. Chatwal G. R. &Sharma H. Environmental Studies, Himalaya Publishing House

**REFERENCE BOOKS:**

- R1. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadards, Vol I and II, Enviro Media (R)  
 R2. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)  
 R3. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email: mapin@icenet.net (R)  
 R4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

**OTHER LEARNING RESOURCES:**

**RELATIONSHIP BETWEEN COURSE OUTCOMES(CO) AND PROGRAMME OUTCOME(PO)**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The students will be able to appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.	<b>1,6,8</b>
<b>2</b>	Students will learn about natural resource, its importance and environmental impacts of Human activities on natural resource	<b>1,6,8</b>
<b>3</b>	Gain knowledge about environment and ecosystem	<b>1,6,8</b>

<b>4</b>	Students will be able to understand the concept of biodiversity and respect them.	<b>1,6,8</b>
<b>5</b>	Gain knowledge about the conservation of biodiversity and its importance. Aware students about problems of environmental pollution,its impact on human and ecosystem and control measures.	<b>1,6,8</b>

SEMESTER – III									
<b>Course Title</b>	<b>ENGLISH LANGUAGE PROFICIENCY (Communicative English &amp; Soft Skills)</b>								
<b>Course code</b>	<b>22UBPD211R</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 54P</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Radiography &amp; Advanced Imaging Technology</b>								
<b>Semester</b>	<b>Fall/ III semester of second of the programme</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>To enable students to learn and comprehend about the proficiency of the English language.</li> <li>To improve the writing skill of the learners and enable them to prepare CV and cover letter for professional development.</li> <li>To evaluate certain attributes in a candidate that can be otherwise difficult for time consuming to a certain</li> </ol>								
<b>CO1</b>	It will develop their writing skills through various techniques of language use.								
<b>CO2</b>	It will enable the learners to manage behaviors, thoughts, and emotions in a conscious and productive way.								
<b>CO3</b>	It will develop their critical thinking ability and develop an independency in their professional career.								
<b>CO4</b>	Develop the ability to comprehend and respond appropriately to spoken English in various contexts.								
<b>CO5</b>	Enhance reading skills for understanding and analyzing texts from diverse genres.								
<b>Unit No.</b>	<b>Content</b>			<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>K L</b>
<b>I</b>	<b>Grammar</b> i. Use of Prepositions ii. Tag Questions.			<b>6</b>	Basics of grammar				<b>1,2</b>
<b>II</b>	<b>Grammar</b> i. Active and Passive Voice ii. Direct and Indirect Speech.			<b>2</b>	Introduction of grammar				<b>1,2</b>
<b>III</b>	<b>Writing Skills</b> i. The Basics of Writing; avoid ambiguity and vagueness ii. Paragraph Writing iii. Resume, CV and Cover Letter			<b>8</b>	Learn about writing skills				<b>1,2</b>
<b>IV</b>	<b>Self-Management Skills</b> i. SWOT Analysis ii. Goal Setting iii. Personal Hygiene			<b>8</b>	Introduction of self-Management skill				<b>1,2</b>

V	Non-Verbal Communication- Sciences of Body Language i. What is Non-Verbal Communication & group discussion Verbal/top- Body Language, ii.skills Types of Body Language, iii. Importance and Impact of Body Language	10	Learn about Body languages	1,2
VI	Group Discussion (Theory) i.Importance, ii. Planning, Elements, and Skills assessed; iii. Effectively on skills disagreeing, iv. Summarizing and Attaining the Objective	8	Basic of group discussion	

### TEXT BOOKS:

- T1.Lata, P. Kumar, S. (2015). Communication Skills, Second Edition. India: Oxford University Press.  
 T2. Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.  
 T3. Mc Dowell, Gayle Laakmann. 2008. Cracking the Coding Interview (Indian Edition)

### REFERENCE BOOKS:

- R1. Zinsser, William. (2006) On Writing Well: The Classic Guide to Writing Non fiction, Harper Perennial  
 R2. Lacina, Antonio. (2016) Understanding Body Language: 51 gestures and what they signal, Books on Demand.

### OTHER LEARNING RESOURCES

- <https://learning.shine.com/talenteconomy/career-help/top-group-discussion-skills>  
<https://www.thoughtco.com/what-is-nonverbal-communication-1691351>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	It will develop their writing skills through various techniques of language use.	1,6,7
2	It will enable the learners to manage behaviors, thoughts, and emotions in a conscious and productive way.	1,6,7

<b>3</b>	It will develop their critical thinking ability and develop an independency in their professional career.	<b>1,6,7</b>
<b>4</b>	Develop the ability to comprehend and respond appropriately to spoken English in various contexts.	<b>1,6,7</b>
<b>5</b>	Enhance reading skills for understanding and analyzing texts from diverse genres.	<b>1,6,7</b>



SEMESTER – III										
Course Title	TECHNO PROFESSIONAL SKILLS II									
Course code	22BRIT215R	Total credits: 1	L	T	P	S	R	O/F	C	
			0	0	2	0	0	0	1	
Prerequisite	Nil	Co-requisite	Nil							
Programme	Bachelor of Radiography & Advanced Imaging Technology									
Semester	Fall/ III semester of second of the programme									
Course Objectives	<ol style="list-style-type: none"> <li>To have knowledge about human anatomy and its terminology.</li> <li>To enhance proficiency in using advanced features of industry-standard software and tools.</li> <li>To develop skills in resource allocation, risk management, and project documentation.</li> </ol>									
CO1	Describe and identify cross-sectional anatomy in the sagittal, coronal and axial planes on CT and MR Images.									
CO2	Describe the proper diagnostic anatomy. Differentiate normal anatomy, and build a personal resource system for future study.									
CO3	Analyze and interpret data using advanced data analysis techniques and tools									
CO4	Utilize project management software to track progress, manage resources, and communicate with stakeholders.									
CO5	Demonstrate advanced skills in using industry-standard software, tools, and programming languages.									
Unit No.	Content	Contact Hour	Learning Outcome					K L		
I	<b>Radiological anatomy of Skull &amp; Vertebrae and its blood supply:</b> • Skull bones- Cranial Bones, Facial Bones • Vertebrae-Cervical, Thoracic, Lumbar, Sacral & Coccyx	6	To learn a knowledge about the anatomy and the blood supply of skull bones and vertebrae.					1,2		
II	<b>Radiological anatomy of thorax and abdomen and its blood supply:</b> Thoracic cavity & Abdominal Cavity	6	To learn a knowledge about the anatomy and the blood supply of thoracic cavity and abdominal cavity.					1,2		
III	<b>Radiological anatomy of pelvis and its blood supply:</b> Pelvic girdle, Hip Joint	6	To learn about the anatomy and the blood supply of Pelvis and Hip joint.					1,2		

**TEXT BOOKS:**

T1. B.D Chaurasia as Human anatomy.

T2. Diagnostic and Surgical Imaging Anatomy: Brain, Head and Neck, Spine by Anne G. Osborn and H. Ric Harns berger.

**REFERENCE BOOKS:**

R1. Text book of Human Anatomy by A.K Dutta

R2. Human Anatomy & Physiology by Ross & Wilson

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME(PO)**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe and identify cross-sectional anatomy in the sagittal, coronal and axial planes on CT and MR Images.	<b>1,2,3</b>
<b>2</b>	Describe the proper diagnostic anatomy. Differentiate normal anatomy, and build a personal resource system for future study.	<b>1,2,3</b>
<b>3</b>	Analyze and interpret data using advanced data analysis techniques and tools	<b>1,2,3</b>
<b>4</b>	Utilize project management software to track progress, manage resources, and communicate with stakeholders.	<b>1,6,7</b>
<b>5</b>	Demonstrate advanced skills in using industry-standard software, tools, and programming languages.	<b>3,7,</b>

SEMESTER – III										
<b>Course Title</b>	<b>BASIC ACCLIMATIZING SKILLS</b>									
<b>Course code</b>	<b>22UULS201R</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>	
		<b>Total hours: 20</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>							
<b>Programme</b>	<b>Bachelor of Radiography &amp; Advanced Imaging Technology</b>									
<b>Semester</b>	<b>Fall/ III semester of second of the programme</b>									
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>To impart knowledge of the fundamentals of Hospitality industry and its applications.</li> <li>Students will be able to familiarize with the cooking equipment &amp; Utensils.</li> <li>Students will be able to handle different modes of reservations</li> </ol>									
<b>CO1</b>	Students will have basic knowledge of cooking methods.									
<b>CO2</b>	Students will gain the knowledge of organizing & Cleaning of Rooms.									
<b>CO3</b>	Students will be able to gain the travel management concept.									
<b>CO4</b>	Students will be able to acquire the knowledge of basic households									
<b>CO5</b>	Students will be able to the physiological and psychological processes involved in acclimatization.									
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>						<b>K</b>	<b>L</b>
<b>I</b>	<b>Introduction to Accommodation Management</b> • Telephone handling technique • Organizing of Rooms. • Cleaning agents. • Cleaning equipment and uses. • Bed making Process	<b>6</b>	To acquire knowledge on accommodation Management.						<b>1,2</b>	
<b>II</b>	<b>Fundamentals of Cooking</b> • Definition of cookery– Aim & Objectives of cooking. • Use of basic Cooking equipment's • Personal Hygiene and Safety • Use of Fire & Fuels	<b>6</b>	To acquire knowledge on cooking and personal hygiene and its safety.						<b>1,2</b>	
<b>III</b>	<b>Methods of Cooking Different Cuts.</b> Use of Herbs and Spices. Basic Food and Beverage Preparation. Regional food Habits	<b>6</b>	To acquire knowledge the knowledge of different types of herbs and spices in cooking.						<b>1,2</b>	

<b>IV</b>	<b>Forms &amp; formats</b> C –form Reservation form Registration form Passport Application form Legal Rent Agreement	<b>2</b>	To gain knowledge about forms and formats.	<b>1,2</b>
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**TEXT BOOKS:**

T1. Arora K(2011).Theory of cookery, Frank brothers & company (pub) pvt ltd – New Delhi. T2. Bruce H. Axler, Carol A. Litrides (2010) Food and Beverage Service Volume 1 of Wiley Professional Restaurateur, Guides.

**REFERENCE BOOKS:**

R1. Mohammed Zulfikar (2010) - Introductions to Tourism and Hotel Industry Introduction to Tourism and Hotel Industry. Vikas Publishing.  
R2. Sudhir Andrews (2013) Food and Beverage Service : A Training Manual, Tata Mc Graw Hill,2013

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)**

<b>COPO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Students will have basic knowledge of cooking methods.	<b>1,7,8</b>
<b>2</b>	Students will gain the knowledge of organizing & Cleaning of Rooms.	<b>1,7,8</b>
<b>3</b>	Students will be able to gain the travel management concept.	<b>1,7,8</b>
<b>4</b>	Students will be able to acquire the knowledge of basic households	<b>1,7,8</b>
<b>5</b>	Students will be able to the physiological and psychological processes involved in acclimatization.	<b>1,7,8</b>

SEMESTER – III									
Course Title	CO-CURRICULAR								
Course code	22UBCC211	Total credits: 1 Total hours:	L 0	T 0	P 0	S 4	R 0	O/F 0	C 1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Radiography & Advanced Imaging Technology								
Semester	Fall/ III semester of second of the programme								
Course Objectives	<p>Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.</p> <p>Co-curricular activities facilitate in the development of various domains of mind and personality such as intellectual development, emotional development, social development, moral development and aesthetic development. Creativity, Enthusiasm, and Energetic, Positive thinking are some of the facets of personality development and the outcomes of extracurricular activities.</p>								
Unit No.	Content	Contact Hour	Learning Outcome	KL					
I	The institute provides the opportunity to the teacher trainees to participate in various activities for their overall development. The institute conducts Seminars and Workshops, Guest Lectures, Essay writing, projects, general knowledge debates, quiz and discussion on current affairs, Discussion on social justice, National Days Celebrations, Assembly, Weekly meetings and Value Education programme, and also organize Dance, Dramatics, Singing competitions. Games and Sports are compulsory for all the students. Provision has, therefore been made for games and sports in college. The college will have unit of N.S.S. and will also give the opportunity to students to participate in it								

<b>SEMESTER – III</b>										
<b>Course Title</b>	<b>EXTRA CURRICULAR ACTIVITIES</b>									
<b>Course code</b>	<b>22UBEC211</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>	
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>	
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>							
<b>Programme</b>	<b>Bachelor of Radiography &amp; Advanced Imaging Technology</b>									
<b>Semester</b>	<b>Fall/ III semester of second of the programme</b>									
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>To impart knowledge of the fundamentals of Hospitality industry and its applications.</li> <li>To enhance specific talents and interests, such as sports, arts, music, drama, and public speaking.</li> <li>Develop a sense of responsibility, discipline, and commitment.</li> </ol>									
<b>CO1</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.									
<b>CO2</b>	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.									
<b>CO3</b>	The students will be trained to represent ADTU in various inter university, state and national level competitions.									
<b>CO4</b>	The students will be given a platform to earn from invited experts in their respective fields									
<b>CO5</b>	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics									
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>						<b>KL</b>	
<b>I</b>	AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.								1,2	
<b>II</b>	These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.								1,2	
<b>III</b>	Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc								1,2	
<b>IV</b>	The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.								1,2	

<b>V</b>	The student members of the club are trained represent AdtU in various inter University student and national level competitions.			
<b>VI</b>	Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective field			

### MAPPING TABLE

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BRIT211R	Radiation Physics	3	2					1	
22BRIT212R	Darkroom Techniques	2	2	3		1			
22BRIT213R	Electronics And Instrument AI Physics	3		1					
22UBES201R	Environmental Science	2					1	1	3
22BRIT214R	Techno Professional Skills II	3	3	2			2	1	
22BRITGE01/02/03	Generic Elective					2	1		3
22UBPD211R	Executive English	1					3	2	
22UULS211R	Basic Acclimatizing Skills	1						2	3
22BRITMO01/02/03	MOOCS	1			2			3	3
22UBCC211	Co-Curricular						3	3	2
22UBEC211	Extra- Curricular						3	3	2

SEMESTER – IV										
Course Title	Physics of Radiology									
Course code	22BRIT221R	Total credits:	5	L	T	P	S	R	O/F	C
		Total hours:	45T+30P	2	1	4	0	0	0	4
Prerequisite	Compulsory	Co-requisite	Nil							
Programme	Bachelor of Radiography & Advance Imaging Technology									
Semester	Autumn/ IV semester of second year of the programme									
Course Objectives	1. To introduce the students to the concepts related to Spectra, electromagnetic waves, atomic structures, radioactivity etc. 2. To introduce the students to the concepts related to physics behind the mechanism of radiography. 3. To explain the students about the working principle of X-ray tube.									
CO1	Provides the knowledge about the radiation that is utilized in Diagnostic Radiology.									
CO2	Understanding the concept of radiation can provide the better utilization of the machine with proper protection									
CO3	Understand the basic fundamentals of electricity and its application in the field of radiology.									
CO4	Comprehend the function of essential electronic components such as resistors, capacitors, inductors, diodes, and transistors.									
CO5	Describe the radiation quantities and dosimeter in the diverse contexts of diagnostic radiology.									
Unit No.	Content	Contact Hour	Learning Outcome	KL						
I	Electromagnetic Radiation: Dispersion and spectrum, Pure and impure spectrum, Emission spectra and adsorption spectra, Continuous, Line and Band spectra, Solar spectra, Fraun Hoffer lines Electromagnetic waves & their properties, Planck's Quantum theory of radiation, Concept of photon, Photoelectric Effect, Photocell, Intensity	10	Learn about electromagnetic spectrum	1,2,3,4						
II	Atomic Structure and Radioactivity: Concept of Atoms, Molecules and Nucleus, Structure of Atoms and Nucleus, Radioactivity, $\alpha$ , $\beta$ and $\gamma$ – rays and their Properties, Radioactive Displacement Law, Decay constant, Half-life, Period, Unit Of Radioactivity, Medicinal use of Radioactive Nuclides.	7	Learn about atoms and radioactivity	1,2,3,4						



<b>III</b>	<b>Fundamentals of Electricity:</b> Electric charge, Quantization of charge, Electrostatic force, Coulomb's Law, Electric Induction, Concept of Electric Lines of Force, Electric Potential Capacitance and Capacitors, Idea of Electric Dipole Conductors, Insulators (dielectrics) and Semiconductors, Ohm's Law Resistance, Kirchoff's Laws (both current and voltage Laws) Conversion of Galvanometer into Ammeter and Voltmeter, Joule's Law of heating, Magnetic effect of Electric Current Faraday's Laws of EM Induction, Peak value and RMS value of an AC, Construction, Transformer Losses and Regulations.	<b>8</b>	Learn about electricity	<b>1,2,3,4</b>
<b>IV</b>	<b>Fundamentals of Electronics:</b> Distinguish between Active & Passive Circuit Elements & Electronic Appliances, Vacuum Tubes, Diode Valves, Effect of Gas in the Diode Valve, Rectifiers, Half wave and Full wave Rectifiers, their Efficiencies, Semiconductors.	<b>5</b>	Learn about rectifiers	<b>1,2,3,4</b>
<b>V</b>	<b>Radiation Quantities:</b> Radiometric Quantities (Fluence & Fluence Rate, The Energy Fluence and Energy Fluence Rate) Interaction Quantities (Interaction Cross-section, Linear Attenuation Coefficient, Mass Attenuation Coefficient, Stopping Power, Linear Energy Transfer, The Radiation Chemical Yield, The Mean Energy Expended in a Gas Per Ion Pair formed. Dosimetric Quantities (Mean energy Imparted, The Specific Energy, Exposure & Exposure Rate, Absorbed Dose and Absorbed Dose Rate, Dose Equivalent and Effective Dose Equivalent	<b>8</b>	Learn about radiation units and measurements.	<b>1,2,3,4</b>
<b>Practical</b>	1. Electric Potential Capacitance and Capacitors, Idea of Electric Dipole Conductors, Insulators (dielectrics) and Semiconductors, Ohm's Law Resistance	<b>30</b>	Learn about the mechanism of capacitor and conductors	<b>1,2,3,4</b>

**TEXT BOOKS:**

- T1. X-ray Physics and Equipment, Ashuworth.
- T2. Computed Radiography, MJ Brooker.
- T3. The Fundamentals of X-ray and radium Physics,6thEdition, Selman

**REFERENCE BOOKS:**

- R1. Clinical Sonography, A Practical guide,1998,RogerCSanders.
- R2. MRI in Practicel, 3rdEdition,2005,Westbook,Rath.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Provides the knowledge about the radiation that is utilized in Diagnostic Radiology.	1,2
Understanding the concept of radiation can provide the better utilization of the machine with proper protection	1,2
Understand the basic fundamentals of electricity and its application in the field of radiology.	3
Comprehend the function of essential electronic components such as resistors, capacitors, inductors, diodes, and transistors.	2,3
Describe the radiation quantities and dosimetry in the diverse contexts of diagnostic radiology.	3

<b>Course Title</b>	<b>Clinical Radiography</b>								
<b>Course code</b>	<b>22BRIT222R</b>	<b>Total credits: 5</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 45T+30P</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>Prerequisite</b>	<b>Compulsory</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Radiography &amp; Advance Imaging Technology</b>								
<b>Semester</b>	<b>Autumn/ IV semester of second year of the programme</b>								
<b>Course Objectives</b>	1. To introduce the students the concepts related to various positioning of the body. 2. To introduce the students the concepts related to various special radiographic views. 3. To introduce the students the concepts related to various techniques used in radiographic examination.								
<b>CO1</b>	Understanding and adapting various techniques for radiographic examination.								
<b>CO2</b>	To ensure optimum image quality with relevant to technical factors while carrying out radiographic examination.								
<b>CO3</b>	Describe the various techniques and procedures of skull radiography.								
<b>CO4</b>	Explain the different views and techniques for chest radiography.								
<b>CO5</b>	Understand and implement the various techniques and procedures of abdomen, pelvis and dental radiography.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	Extremities Radiography – Hand- Finger –MCP-Wrist joint- Forearm - Elbow joint – humerus – shoulder joint. Foot–Toes- Tarsal Bones-Ankle joint -Knee joint – patella–tibia- femur–Hip joint– pelvis - sacroiliac joint	<b>10</b>	x-ray positioning of upper and lower extremities					<b>1,2,3,4</b>	
<b>II</b>	Spine Radiography - Vertebral column– Atlanta occipital articulation- cervical spine- dorsal spine - lumbar spine – sacrum -vertebral canal- vertebral foramen.	<b>7</b>	x-ray positioning of spine					<b>1,2,3,4</b>	
<b>III</b>	Skull Radiography – general, sella – temporal bone–mastoid–optic foramen– Internal auditory canal– Superior and inferior orbital fissure – base of skull– facial bones–petrous apex– Zygomatic bone, nasal bone, sinuses of skull – mandible – Tem pro- Mandibular joint – Paranasal sinuses Radiography.	<b>8</b>	x-ray positioning of skull					<b>1,2,3,4</b>	

<b>IV</b>	Chest Radiography –Basic views (PA & AP) - inspiratory & expiratory films- special chest views & their significance – larynx- trachea- thoracic inlet - Sternum - Ribs –as. Heart and great vessels – mediastinum -Diaphragm – double exposure technique.	<b>5</b>	x-ray positioning of chest	1,2,3,4
<b>V</b>	Abdomen & Pelvic Radiography – all projection – the acute abdomen investigation. Soft tissue radiography: Preparations, Instructions, Various techniques, positioning digital mammography, High and low KV Technique– radiography–technique for steep range radiography – intensifying screen.	<b>8</b>	Learn about Abdomen & pelvis x-ray	1,2,3,4
<b>VI</b>	<b>Special Radiography:</b> <b>Stereo Radiography:</b> Principle–tube shifting relation of patient – correct making and viewing of stereo radiographs. – applications. Macro radiography Principle sizes of focal spot its limitation in its application. High kV technique: technique & usefulness. Dental radiography-types of equipment’s – techniques-indications- films-dental radiography in trauma patient	<b>10</b>	Learn about Dental x-ray and different techniques used.	1,2,3
<b>Practical</b>	Positioning of non- contrast Radiography	<b>30</b>	Learn about position of radiographic examination	1,2,3,4

#### TEXT BOOKS:

T1 Merrill’s Atlas of Radiographic Positioning & Procedures, 11th Edition, 2007, Frank ,long, Smith.  
T2.Clark’s positioning in Radiology, 12th Edition,2005,Clark. 3. Medical X-ray Techniques in Diagnostic Radiology, Vander Plaals

#### REFERENCE BOOKS:

R1. Radiographic Anatomy and Positioning: Anintegrated approach,1998,Comuelle, Andrea Gauthier  
R2.Special Techniques in Orthopaedic Radiology, Stripp W.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOME**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Understanding and adapting various techniques for radiographic examination.	<b>1</b>
Ensure optimum image quality with relevant technical factors while carrying out radiographic examination.	<b>1,2</b>
Describe the various techniques and procedures of skull radiography.	<b>3</b>
Identify the different views and techniques for chest radiography.	<b>2,3</b>
Understand and implement the various techniques and procedures of abdomen, pelvis and dental radiography.	<b>1,2,3</b>

<b>Course Title</b>	<b>Radiation protection</b>								
<b>Course code</b>	<b>22BRIT223R</b>	<b>Total credits: 3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 45</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>Prerequisite</b>	<b>Compulsory</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Radiography &amp; Advance Imaging Technology</b>								
<b>Semester</b>	<b>Autumn/ IV semester of second year of the programme</b>								
<b>Course Objectives</b>	<p>1. To introduce the students about the concepts related to radiation dose, exposure, effective dose etc.</p> <p>2. To introduce the students about the concepts related to effect of radiation on human being.</p> <p>3. To introduction the students about various radiation monitoring devices.</p>								
<b>CO1</b>	Understanding the knowledge on biological effects of radiation in patients, occupational worker and public.								
<b>CO2</b>	Applying the knowledge and perception of various radiation protection techniques such as lead shielding, collimation, dose reduction techniques.								
<b>CO3</b>	Understanding the knowledge of radiation units and its measurement such as Personal monitoring and Area monitoring devices.								
<b>CO4</b>	Describe radiation hazards and principle of radiation protection.								
<b>CO5</b>	Discuss the importance of various regulatory bodies, guidelines and safety standards.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>Radiation Quantities and Units</b> Radiation- Radioactivity- Sources of radiation - natural radioactive sources cosmic rays-terrestrial radiation-- manmade radiation sources. Units of radiation - Quality factor - Flux-Fluence - Kerma- Exposure- Absorbed dose Equivalent Dose- Weighting Factors Effective Dose - Occupational Exposure Limits-Dose limits to public.	<b>6</b>	To learn about the Radiation and its types, and also units and measurement of radiation.				<b>1,2,3</b>		
<b>II</b>	<b>Biological Effects of radiation Ionization</b> excitation and free radical formation, hydrolysis of water, action of radiation on cell Chromosomal aberration and its application for the biological dosimetry- Effects of whole body and acute irradiation, dose fractionation, effects of ionizing radiation on each of major organ system including foetus -Somatic effects and hereditary effects- stochastic and deterministic effects- Acute Exposure and chronic exposure- LD50- factors affecting radio-sensitivity. Biological effects of non-ionizing radiation like ultrasound, lasers, IR, UV and magnetic fields.	<b>6</b>	To acquire knowledge about the biological effects of ionizing radiation.				<b>1,2,3,4</b>		

<b>III</b>	<b>Radiation detection and Measurements:</b> Ionization of gases- Fluorescence and Phosphorescence -Effects on – secondary standard dosimeters – film dosimeter – chemical dosimeter- thermos- luminescent Dosimeter. - Pocket Dosimeter-Radiation survey meter- wide range survey meter - zone monitor- contamination monitor -their principle function and uses. Advantages & disadvantages of various detectors & its appropriateness of different detectors for different type of radiation measurement.	<b>8</b>	To acquire knowledge on radiation detectors	1,2 3, 4
<b>IV</b>	<b>Radiation protection:</b> Radiation protection of self and patient- Principles of radiation protection, time- distance and shielding. shielding - calculation and radiation survey- ALARA- personnel dosimeters (TLD and film batches)- Occupational exposure.	<b>4</b>	To learn about ALARA principle.	1,2 3, 4
<b>V</b>	<b>Radiation Hazard evaluation and control</b> Philosophy of Radiation protection, effects of time, Distance Shielding. Calculation of Workload, weekly Calculated dose to radiation worker & General public Good Work practice in Diagnostic Radiology. Planning Consideration for radiology, including Use factor, Occupancy factors, and different shielding material.	<b>4</b>	To learn about hazards of radiation and take safety measures for radiation protection.	1,2 3, 4
<b>VI</b>	<b>Regulatory bodies and regulatory requirements:</b> International Commission on Radiation Protection (ICRP)/National Regularity body (AERB -Atomic Energy Regulatory Board), NRPB, NCRP and WHO guidelines for radiation protection, pregnancy and radiation protection Responsibilities organization, Safety Standard, Codes and Guides, Responsibilities of licenses, registrants & employers and Enforcement of Regulatory requirements.	<b>5</b>	To acquire knowledge on AERB, ICRP, IAEA and role of radiographer.	1,2 3

**TEXT BOOKS:**

T1- Radiological Science for Technologist: Physics, Biology and Protection, 8thEdition, 2004, Bushong , Stewart C.

T2- Safety code for medical diagnostic x-ray equipment and installations, 1986, Radiological Safety Division, AERB.

**REFERENCE BOOKS:**

R1- Radiological safety in Enclosed Radiography installations, 1986, Radiological Safety Division, AERB.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Understanding the knowledge on biological effects of radiation in patients, occupational worker and public.	1,3
Applying the knowledge and perception of various radiation protection techniques such as lead shielding, collimation, dose reduction techniques.	2
Understanding the knowledge of radiation units and its measurement such as Personal monitoring and Area monitoring devices.	3
Describe radiation hazards and principle of radiation protection.	1,2
Discuss the importance of various regulatory bodies, guidelines and safety standards.	3,8



<b>Course Title</b>	<b>Digital Imaging Technology</b>								
<b>Course code</b>	<b>22BRIT224R</b>	<b>Total credits: 3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 45</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>Prerequisite</b>	<b>Compulsory</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Radiography &amp; Advance Imaging Technology</b>								
<b>Semester</b>	<b>Autumn/ IV semester of second year of the programme</b>								
<b>Course Objectives</b>	<p>1. To introduce the students towards the concept of computed radiography, digital radiography, digital subtraction technique.</p> <p>2. To introduce the students towards the concept of digital subtraction technique.</p> <p>3. To introduce the students towards the concept of mammography.</p>								
<b>CO1</b>	Development of recent advancement and current trends in medical imaging technology.								
<b>CO2</b>	Understanding the knowledge on multi modal imaging technologies, anatomy relevant to radiography and radiological procedures.								
<b>CO3</b>	Describe Macro Radiography including principles, techniques, and applications.								
<b>CO4</b>	Discuss various intra-oral and extra-oral radiography techniques.								
<b>CO5</b>	Explain mammography including physics and various techniques.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Computed Radiography Introduction</b> Components Cassettes and Imaging plates Digitizer Image processing & display systems Advantages and disadvantages Digital Radiography Introduction Principle & its components.	<b>12</b>	Knowledge about CR&DR.					<b>1,2,3</b>	
<b>II</b>	<b>PACS: Introduction, HIS, RIS, DICOM, Work flow, Components, Types &amp; Storage Advantages and disadvantages, DSA Introduction Room layout and design Equipment Image recording system Automatic injection devices Contrast media Catheters and accessories Subtraction techniques.</b>	<b>12</b>	Knowledge about digital imaging					<b>1,2,3,4</b>	
<b>III</b>	<b>Macro radiography Definition Principle Unharness Scattered radiation Cassette support Examples of macro radiography</b>	<b>6</b>	To learn about image quality					<b>1,2,3,4</b>	
<b>IV</b>	<b>Dental radiography Introduction Terminology Dental formula Intra – oral radiography Bite wing Periapical radiography Occlusal radiography Extra oral oblique lateral Cephalometry Orthopantomography.</b>	<b>10</b>	Knowledge about dental radiography					<b>1,2,3,4</b>	
<b>V</b>	<b>Mammography Introduction, physics involved in it patient preparation in</b>	<b>7</b>	Knowledge about mammography gland					<b>1,2,3,4</b>	

	different techniques.		imaging	
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**TEXT BOOKS:**

T1- Digital Radiography Physical principles and quality control by Euclid Seeram.

**REFERENCE BOOKS:**

R1- Handbook of Digital Imaging Michael Kriss John Wiley & Sons, 16 Feb 2015 A comprehensive and practical analysis and overview of the imaging chain through acquisition, processing and display

**OTHER LEARNING RESOURCES:**

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Development of recent advancement and current trends in medical imaging technology.	<b>2</b>
Understanding the knowledge on multi modal imaging technologies, anatomy relevant to radiography and radiological procedures.	<b>3</b>
Describe Macro Radiography including principles, techniques, and applications.	<b>3</b>
Discuss various intra-oral and extra-oral radiography techniques.	<b>2,3</b>
Explain mammography including physics and various techniques.	<b>1,2</b>

SEMESTER – IV									
<b>Course Title</b>	<b>Personality development skill for employability (communicative English and soft skills)</b>								
<b>Course code</b>	<b>22UBPD221R</b>	<b>Total credits: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 45</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Prerequisite</b>	<b>English Language proficiency</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Radiography &amp; Advanced Imaging Technology</b>								
<b>Semester</b>	<b>Autumn/ IV semester of second year of the programme</b>								
<b>Course Objectives</b>	<p>1. To enable the students for effective presentation.</p> <p>2. To presentations to find new, innovative ways of developing and managing people.</p> <p>3. To boost their confidence through self-reflection and mock interview techniques.</p>								
<b>CO1</b>	It will prepare the learners to speak with greater control and charisma in front of others.								
<b>CO2</b>	It will have a positive impact in their thought process and problem-solving skills.								
<b>CO3</b>	It will enable students to prepare a professional resume and present themselves in an effective manner.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>K</b>	<b>L</b>
<b>I</b>	<b>Presentation Skills</b> i. Introduction ii. Essential characteristics of a good presentation iii. Preparation of a good presentation	<b>8</b>	Introduction to skills						<b>1,2,3</b>
<b>II</b>	<b>Public Skills</b> i. Fear of Public Speaking, ii. Understanding and Overcoming Fear of Public Speaking, iii. Confidence and Control, iv. Tips for Presentations and Public Speaking, v. Tips for Using Visual Aids in Presentations, vi. Delivering Presentation unsuccessfully, vii. Double Clearing and Summary of Main Points	<b>8</b>	Learn about public skills						<b>1,2,3</b>
<b>III</b>	Practical session on Resume, Curriculum Vitae, writing cover letter & LinkedIn Profile Preparation, submission & screening of Resume. Practical session on cover letter screening session Creating profile in LinkedIn iv. How to utilize it.	<b>8</b>	Know about Preparation, submission & screening of Resume						<b>2,3,4</b>
<b>IV</b>	<b>Leadership &amp; Management Skills</b> i. Concepts of Leadership ii. Leadership Styles	<b>10</b>	Know about Concepts of Leadership						<b>1,2,3,4</b>

	<ul style="list-style-type: none"> <li>iii. Manager VS Leader</li> <li>iv. How to be an Effective Leader</li> </ul> Doubt Clearing Session			
<b>V</b>	Interview Skills & Dress code Ethics <ul style="list-style-type: none"> <li>i. Types of interviews- telephonic, virtual &amp; face to face</li> <li>ii. Online interview, personal interview</li> <li>iii. Panel interview</li> <li>iv. Group interview</li> <li>v. Types of interview questions- traditional / common interview question</li> <li>vi. General Strategies for answering questions,</li> <li>vii. Preparation before the interview,</li> <li>viii. How to dress up for an interview,</li> <li>ix. How to maintain eye contact and positive body language</li> <li>x. Interview does and don'ts,</li> <li>xi. Introduction to Dress Code Ethics</li> <li>xii. Purpose and Importance What Wear During Interviews or Any Other Formal Meetings</li> </ul>	<b>10</b>	Learn about interview skills	<b>1,2,3,4</b>
<b>VI</b>	Mock Interview <ul style="list-style-type: none"> <li>i. Practical Mock Interview,</li> <li>ii. Feedback – Receiving Feedback,</li> <li>iii. Giving Feedback,</li> </ul> Advantages of Effective Feedback, how to deal with negative feedback	<b>6</b>	Knowledge on mock interview	<b>2,3,4</b>

TEXT BOOKS:

T1- Wren, P. C and Martin, H. 1995. High School English Grammar and Composition, S Chand Publishing.

T2- Barrett, Grant. 2016. Perfect English Grammar : The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.

REFERENCE BOOKS:

R1- Patil, Shailesh. (2020) Handbook on Public Speaking, Presentation & Communication Skills : Principles & Practices to create high impact presentations & meaningful conversations, Notion Press

T2- Weiser, Ryan, (2021) Winning Interview: An Ultimate Guidebook of Tricks, Strategies and Tips on Interview Preparations and Answering Questions to Get the Job You Want! : 1(Job Interview), Charlie Creative Lab Ltd Publishes

**OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=YY2yjEEoB3U>

<https://www.youtube.com/watch?v=ADJAcyTq1us>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
It will prepare the learners to speak with greater control and charisma in front of others.	<b>6,8</b>
It will have a positive impact in their thought process and problem-solving skills.	<b>6,8</b>
It will enable students to prepare a professional resume and present themselves in an effective manner.	<b>6,8</b>

<b>SEMESTER – IV</b>										
<b>Course Title</b>	<b>Techno Professional Skills III</b>									
<b>Course code</b>	<b>22BRIT225R</b>	<b>Total credits: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>	
		<b>Total hours: 30P</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	
<b>Prerequisite</b>	<b>Compulsory</b>	<b>Co-requisite</b>	<b>Nil</b>							
<b>Programme</b>	<b>Bachelor of Radiography &amp; Advanced Imaging Technology</b>									
<b>Semester</b>	<b>Autumn/ IV semester of second year of the programme</b>									
<b>Course Objectives</b>	1. To understand the basics of emergency care and life support skills. 2. To Manage an emergency including moving a patient 3. To help prevent harm to workers, property, the environment and the general public.									
<b>CO1</b>	Upon completion, Students should be able to apply healthcare quality improvement and patient safety principles, concepts, and methods at the micro-, meso-, and macro-system levels									
<b>CO2</b>	Understanding the concept of infection control									
<b>CO3</b>	Understanding the concept of control and prevention of bio medical waste									
<b>CO4</b>	Understanding the knowledge of life saving drugs.									

CO5		Understanding the concept of different norms and guidelines of patient safety.		
Unit No.	Content	Contact Hour	Learning Outcome	KL
I	Patient safety & management– Concepts of Quality of Care, Quality Improvement Approaches, Standards and Norms, Introduction to NABH guidelines.	6	Learn about the patient safety & management	1,2,3
II	Basics of emergency care and life support skills - Basic life support (BLS), Vital signs and primary assessment, Basic emergency care – first aid and triage, Ventilations including use of bag- valve masks (BVMs), Choking, rescue breathing methods, One and Two-rescuer CPR.	8	Learn about the basic life support skills used.	1,2,3
III	Bio medical waste management and environment safety - Definition of Biomedical Waste, Waste minimization, BMW – Segregation, collection, transportation, treatment and disposal (including colour coding), Liquid BMW, Radioactive waste, Metals/ Chemicals / Drug waste, BMW Management & methods of disinfection, Modern technology for handling BMW, Use of Personal protective equipment (PPE), Monitoring & controlling of cross infection (Protective devices)	8	To acquire the knowledge about the bio medical waste management.	1,2,3,4
IV	Infection prevention and control - Evidence based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)], Prevention & control of common healthcare associated infections, Components of an effective infection control program, Guidelines (NABH and JCI) for Hospital Infection control.	8	Learn about the infection and it's control.	1,2,3,4
V	Antibiotic Resistance- History of Antibiotics, How Resistance Happens and Spreads, Types of resistance Intrinsic, Acquired, Passive, Trends in Drug Resistance, Actions to Fight Resistance, Bacterial persistence,	12	To acquire the knowledge about the history of antibiotics, types of resistance and bacteria control	1,2,3,4

	Antibiotic sensitivity, Consequences of antibiotic resistance Disaster preparedness and management - Fundamentals of emergency management, psychological impact management, Resource management, Preparedness and risk reduction, information management, incident command and institutional mechanisms.			
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**TEXT BOOKS:**

T1- Understanding Patient Safety, Second Edition by Robert Wachter

T2- Handbook of Healthcare Quality & Patient Safety Author: Girdhar J Gyani, Alexander Thomas

**REFERENCE BOOKS:**

R1- Washington Manual of Patient Safety and Quality Improvement Paperback by Fondahn, 2016

R2- Researching Patient Safety and Quality in Healthcare: A Nordic Perspective Karina Aase, Lene Schibeveaag

R3- Old Handbook of Healthcare Quality & Patient Safety by Gyani Girdhar J

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Upon completion, Students should be able to apply healthcare quality improvement and patient safety principles, concepts, and methods at the micro, macro-, and macro-system levels	1,2
Understanding the concept of infection control	1
Understanding the concept of control and prevention of bio medical waste	1,8
Understanding the knowledge of life saving drugs.	1,2
Understanding the concept of different norms and guidelines of patient safety.	2,5

SEMESTER – IV									
Course Title	Basic Life Saving Skills								
Course code	22UULS202R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Radiography & Advanced Imaging Technology								
Semester	Autumn/ IV semester of second year of the programme								
Course Objectives	1. The aim of the course is to provide the learners with basic knowledge and practical skills needed in an emergency fire situation, and to provide appropriate basic management and treatment for injuries.								
CO1	The students will be able to recognize respiratory arrest/cardiac arrest, and provide oxygen to the patients to sustain tissue viability.								
CO2	The students will be able to perform the importance of early CPR on Adult, child and infants' victims.								
CO3	The students will be able to perform the basic steps to relive choking for responsive and unresponsive victims								
CO4	The students will be able to prevent injury from getting worse, aid in recovery, relieving pain and protecting the victims from deterioration.								
CO5	The students will be able to learn about the fire equipment requirements, methods of operation and getting out alive.								
Unit No.	Content	Contact Hour	Learning Outcome	KL					
I	Basic Life Support (BLS) <ul style="list-style-type: none"> <li>Introduction of BLS</li> <li>Chain of survival</li> <li>ABCs Assessment</li> <li>CPR and Ventilation Technique</li> <li>AED Choking for adult and children</li> </ul>	4	To learn the knowledge about basic survival skills.	1,2					
II	<b>First Aid</b> <ul style="list-style-type: none"> <li>Golden rules of First aid First aid Kits</li> </ul>	4	To acquire the knowledge about the golden rules of first aid.	1,2,3,4					
III	<b>Trauma emergencies</b> <ul style="list-style-type: none"> <li>Introduction</li> <li>Priorities of Initial approach in prehospital care a) Scene safety b) Primary assessment c) Bleeding control d) Extrication of victims and safe transfer e) Cervical spine stabilization and C-collar application Splinting of broken Limbs</li> </ul>	4	To learn the knowledge about the handling of trauma patients and patient safety.	1,2,3,4					
IV	<b>Tri age system</b> <ul style="list-style-type: none"> <li>Introduction</li> <li>Flow chart approach of Triage</li> <li>Triage of Single and Multiple Casualties in Pre- Hospital setting</li> </ul>	4	To learn the knowledge about the Triage system.	1,2,3,4					



<b>V</b>	<b>Medical emergencies</b> •Introduction •Victim centered approach and Management of: - a) Seizures b) Heart attack c) asthma d)diabetic emergencies e) emergency childbirth Respiratory distress and failure	<b>4</b>	To acquire the knowledge on the approach to medical emergencies.	<b>1,2,3,4</b>
<b>VI</b>	<b>Environmental Emergency</b> •Recognizing and caring for heat related illness such as: Heat stroke, heat cramps, heat exhaustion, dehydration. •Recognizing and caring for cold related illness such as frostbite, hypothermia. Poisoning, Snakebite.	<b>2</b>	To acquire the knowledge on the illness and treatment.	<b>1,2,3,4</b>
<b>VII</b>	<b>Safety of people in the event of fire</b> •Recognition of possible fire sources and emergency procedures, construction techniques for eliminating fire. •Types of detecting devices and extinguishing agents and systems • Devising procedures in the event of fire and react to fire danger. Safety goals and objectives, Identifying hazards and risks	<b>2</b>	To acquire the knowledge on identifying the hazards and safety measures.	<b>1,2,3,4</b>

**TEXT BOOKS:**

T1- Nancy Caroline’s Emergency Care in the streets eight edition by Jones and Bartlett

T2- First Aid book by LC Gupta; Publisher Jay pee Brothers, 7thEdition.

T3- Advance Cardio vascular life support and Basic life support provider manual@ American Heart Association (AHA)

**REFERENCE BOOKS:**

R1. The Prepper's Complete Book of Disaster Readiness: Life-Saving Skills, Supplies, Tactics and Plans Paperback – Import, 17 September 2013 by Jim Cobb (Author)

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping	
Course Outcome (CO)	Mapped Program Outcome
The students will be able to recognize respiratory arrest/cardiac arrest, and provide oxygen to the patients to sustain tissue viability.	1,2,6,7
The students will be able to perform the importance of early CPR on Adult, child and infants' victims.	1,2
The students will be able to perform the basic steps to relieve choking for responsive and unresponsive victims	7
The students will be able to prevent injury from getting worse, aid in recovery, relieving pain and protecting the victims from deterioration.	1,6,7
The students will be able to learn about the fire equipment requirements, methods of operation and getting out alive.	1,3

SEMESTER – IV										
Course Title	Introduction to Financial Budgeting and Planning									
Course code	22UUFL201R	Total credits: 2	L	T	P	S	R	O/F	C	
			0	0	2	0	0	0	2	
Prerequisite	Compulsory	Co-requisite	Nil							
Programme	Bachelor of Radiography & Advance Imaging Technology									
Semester	Autumn/ IV semester of second year of the programme									
Course Objectives	1. To create awareness among students about the need for possessing financial literacy education. 2. Identification of money as a working asset. 3. Impart the ability to make better financial decisions									
CO1	The students would be able to understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.									
CO2	The students would be able to understand the need and various kind of banking institutions' instrument and their utilities.									
CO3	The student would be able to describe the importance of insurance services as social security measures.									
CO4	The student would be able to manage the money and debt more effectively									
Unit No.	Content	Contact Hour	Learning Outcome						K L	
I	<b>Introduction:</b> Meaning, need and importance of Financial Literacy; Different components of Financial Literacy; Prerequisites of financial literacy; Savings – Meaning and Difference between savings and investment; Types of Financial Institutions and the services provided - Banking and Non-Banking; Different investment avenues.	5	To learn about the financial literacy						1,2,3	
II	<b>Financial Planning:</b> •Meaning, need and importance for financial planning. •Economic needs, balancing between economic need and resources. •Three pillars of investments - risk, return, liquidity. •Budgeting and its importance in financial planning; •Steps involved in Financial Planning Process. Preparation of personal budgets, budget surplus and budget deficit, avenues for savings	10	To learn about the financial planning, economic needs and investments and budgeting.						1,2,3	

	<p>from surplus, sources for meeting deficit.</p> <ul style="list-style-type: none"> <li>• Informal Society funds and crowd funding</li> </ul>			
<b>III</b>	<p><b>Banks &amp; Post Office - As financial service provider:</b></p> <ul style="list-style-type: none"> <li>• Meaning and evolution of money</li> <li>• Banks – meaning, types &amp; functions; types of accounts; Formalities to open various accounts.</li> </ul> <p>Different types of Post Office saving schemes: Recurring deposit, savings, term deposit; NSC; Kisan Vikas Patra; Monthly Income scheme (MIS) Account</p> <ul style="list-style-type: none"> <li>• Public Provident Funds (PPF), Senior citizen savings</li> <li>• scheme (SCSS), Sukanya Samridhi Accounts,</li> <li>• Indian Postal Order; International Money transfer service; Forex Services;</li> <li>Money remittance services; Jansuraksha Scheme.</li> </ul>	<b>10</b>	To understand the knowledge about different types of banks.	1,2,3,4
<b>IV</b>	<p><b>Insurance - As financial service provider:</b></p> <ol style="list-style-type: none"> <li>Different types of Risks and their Management, Diversification of risk;</li> <li>Meaning, need and importance of Insurance;</li> <li>Types of Insurance – Life Insurance, Health Insurance, General Insurance, Term Insurance,</li> <li>Pension and retirement policies;</li> <li>Post office</li> <li>life insurance schemes, Postal life insurance and rural postal life insurance</li> </ol>	<b>10</b>	To acquire the knowledge about different types of insurance company.	1,2,3,4
<b>V</b>	<p><b>Transformations in Digital Money market:</b></p> <ol style="list-style-type: none"> <li>Various functions &amp; innovative services of Banks; Mobile Banking, NEFT, IMPS, RTGS, Money transfer, Different types of cards- Debit &amp; Credit, E-Banking, Unified payment interface</li> </ol>	<b>10</b>	To acquire the knowledge about the Various functions & innovative services of Banks.	1,2,3,4

	(UPI), ii. Credit Scoring - CIBIL, Digital Banking, crypto currency and related transactions, Fintech, Block chain; Understanding Digital Payments			
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### TEXT BOOKS:

T1- The Young Adult's Guide to Financial Success – How To Manage Your Money & Live Better On Less By Edward M. Wolpert

T2- Financial Freedom with Financial Control by Jagmohan Singh Pendown Press

T3- The Richest Man in Babylon (Deluxe Hardbound Edition) by George S. Clasonixia Press Garden City, New York, Ships from and sold by MG BOOKS.

### REFERENCE BOOKS:

R1- Financial literacy to financial planning by Dr. Purvi Kothari and Mr. Keyur Mehta Nexus Publications Surat Gujarat

R2- Ernst & Young's Personal Financial Planning Guide: Take Control of Your Future and Unlock the Door to Financial Security by Ernst & Young, Robert J. Garner, Robert B. Coplan, Barbara J. Raasch, Charles L. Ratner

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping	
Course Outcome (CO)	Mapped Program Outcome
The students would be able to understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.	6,7
The students would be able to understand the need and various kind of banking institutions' instrument and their utilities.	7
The student would be able to describe the importance of insurance services as social security measures.	5
The student would be able to manage the money and debt more effectively	8

SEMESTER – IV										
Course Title	Co-curricular									
Course code	22UBCC221	Total credits: 1		L	T	P	S	R	O/F	C
		Total hours: 15T		0	0	0	4	0	0	1
Prerequisite	Compulsory	Co-requisite		Nil						
Programme	Bachelor of Radiography & Advance Imaging Technology									
Semester	Autumn/ IV semester of second year of the programme									
Course Objectives	<p>Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.</p> <p>Co-curricular activities facilitate in the development of various domains of mind and personality such as intellectual development, emotional development, social development, moral development and aesthetic development. Creativity, Enthusiasm, and Energetic, Positive thinking are some of the facets of personality development and the outcomes of extracurricular activities.</p>									
Unit No.	Content				Contact Hour	Learning Outcome				K L
I	<p>The institute provides the opportunity to the teacher trainees to participate in various activities for their overall development. The institute conducts Seminars and Workshops, Guest Lectures, Essay writing, projects, general knowledge debates, quiz and discussion on current affairs, Discussion on social justice, National Days Celebrations, Assembly, Weekly meetings and Value Education programme, and also organize Dance, Dramatics, Singing competitions. Games and Sports are compulsory for all the students. Provision has, therefore been made for games and sports in college. The college will have unit of N.S.S. and will also give the opportunity to students to participate in it.</p>									

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOME**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Co-curricular activities facilitate in the development of various domains of mind and personality such as intellectual development, emotional development, social development, moral development and aesthetic development. Creativity, Enthusiasm, and Energetic, Positive thinking are some of the facets of personality development and the outcomes of extracurricular activities.	<b>6,7,8</b>

SEMESTER – IV																	
Course Title	Extra-curricular																
Course code	22UBEC221	Total credits:	1	L	0	T	0	P	0	S	4	R	0	O/F	0	C	1
Prerequisite	Compulsory	Co-requisite	Nil														
Programme	Bachelor of Radiography & Advance Imaging Technology																
Semester	Autumn/ IV semester of second year of the programme																
Course Objectives	It is to develop the social and soft skills and to promote a holistic development of the learners.																
CO1	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.																
CO2	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.																
CO3	The students will be trained to represent ADTU in various inter university, state and national level competitions.																
CO4	The students will be given a platform to learn from invited experts in their respective fields.																
CO5	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.																
Unit No.	Content				Contact Hour	Learning Outcome			KL								
1	<p>AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest. These activities are aimed to develop the social and soft skills and promote a holistic development of the learners. Keeping in mind the 360-degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc. The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies. The student members of the club are trained represent AdtU in various inter University student and national level competitions. Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective field</p>																



## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.	6,7,8
The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.	6,7,8
The students will be trained to represent ADTU in various inter university, state and national level competitions.	6,7,8
The students will be given a platform to earn from invited experts in their respective fields.	6,7,8
The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.	6,7,8

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BRIT221R	PHYSICS OF RADIOLOGY	3				1			
22BRIT222R	CLINICAL RADIOGRAPHY	3	3				3	2	
22BRIT223R	RADIATION PROTECTION	2		1		3	2	2	3
22BRIT224R	DIGITAL IMAGING TECHNOLOGY	2	3	3	2	1	1		
22BRIT225R	TECHNO PROFESSIONAL SKILLS III	3	1			3			2
22BRITGE21/ 2 2/23	GENERIC ELECTIVE						1	1	3
22BRITMO21 /2 2/23	MOOCS							1	2
22UBPD221R	PERSONALITY DEVELOPMENT PROGRAM						2	2	3
22UUFLL201R	INTRODUCTION TO FINANCIAL BUDGETING AND PLANNING						2	2	3
22UULS202R	BASIC LIFE SAVINGSKILLS	2	2	1			3	3	1
22UBCC221	CO-CURRICULAR						2	2	3
22UBEC221	EXTRA-CURRICULAR						2	2	3

SEMESTER – V									
Course Title	IMAGE PROCESSING TECHNIQUES								
Course Code	2BRIT311R	TOTAL CREDIT:	L	T	P	S	R	O	C
		3	3	0	0	0	0	0	3
Pre-Requisite		COMPULSORY		CO-REQUISITE		NIL			
Programme		BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY							
Semester		Fall / V semester of third year of the programme							
Course Objectives		<ol style="list-style-type: none"> <li>To educate the students in detail about various photographic processes, image standard, radiographic quality, imaging standard, quality.</li> <li>Management of image quality and various exposure systems.</li> <li>Developing a thorough understanding of different type of x-ray cassette, applications, care and maintenance</li> </ol>							
CO1		Understand the construction of radiographic film,							
CO2		Describe the construction and maintenance of cassettes and intensifying screens.							
CO3		Demonstrate the factors affecting radiographic images and its quality.							
CO4		Proficient in preparation of chemicals and effective storage techniques for processing chemicals.							
CO5		Describe the construction and the accessories used in the darkroom.							
Unit No.	Content			Contact Hour	Learning outcome			KL	
1	<b>Radiographic Film: X-ray film construction–</b> Composition of single and double coated radiographic films <b>Characteristic curve:</b> speed, base fog, gamma, latitude - effect of grain size on film response to exposure, interpretation of characteristics curve- exposure to x-rays. Types of Radiographic Films- Applications - advantages/limitations of different types Structure, properties of different parts. Film storage - handling - film wrappings- handling of exposed and unexposed films -safe light			9 hrs	Understanding the construction of X-ray film, principles, film storage and applications.			1,2,3	

	requirements.			
2	<p><b>Cassettes &amp; Intensifying screen:</b>  Loading and unloading of cassettes and their care/maintenance. effects of kV and mA on variation of emitted radiation intensity. Intensifying screens-determination of relative speeds - film contrast -film screen contact. Structure and functions, common phosphors used- types, screen mounting, care and maintenance of film screen contact. Intensifying factor-speed and detail- crossover effect- Resolution mottle-reciprocity- screen asymmetry-cleaning. New phosphor technology- influence of kilo-voltage. Photo-stimulable phosphor  Imaging.</p>	10 hrs	Demonstration of various types of cassettes and its applications, assurance and quality check.	1,2,3,4
3	<p><b>Sensitometer, Control of scattered radiation, Factors affecting Image Quality &amp; Radiographic image:</b>  Sensitometer Control of scattered radiation Factors affecting Image Quality Radiographic illuminators and viewing conditions, visual acuity and resolution. Radiographic image- components of image quality- Un-sharpness in radiographic image-contrast of the radiographic image distinctness of the radiographic image-size, shape and spatial relationships.</p>	9 hrs	Determine about exposure factors and calibration, film response testing, collimation, grids, motion artifacts, film processing, scatter radiation, parameters for image quality	1,2,3
4	<p><b>Photochemistry:</b> Principles: Acidity, alkalinity, pH, the processing cycle, development, developer solution. Fixing, fixer solution, washing, drying replenishment, checking and adjusting- latent image formation- -nature of development- constitution of developer- development time- factors in the use of developer. Fixers-</p>	10 hrs	Evaluating the chemistry involved during latent image formation based on different agents while maintaining quality control	2,3,4,5

	<p>constitution of fixing solution- factors affecting the fixer  replenishment of fixer- silver Conservation- Drying- developer and fixer for automatic film processor rinsing-washing and drying. Replenishment rates in manual and automatic  Processing-Silver Recovery- Auto and manual chemicals. <b>Image processing:</b> manual processing - care of processing equipment  Automatic processing</p>			
5	<p><b>Processing room &amp; Dark room and its planning:</b> Room layout dark room design construction, processing area- illumination, safe light compatibility - entrance safe lighting types- storage shelving of films- cleaning and maintenance.  <b>Presentation of radiographs &amp; Monitor images:</b> Presentation of radiographs- opaque letters and markers Identification of dental films- preparation of stereo radiographs-viewing conditions.  Monitor images- Characteristics of the video image-television camera- imaging camera. Laser light and laser-laser imaging laser imagers-imaging plates- Dry cameras</p>	7 hrs	<p>Design and layout of dark room, site selection and radiation signage's in accordance with Regulatory compliance. Inspection of technical competence, process of image evaluation and equipment's</p>	4,5,6

### TEXTBOOKS

T1- Chesneys' Radiographic Imaging, John Ball & Tony Price, 6th Edition.

T2- Christensen's Physics of Diagnostic Radiology, Thomas S. Curry. III, James E. Dowdey, Robert C. Murry Jr. 4th Edition.

### REFERENCE BOOKS

R1- Joseph Selman 'The fundamentals of X-ray and Radium Physics' 5th Edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Understand the construction of radiographic film.	1,2,3
Describe the construction and maintenance of cassettes and intensifying screens.	1,2,3
Demonstrate the factors affecting radiographic images and its quality.	1,2,3
Proficient in preparation of chemicals and effective storage techniques for processing chemicals.	1,2,3
Describe the construction and the accessories used in the darkroom.	1,2,3

SEMESTER – V									
COURSE TITLE	CONTRAST AND SPECIAL RADIOGRAPHY								
COURSE CODE	22BRIT312R	Total Credit = 5	L	T	P	S	R	O	C
PRE-REQUISITE	COMPULSORY CO-REQUISITE	Total Hours = 45t+12P	3	0	4	0	0	0	5
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
SEMESTER	Fall / V semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. On completion of this subject, the students shall be able to gain the knowledge about basic and technological aspects of special procedures in radiology.</li> <li>2. Differentiation and emphasis on sterilization techniques and radiological procedures.</li> <li>3. Understanding and implementation of contrast media, its classification and toxicity, management and treatment of contrast media. Performing the theory based special procedures by ensuring safety of patients with respect to dosage of contrast media and radiation dose.</li> </ol>								
CO1	Understand the contrast media and its types.								
CO2	Demonstrate the various radiographic techniques and procedures for gastrointestinal tract.								
CO3	Discuss the various radiographic techniques and procedures of salivary glands and biliary system.								
CO4	Utilize various radiographic techniques of urinary system and female reproductive system.								
CO5	Explain the impact of high kv techniques on image quality, and management of soft tissue radiography.								
Unit No.	Content				Contact Hour	Learning outcome		KL	
1	<b>Paediatric Imaging:</b> <ul style="list-style-type: none"> <li>• special needs of patient and radiographer- use of dedicated equipment and accessories- modified technical considerations - selection of exposure factors- image quality considerations Radiation protection of the patient - special techniques in children for contrast studies.</li> <li>• Geriatric radiography:</li> <li>• Equipment and accessories – exposure factor considerations in</li> </ul>				12 hrs	Description about paediatrics and geriatric radiography such as radiation safety, diagnostic challenges and patient care, responsibility, role of a radiographer during radiological		1,2,5	

	<p>special care. Elderly patients profile - difficulties during radiography – technical considerations-projections with unconventional special positioning.</p> <p><b>Trauma/Emergency Radiography:</b></p> <ul style="list-style-type: none"> <li>• Selection of suitable X-Ray equipment – patient position - radiographic projections and sequence for each patient – modification of routine positioning– radiation protection – patient care.</li> </ul> <p><b>Operation theatre radiography:</b></p> <ul style="list-style-type: none"> <li>• O.T Procedures - Operative cholangiography – orthopaedic procedures –maintenance of asepsis – preparation of radiographer and equipment/accessories – careful safe use of mobile and fluoroscopic equipment – radiation protection – patient care – rapid availability of radiographic image- cooperation with OT staff-type of studies done clinical applications - clinical applications- per operative radiographs- pre- operative fluoroscopy studies - patient care radiation protection of all staff.</li> </ul> <p><b>Responsibility of Radiographer during Radiological Procedure</b></p> <p>Preparation of Patient for Different Procedures. • Contrast Media - Positive and Negative, Ionic &amp; Non—Ionic • Adverse Reactions to Contrast Media and Patient Management • Emergency Drugs in the Radiology Department • Emergency Equipment In the Radiology Department • Aseptic technique</p>		<p>procedure used or guided during Operation Theatre</p>	
2	<p><b>Procedure for gastrointestinal tract:</b></p> <ul style="list-style-type: none"> <li>• Fluoroscopy, general considerations, responsibility of radiographers.</li> <li>• Barium swallow</li> <li>• Barium meal and follow through.</li> <li>• Hypotonic</li> </ul>	10 hrs	<p>Understanding the concept of radiological anatomy and investigations of digestive system, fistula and sonogram.</p>	2,3,5 14



	<p>Duodenography.</p> <ul style="list-style-type: none"> <li>• Small bowel enema.</li> <li>• Barium Enema routine projections for colon and rectum, colonic activators; double.</li> <li>• Contrast studies; colostomy.</li> </ul> <p>Special techniques for specific disease to be examined.</p> <ul style="list-style-type: none"> <li>• Water soluble contrast media -eg. Gastrographic studies</li> <li>• Sinography</li> <li>• Fistulogram</li> </ul>		<p>Describe and explain clinical indications, contra-indication, patient preparation, exposure factors, contrast media, technique, filming, after care and radiation protection</p>	
3	<p><b>Procedures for Salivary glands and Biliary system:</b></p> <p>Sialography</p> <ol style="list-style-type: none"> <li>1. Intravenous cholangiography.</li> <li>2. Percutaneous cholangiography.</li> <li>3. Endoscopic retrograde Cholangio-pancreatography (ERCP).</li> </ol> <p>Operative cholangiography.</p> <ol style="list-style-type: none"> <li>4. Post-Operative cholangiography (T –tube Cholangiography).</li> </ol> <p>Percutaneous Transhepatic Biliary Drainage (PTBD)</p>	8 hrs	<p>Understanding the concept of radiological anatomy and investigations of salivary glands and hepato biliary system. Describe and explain clinical indications, contraindication, patient preparation, exposure factors, contrast media, technique, filming, after care and radiation protection</p>	2,3,5
4	<p><b>Procedures for Urinary system and Female reproductive system:</b></p> <ul style="list-style-type: none"> <li>• Intravenous urogram/Intravenous pyelogram (IVU/IVP)</li> <li>• Retrograde pyelography (RGU)</li> <li>• Antegrade pyelography.</li> <li>• Cystography and Micturating cysto-urethrography.</li> <li>• Urethrography(ascending).</li> <li>• Renal puncture</li> <li>• Female reproductive system:</li> <li>• Hysterosalpingography &amp; FTR</li> <li>• Arthrography</li> </ul> <p>Discography</p>	8 hrs	<p>Understanding the concept of radiological anatomy and investigations of both male and female urinary system and reproductive organs. Describe and explain clinical indications, contra-indication, patient preparation, exposure factors, contrast media, technique,</p>	2,3,5  14

			filming, after care and radiation protection	
5	<ul style="list-style-type: none"> <li>• Macro radiography, Soft Tissue</li> <li>• Radiography, High kV Radiography &amp; Localization of foreign bodies: <ul style="list-style-type: none"> <li>• General principles. Requirement.</li> <li>• Equipment's. Techniques.</li> </ul> </li> <li>• Soft Tissue Radiography: <ul style="list-style-type: none"> <li>• High and low kilo voltage technique; differential filtration.</li> <li>• Non –screen technique - simultaneous screen and non – screen technique.</li> <li>• Multiple radiography. <ul style="list-style-type: none"> <li>• Uses of soft tissue radiography.</li> </ul> </li> <li>• High kV Radiography: <ul style="list-style-type: none"> <li>• General principles</li> <li>• Relation to patient dose</li> <li>• Change in radiographic contrast.</li> </ul> </li> <li>• Scatter limitations; beam collimation; grid ratio.</li> <li>• Speed and type of grid movement.</li> <li>• Radiographic factor; application and uses. Localization of Foreign body: <ul style="list-style-type: none"> <li>• General Principle.</li> <li>• Ingested; inhaled; inserted; embedded foreign bodies.</li> <li>• Foreign bodies in eye.</li> <li>• Preparation of the area to be investigated. Appropriate projection for all Techniques to locate non-opaque foreign body.</li> </ul> </li> </ul> </li> </ul>	7 hrs	<p>Illustration and explanation of working principles, equipment's, applications and technique of Macro and High kV radiography</p> <p>Interpretation of soft tissue radiography- procedure, exposure settings, factors, contrast techniques.</p>	3,4,6
<b>PRACTICAL</b>				
<b>Unit I</b>	Special and contrast procedures.	30 HRS	To learn about practical knowledge	3,4,5

**TEXT BOOKS:**

T1- Radiological Procedures – A Guideline by Bhushan N. Lakhar

T2- Guide to Radiological Procedures by Chapman &amp; Nakielny

**REFERENCE BOOKS :**

R1: X-ray Contrast Agent Technology: A Revolutionary History Hardcover – 16 April 2019 by Christoph de Haen (Author)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Understand the contrast media and its types.	1,2,3,5,6,7
Demonstrate the various radiographic techniques and procedures for gastrointestinal tract.	1,2,3,6
Discuss the various radiographic techniques and procedures of salivary glands and biliary system.	1,2,3,6
Utilize various radiographic techniques of urinary system and female reproductive system.	1,2,3
Explain the impact of high kv techniques on image quality, and management of soft tissue radiography.	1,2,3,5,6

SEMESTER – V									
COURSE TITLE	ULTRASOUND AND MAMMOGRAPHY								
COURSE CODE	22BRIT313R	TOTAL CREDIT	L	T	P	S	R	O	C
		3	2	1	0	0	0	0	0
TOTAL HOURS = 45T		CO-REQUISITE		NIL					
PRE-REQUISITE	COMPULSORY								
PROGRAMME	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
SEMESTER	Fall / V semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. To introduce the students the concepts related to reflection, refraction, ultrasonography, its use and application etc.</li> <li>2. Equip students the hands-on experience they need to effectively execute and interpret mammography and ultrasound imaging procedures, resulting in high standards of patient care and diagnostic accuracy.</li> <li>3. Developing a thorough understanding of the anatomy, both normal and pathological, as seen by mammography and ultrasound. This will help students distinguish between different diseases and medical conditions.</li> </ol>								
CO1	Understand the working principle of ultrasound and its equipmentation								
CO2	Comprehensive understanding of evolution history of mammography, construction and its safety considerations.								
CO3	Identify various mammographic techniques and its limitations.								
CO4	Explain the working principle of doppler ultrasound and its equipmentation.								
CO5	Acquire advance knowledge on 3D/4D sonography and its data acquisition systems.								
Unit No.	Content	Contact Hour	Learning outcome				KL		
1	Ultrasonography: Basic acoustics principle- Basic physics of sound propagation in different media, production of Ultrasound (piezoelectric effect), ultrasound terminologies – interaction of ultrasound with matter – ultrasound	10 hours	Describe the fundamentals of sound transmission across various mediums, production of				1,2,3		

	<p>properties propagation in tissue absorption, reflection and refraction- acoustic impedance- piezo electric effect- transducer- Pulsar- receiver- beam/sensitivity and gain- generators- A, B &amp; M scanning &amp; echo modes transducers- techniques of sonography- equipment selection- display methods- ultrasound image formation- data storage &amp; display- image and artifacts- transducer- quality assurance and performance tests- bio effects and safety consideration. Types of machines- portable systems- acoustic coupling agents- ingredients/ preparation.</p>		<p>piezoelectric and terminology. Explanation of the properties of ultrasound propagation in tissue, such as absorption, scattering, reflection, refraction, and acoustic impedance, as well as how ultrasound interacts with matter. Demonstrate knowledge and discuss techniques of sonography, equipment selection, display methods, and ultrasound image formation - artifacts, along with data storage and display.</p>	14
2	<p>Mammography system: History - Imaging requirements- Mammography system - construction/types accessories – tube compression, grids, AEC etc.- nature, of X-Ray beam suitable – accessories for immobilization - film processing - image quality - image recording devices – interventional procedures – accessories-biopsy equipment attachments - radiation dose- - mammo tomogram-Sono mammography-future developments.</p>	10 hours	<p>Summarize the history and development of mammography systems. Describing the film processing, image formation and the type of Xray beam utilized in mammography. Recognize the use of different image capturing devices and comprehend the fundamentals of interventional techniques. Describe the use of biopsy equipment attachments, assess radiation dose considerations, and explore advanced techniques like mammography, sono-mammography and future developments.</p>	1,2,3,4

3	<p>Mammography: The Mammography as a clinical diagnostic tool- immobilization and identification techniques- positioning techniques for various projections - exposure factors Conventional &amp; Digital studies- quality and advantage- diagnosis and screening- Characteristics of benign and malignant lesions – patient care – female attendant - interventional procedures - radiation dose- recent advances in mammography techniques - mamotomogram &amp; Sono mammography procedures advantages &amp; limitation.</p>	10 Hours	<p>Understand the identification and immobilization techniques as well as positioning techniques for various mammographic projections. Developing the appropriate exposure factors for both conventional and digital mammography studies. Identify the differences between benign and malignant lesions, understand the importance of mammography in screening and diagnosis, and offer complete patient care and radiation protection Analyse new developments in mammography and weigh the benefits and drawbacks of mamotomography and sonomammography.</p>	1,2,4,5
				14

4	Doppler ultrasound: Doppler effect, Doppler shift, types of Doppler ultrasound. Doppler instrumentation – doppler equation	8 Hours	Describe the Doppler shift and Doppler effect, and explain how these concepts are used in medical imaging. Recognize and distinguish between the several kinds of Doppler ultrasonography, such as power, color, pulsed, and continuous wave. Describe the parts of the Doppler ultrasound apparatus and explain how to compute blood flow velocities and other pertinent parameters in clinical practice using the Doppler equation.	2,3,5
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5	Recent Advances in Imaging 3D/4D Sonography systems Image processing & Display Systems- Recent advances, concepts and applications in processing of images in digital form using computer based Systems.	9 hours	Recognize the fundamentals of 3D/4D sonography image processing and display systems, as well as the methods for improving and visualizing pictures. Identify and discuss the most current developments in 3D/4D sonography, with an emphasis on novel ideas, tools, and techniques that enhance imaging and diagnostic precision. Apply knowledge of computer-based systems for processing images in digital form, and explore their applications in various clinical scenarios to improve patient outcomes.	4,5,6
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**TEXTBOOKS:**

T1- Essentials of Ultrasound Physics by James A. Zagzebski

**REFERENCE BOOKS:**

R1: Introduction to Sonography and Patient Care 2nd Edition by Steven M. Penny M.A.  
RT (R) RDMS (Author)



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Understand the working principle of ultrasound and its equipment	1,2,3,6
Comprehensive understanding of evolution history of mammography, construction and its safety considerations.	1,2,3
Identify various mammographic techniques and its limitations.	1,2,3,6
Explain the working principle of doppler ultrasound and its equipment.	1,2,3
Acquire advance knowledge on 3D/4D sonography and its data acquisition systems.	1,2,3,8

		<b>SEMESTER – V</b>							
<b>COURSE TITLE</b>	<b>TECHNO PROFESSIONAL SKILL IV</b>								
<b>COURSE CODE</b>	<b>22BRIT314R</b>	<b>TOTAL CREDIT:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>1</b>							
		<b>TOTAL HOURS = 30P</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	<b>COMPULSORY</b>	<b>CO-REQUISITE</b>							
<b>Programme</b>	<b>BACHELOR OF RADIOGRAPHY &amp; ADVANCED IMAGING TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>Fall / V semester of third year of the programme</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To improve the image quality thereby increasing the diagnostic value.</li> <li>2. To reduce the radiation exposure and repeat examination.</li> <li>3. To maintain the various diagnostic and imaging units at their optimal performance.</li> </ol>								
<b>CO1</b>	Describe the Quality Assurance & quality control of diagnostic Radiology Equipment.								
<b>CO2</b>	Describe about Care and Maintenance of Radiology Equipment.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning outcome</b>	<b>KL</b>					
<b>1</b>	<b>Care and Maintenance of X- ray Equipment</b> <ol style="list-style-type: none"> <li>i. General care.</li> <li>ii. Functional tests.</li> <li>iii. Testing the performance of exposure timers.</li> <li>iv. Assessing the MA settings.</li> <li>v. Testing the available KV.</li> <li>vi. Measurement of focal spot of an x-ray tube, faults and remedies for X-ray tubes.</li> <li>vii. Testing the light beam diaphragm.</li> <li>viii. Practical precautions pertaining to Brakes and locks, H.T. cables, meters and controls. Assessing of tube stands and tracks as well as accessory equipment.</li> </ol>	<b>15 hours</b>	To acquire knowledge on Quality assurance and quality control and quality test on Xray unit both mechanical and radiological check.	<b>1,2,3,4</b>					

2	<b>Quality Assurance and quality control of Modern Radiological Equipment.</b> i. Conventional Radiography. ii. Fluoroscopy. iii. Digital Radiography. iv. Computed Radiography. v. Computed Tomography (CT). vi. Magnetic Resonance Imaging (MRI). vii. Ultrasonography (USG). viii. Picture Archiving and Communication System (PACS). Mammography. ix. DEX	15hrs	To demonstrate knowledge on Quality checking of fluoroscopy, CT, MRI, USG and DEXA.	2,3,4 ,5  15
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### TEXT BOOKS:

T1- Quality assurance in Diagnostic Radiology” By J.M. Mcolemore (Year book of Medical Publishers)

T2- Quality Control in diagnostic imagine” By J.E. Gray (University Park Press)

T3- Processing and Quality Control by William E.J. Mc Kinney (J.B. Lippincott Company)

### REFERENCE BOOKS:

R1- Physical Principles, Clinical Applications and Quality Control by Euclid Seeram.

R2- Diagnostic Imaging: Quality Assurance By: M.M.Rehani (Jaypee Bros Medical Publishers)

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Describe the Quality Assurance & quality control of diagnostic Radiology Equipment.	1,3
Describe about Care and Maintenance of Radiology Equipment.	1,3

		<b>SEMESTER – V</b>							
<b>COURSE TITLE</b>	<b>DEPARTMENTAL ELECTIVE</b>								
<b>COURSE CODE</b>	<b>22BRIT315R</b>	<b>TOTAL CREDIT: 3 TOTAL HOURS = 45</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
			<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>PRE-REQUISITE</b>	<b>HOSPITAL TRAINING AND MANAGEMENT</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>BACHELOR OF RADIOGRAPHY &amp; ADVANCED IMAGING TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>Fall / V semester of third year of the programme</b>								
<b>COURSE OBJECTIVE</b>	The objective of this course is to aid students in comprehending fundamental ideas, management principles, and their practical implementations in healthcare.								
<b>CO1</b>	Discuss about the hospital ethics.								
<b>CO2</b>	Use the approach of reassuring and consoling the patient								
<b>CO3</b>	Apply first aid techniques and emergency care to the patient.								
<b>CO4</b>	Utilize the various radiographic techniques used for both paediatric and geriatric radiography.								
<b>CO5</b>	Explain about the sterilization techniques used during radiographic examination.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning outcome</b>	<b>KL</b>					
<b>1</b>	<b>Hospital staffing and administration</b> 1. Hospital records. 2. Professional ethics. 3. Co-operation with other staff and departments. 4. Departmental organizations.	<b>6 hours</b>	<b>To acquire knowledge about the functions of hospital and its ethics.</b>	<b>1,2,3,4</b>					

2	<b>Care of the patient</b> 1. Management of chair and stretchers to patients. 2. Management for the unconscious patient. 3. Elementary hygiene & personal cleanliness hygiene. 4. Management for the visually impaired, speech and hearing impaired, mentally impaired, drug addicts and non-English speaking patients. 5. Management for the seriously ill and traumatized patients 6. Informed consent	6 hrs	To acquire knowledge about patient care and management	2,3,4
3	<b>First aid</b> 1. First aid wounds and bleeding dressing and bandages pressure and splints supports. 2. Shock, electrical shock, haemorrhage, burns, Asphyxia, fractures, loss of consciousness	6 hrs	To understand the knowledge on First aid.	1,3,5
4	<b>Patient care &amp; implementation of radiographers in:</b> <ul style="list-style-type: none"> <li>• Paediatrics</li> <li>• Geriatrics</li> <li>• Patient care during Investigating. Tract, Biliary tract, Respiratory tract, Gynaecology, Cardiovascular system, Lymphatic system, C.N.S. etc.</li> </ul>	6 hrs	To understand the knowledge on both paediatric and geriatric radiography and its patient care.	3,4,5
5	<b>Principles of asepsis</b> <ul style="list-style-type: none"> <li>• Sterilization methods.</li> <li>• Handling of infected patients in the department and ward.</li> </ul>	6 hrs	To understand the knowledge on both paediatric and geriatric radiography and its patient care.	1,2,3,4

### TEXTBOOKS:

T1- Patient Care in Radiography by Ruth Ehrlich.

T2- Patient Care in Radiography with an Introduction to Medical Imaging by Ruth Ann Ehrlich and Dawn M Coakes, Elsevier Science.

### REFERENCE BOOKS:

R1: Radiographer Notebook Paperback – August 3, 2023 by Fried Kobyn Sebastian (Author)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Discuss about the hospital ethics.	<b>5</b>
Use the approach of reassuring and consoling the patient	<b>2</b>
Apply first aid techniques and emergency care to the patient.	<b>2</b>
Utilize the various radiographic techniques used for both paediatric and geriatric radiography.	<b>2</b>
Explain about the sterilization techniques used during radiographic examination.	<b>2</b>

		<b>SEMESTER – V</b>							
<b>COURSE TITLE</b>	<b>DEPARTMENTAL ELECTIVE</b>								
<b>COURSE CODE</b>	<b>22BRIT316R</b>	<b>TOTAL CREDIT :3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS:45T</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>PRE-REQUISITE</b>	<b>HOSPITAL TRAINING AND MANAGEMENT</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>BACHELOR OF RADIOGRAPHY &amp; ADVANCED IMAGING TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>Fall / V semester of third year of the programme</b>								
<b>COURSE OBJECTIVE</b>	<p>1.To provide knowledge about the advanced modalities and techniques used in Radio imaging.</p> <p>2. To introduce the students towards the concept of computed radiography, digital radiography.</p> <p>3. To introduce the students about nuclear physics and use of radioactive material in the body.</p>								
<b>CO1</b>	Knowledge about the Advanced techniques in MRI, Advanced Computed Tomography and Ultrasonography.								
<b>CO2</b>	Knowledge about the MR and CT contrast media, Pulse sequence, MRI Safety.								
<b>CO3</b>	Knowledge about the Hounsfield unit, CT windowing, CT image quality and artifacts								
<b>CO4</b>	Understanding comprehensive knowledge on basics and advancement of MRI.								
<b>CO5</b>	Understanding comprehensive knowledge on basics and advancement of PET & SPECT.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning outcome</b>	<b>KL</b>					
<b>1</b>	<b>Basics and Advancement of X- ray</b> Computed Radiography Digital Radiography	<b>5 hrs</b>	To understand the basics and the working principle of CR and DR.	<b>1,2,3</b>					
<b>2</b>	<b>Basics and Advancement of Ultrasonography</b> Real-time ultrasound Techniques for imaging different anatomic areas, ultrasound artifacts, biological Effects and safety. Doppler Ultrasound- Patient preparation for Doppler, Doppler artifacts, vascular Sonography. Ultrasonography/ Doppler studies: Techniques of sonography-selection- Preparations - instructions and positioning of patient for TAS, TVS, and TRUS, neck USG and extremities patient care and maintenance protocols clinical	<b>12 hrs</b>	To understand the basic principle of ultrasound and its imaging technique.	<b>2,3,4,5</b>					

	<p>applications display methods—  quality image reproducible extend—  Biopsy procedures, assurance to  patients. Endosonography &amp;  Elastography</p>			
3	<p><b>Basics and Advancement of  Computed Tomography</b>  1. Helical CT scan: Slip ring  2. technology  3. DECT  4. CT angiography, CT fluoroscopy,  HRCT, post processing techniques:  MPR, MIP, Min MIP, 3D rendering:  SSD and VR.</p>	10hrs	To acquire knowledge on advanced technique used in CT	1,2,4,5
4	<p><b>Basics and Advancement of  Magnetic Resonance Imaging</b>  1. MR Spectroscopy — functional  MRI, Cardiac imaging,  2. MR angiography- TOF &amp; PCA</p>	10hrs	To acquire knowledge on recent advances in MRI.	3,4,5
5	<p><b>Basics and Advancement of  Radionuclide Imaging</b>  1. Scintigraphy  2. Ortho-pantomography  3. PET &amp; SPECT</p>	8 hrs	To demonstrate the knowledge on advanced technique used in Nuclear Medicine.	2,3,4,5



**TEXT BOOKS:**

T1- Catherine Westbrook, Carolyn Kaut Roth and John Talbot 'MRI In Practice' 4th Edition (2011).

T2- Computed Tomography, Physical principles, clinical application and quality control 4th Edition. 2009

**REFERENCE BOOKS**

R1- Physics in nuclear medicine by Simon R. Cherry, James A. Sorenson

R2- Essentials of Ultrasound Physics by James A. Zagzebski.

R3- Thomas S Curry "Christensen's Physics of Diagnostic Radiology", 4th Edition August (1990)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
Knowledge about the Advanced techniques in MRI, Advanced Computed Tomography and Ultrasonography.	<b>1,3</b>
Knowledge about the MR and CT contrast media, Pulse sequence, MRI Safety.	<b>1,3</b>
Knowledge about the Hounsfield unit, CT windowing, CT image quality and artifacts	<b>1,3</b>
Understanding comprehensive knowledge on basics and advancement of MRI.	<b>1,3</b>
Understanding comprehensive knowledge on basics and advancement of PET & SPECT.	<b>1,3</b>

	<b>SEMESTER – V</b>								
<b>COURSE TITLE</b>	<b>CO-CURRICULAR</b>								
<b>COURSE CODE</b>	<b>22UBCC311</b>	<b>TOTAL CREDIT :1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	<b>COMPULSORY</b>	<b>CO-REQUISITE</b>							
<b>Programme</b>	<b>BACHELOR OF RADIOGRAPHY &amp; ADVANCED IMAGING TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>Fall / V semester of third year of the programme</b>								
<b>COURSE OBJECTIVE</b>	Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.								
<b>COURSE OUTCOMES</b>	Co-curricular activities facilitate in the development of various domains of mind and personality such as intellectual development, emotional development, social development, moral development and aesthetic development. Creativity, Enthusiasm, and Energetic, Positive thinking are some of the facets of personality development and the outcomes of extracurricular activities								
<b>Sl no</b>	<b>Content</b>								
<b>1</b>	The institute provides the opportunity to the teacher trainees to participate in various activities for their overall development. The institute conducts Seminars and Workshops, Guest Lectures, Essay writing, projects, general knowledge debates, quiz and discussion on current affairs, Discussion on social justice, National Days Celebrations, Assembly, Weekly meetings and Value Education programme, and also organize Dance, Dramatics, Singing competitions. Games and Sports are compulsory for all the students. Provision has, therefore been made for games and sports in college. The college will have unit of N.S.S. and will also give the opportunity to students to participate in it.								

	<b>SEMESTER – V</b>									
<b>COURSE TITLE</b>	<b>EXTRA CURRICULAR ACTIVITIES</b>									
<b>COURSE CODE</b>	<b>22UBEC311</b>	<b>TOTAL CREDIT :1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	
		<b>TOTAL HOURS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	<b>COMPULSORY</b>	<b>CO-REQUISITE</b>	<b>NIL</b>							
<b>Programme</b>	<b>BACHELOR OF RADIOGRAPHY &amp; ADVANCED IMAGING TECHNOLOGY</b>									
<b>SEMESTER</b>	<b>Fall / V semester of third year of the programme</b>									
<b>COURSE OBJECTIVE</b>	It is to develop the social and soft skills and to promote a holistic development of the learners.									
<b>CO1</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc									
<b>CO2</b>	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.									
<b>CO3</b>	The students will be trained to represent ADTU in various inter university, state and national level competitions.									
<b>CO4</b>	The students will be given a platform to learn from invited experts in their respective fields.									
<b>CO5</b>	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics									
<b>Sl no</b>	<b>COURSE CONTENTS</b>									
<b>1</b>	AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.									
<b>2</b>	These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.									
<b>3</b>	Keeping in mind the 360-degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.									
<b>4</b>	The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.									
<b>5</b>	The students' members of the club are trained represent AdtU in various inter University student and national level competitions.									
<b>6</b>	Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective field.									

## MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BRIT311R	Image Processing Techniques	2	3	3				1	
22BRIT312R	Contrast And Special Radiography	2	3	3	2	1		1	1
22BRIT313R	Ultrasound And Mammography	3	2	3					1
23BRIT314R	Techno Professional Skills IV	1		3				1	1
22BRITDE31/3 2/33	General Principles Of Hospital Training And Management/Recent Advancement In Medical Imaging Technolgy	3	3	3					1
23BRITMO31/3 2/33	Moocs								2
22UBCC311	Co-Curricular						2	2	3
22UBEC311	Extra- Curricular						2	2	3

SEMESTER – VI									
Course Title	MAGNETIC RESONANCE IMAGING								
Course code	22BRIT322R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 45T	3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	NIL						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
SEMESTER	Autumn/ VI semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. Providing knowledge about basic principle of MRI, equip mentation and its application and its use in diagnostic imaging.</li> <li>2. Providing knowledge on advancement in MRI techniques.</li> <li>3. Ability to perform various techniques such as plain and contrast examination, MR Angiography, Diffusion weighted/tensor Imaging, Perfusion and MR Spectroscopy.</li> </ol>								
CO1	Understand the basic principles of MRI and characteristics of MR contrast media.								
CO2	Analyse encoding, data collection & image formation.								
CO3	Describe the instrumentation of MRI and it's layout.								
CO4	Explain the process of MR Flow phenomena, vascular and cardiac imaging.								
CO5	Comprehend on MRI protocols and meaningful application of various techniques.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Basic principle of MRI: Introduction, Atoms and its motion, MR active nuclei and Alignment, Precession and Larmor equation, Resonance, MR signal, Free Induction Decay, Relaxation, T1 recovery, T2 decay, Pulse timing parameters (TR& TE) Image weighting and Contrast: Contrast mechanism, Relaxation in fats & water, Contrast parameters, Image weighting in both fats and water, Proton density weighting, T2*decay Contrast agents in MRI – Uses, mechanism of action, magnetic susceptibility, Relativity, Gadolinium safety, current application of MRI contrast media.	12	Understanding the Basic interaction of hydrogen molecules with the application of external magnetic field and changes it made on image Contrast.	1,2,3					
II	Encoding, data collection & Image formation: Encoding – Gradients, slice selection, Frequency encoding, Phase encoding, Sampling k-space, K-space filling and its types, Fast Fourier transformation, matrix, scan timing, Pre-scan and Types of acquisition	11	Knowledge on encoding the signal in its spatial location by carefully application of gradients.	2,3					

	Factors affecting image formation – Signal to noise ratio, Contrast to noise ratio, Spatial resolution, Scan time Pulse sequences – Spin echo pulse sequence & its types, Gradient echo pulse sequences & its types MRI artifacts, types and their compensation techniques.		formation of image and factors affecting the image.	
III	Instrumentation, Equipment's and Layout of MRI: Magnetism – Permanent magnets, Electromagnets, Superconducting-magnets Fringe fields, shimming, ramping and quenching MRI coils – Shim coils, RF coils, Gradient coils the control unit, Operator interface and patient transportation system, Layout – Site selection, Layout (Magnet room, equipment room and control console), dimensions, temperature, RF shielding, Construction materials for Floor, walls and ceilings, Accessory equipment's, Safety Zone and waste disposal.	7	Knowledge on equipment's and instrumentations in MRI, Layout and safety measures from RF pulse	3,4
IV	Flow phenomena, vascular and cardiac imaging Flow phenomena, types and compensation techniques Conventional vascular imaging, MR Angiography (Black blood Imaging & Bright blood imaging), Perfusion & diffusion imaging Cardiac imaging, Peripheral & pseudo gating, Types of cardiac imaging and SPAMM.	9	Understanding the techniques of blood vessels examinations by correctly applying the specific pulse sequences	4,5
V	Advancement in MRI & MRI protocols: Advance imaging – High speed gradient system, Echo planar Imaging, Spectroscopy, MR microscopy, Functional Imaging, Interventional MRI Cross sectional anatomy of - Brain including MRA and Epilepsy, Neck, Thorax, Abdomen, Pelvis, Extremities (Upper & Lower), Spine (Cervical, Thoracic, Lumbar, Sacrum & Coccyx)	9	Ability to carry out the procedures and techniques in MRI.	4,5

### **TEXT BOOKS:**

T1. Catherine Westbrook, Carolyn Kaut Roth and John Talbot 'MRI In Practice' 4th Edition (2011).

T2. Catherine Westbrook 'Handbook of MRI Technique' 4th Edition (2014)

T3. Catherine Westbrook 'MRI at a Glance' 2nd Edition (2009)

### **REFERENCE BOOKS:**

R1: Scott W. Atlas 'Magnetic Resonance Imaging of the Brain and Spine' 5th Edition (2016)

R2. Stewart Carlyle Bushong and Geoffrey Clarke 'Magnetic Resonance Imaging: Physical and Biological Principles' Edition(2014)

R3. Hariqbal Singh, Vikash Ojha and Santosh Konde 'Atlas of Magnetic Resonance Imaging' 1st Edition

(2014) T3. Catherine Westbrook 'MRI at a Glance' 2nd Edition (2009)

R3: Sharp, Lester W. Fundamentals of Cytology. 1st edition. Mc Graw Hill Company; 1943.

### **OTHER LEARNING RESOURCES:**

<https://www.master.com>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the basic principles of MRI and characteristics of MR contrast media.	<b>1,2,6</b>
<b>2</b>	Analyse encoding, data collection & image formation.	<b>1,2,4</b>
<b>3</b>	Describe the instrumentation of MRI and it's layout.	<b>3,5</b>
<b>4</b>	Explain the process of MR Flow phenomena, vascular and cardiac imaging.	<b>1,2</b>
<b>5</b>	Comprehend on MRI protocols and meaningful application of various techniques.	<b>1,2,3,8</b>



<b>SEMESTER – VI</b>									
<b>Course Title</b>	<b>COMPUTED TOMOGRAPHY</b>								
<b>Course code</b>	<b>22BRIT322R</b>	<b>Total credits: 3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 45T</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>NIL</b>						
<b>Programme</b>	<b>BACHELOR OF RADIOGRAPHY &amp; ADVANCED IMAGING TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>Autumn/ VI semester of first year of the programme</b>								
<b>Course Objectives</b>	<p>1. To introduce the students about the concepts of Computed Tomography and physical principles to qualitative image quality.</p> <p>2. To introduce the students about the diagnostic imaging procedures and techniques used in Computed Tomography.</p> <p>3. To introduce the students about the room layout and instrumentation of CT scanner.</p>								
<b>CO1</b>	Discuss the history and basic principle of CT scan.								
<b>CO2</b>	Implement the CT protocols and techniques in diagnostic imaging.								
<b>CO3</b>	Perform the data acquisition system and post processing of image.								
<b>CO4</b>	Describe the instrumentation of CT scanner and its advancements								
<b>CO5</b>	Comprehensive assessment of CT parameters and image artifacts.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>					
<b>I</b>	CT scan systems: • History-generations of scanners-CT technology - helical/spiral & multi slice C.T ultra-fast scanners-system components - performance parameters - image quality and methods of image reconstruction- radiation dose measurements and technical aspects of Q.A -calibration and image acquisition.	<b>8</b>	Comprehend knowledge on the History and basic principle of CT scan.	<b>1,2,3</b>					
<b>II</b>	CT scan studies acquisition/ protocols /techniques: • CT of head and neck – thorax – abdomen – pelvis – Musculo skeletal system – spine – PNS. Anatomy – clinical indications and contraindications – patient preparation – technique – contrast media-types, dose, injection technique; timing.	<b>12</b>	Comprehend knowledge on the techniques and protocols Of CT scan examination.	<b>2,3</b>					

	sequence - image display – patient care – utilization of available techniques & image processing facilities to guide the clinician-CT anatomy and pathology of different organ systems.			
III	Image processing & Display systems Recent advances, concepts and applications in processing of images in digital form using computer-based systems.	8	To acquire knowledge on the recent advances of CT scan and image processing.	3,4
IV	Data Acquisition- Basic Scheme for Data Acquisition Terminology Data Acquisition Geometries Slip-Ring Technology X-Ray System- X-Ray Generator, X-Ray Tubes, Filtration, Collimation CT Detector Technology Detector types.	10	To acquire knowledge on slip ring Technology, components of x-ray system and detectors.	4,5
V	Image post-processing and Image Quality- Definition Techniques Windowing- Window Width and Window Level Image Artifact-types Quality Control	7	Understanding knowledge on image quality.	4,5

### TEXT BOOKS:

T1. Computed tomography: Physical principles, clinical applications, and quality control by Euclid Seeram.

T2. Computed Tomography for Technologists: A Comprehensive Text

### REFERENCE BOOKS:

R1: Computed Tomography for Technologists: An Exam Review

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	<b>Discuss the history and basic principle of CT scan.</b>	<b>1,3,5</b>
<b>2</b>	<b>Implement the CT protocols and techniques in diagnostic imaging.</b>	<b>1,2,3,6</b>
<b>3</b>	<b>Perform the data acquisition system and post processing of image.</b>	<b>1,3</b>
<b>4</b>	<b>Describe the instrumentation of CT scanner and its advancements</b>	<b>1,3,4</b>
<b>5</b>	<b>Comprehensive assessment of CT parameters and image artifacts.</b>	<b>1,2,3</b>

<b>SEMESTER – VI</b>										
<b>Course Title</b>	<b>INTERVENTIONAL RADIOLOGY AND NUCLEAR MEDICINE</b>									
<b>Course code</b>	<b>22BRIT323R</b>	<b>Total credits: 3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>	
		<b>Total hours: 45T</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>NIL</b>							
<b>Programme</b>	<b>BACHELOR OF RADIOGRAPHY &amp; ADVANCED IMAGING TECHNOLOGY</b>									
<b>SEMESTER</b>	<b>Autumn/ VI semester of first year of the programme</b>									
<b>Course Objectives</b>	<p>1. To gain the knowledge about basic and technological aspects of Special procedures in Radiology.</p> <p>2. It will give the man idea on how to work with Sterility in Procedures and on how the procedures are performed under Fluoroscopy and Interventional radiology.</p> <p>3. To introduce the students about nuclear physics and use of radioactive material in the body.</p>									
<b>CO1</b>	Comprehend the understanding on equipment used in interventional procedures.									
<b>CO2</b>	Discuss the various procedures, techniques and guided procedures of interventional radiology.									
<b>CO3</b>	Comprehend the understanding of basic nuclear physics and radiopharmaceuticals used in nuclear imaging.									
<b>CO4</b>	Explain the different types of production of radionuclides.									
<b>CO5</b>	Discuss the instrumentation used in nuclear medicine.									
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>		
<b>I</b>	<b>Basic principle and hardware Angiography equipment's history</b> – Conventional angiography X-Ray equipment - Equipment construction-principle - DSA system basics - digital techniques - subtraction process- procedures for subtraction - care, choice and installation of the equipment – equipment, pitfalls and complications -pressure injectors contrast media -accessories catheters, guide wires-uses of serial imaging devices- cine camera - video-recorder -film processing radiation protection.	<b>10</b>	To acquire knowledge about contrast media & its types, Procedures used in Angiography					<b>1,2,3</b>		
<b>II</b>	<b>Interventional Radiology:</b> Conventional / DSA studies Abdominal, visceral, peripheral, cerebral and cardiac angiography - arterial/venous anatomy, physiology- clinical indications and	<b>1</b>	To acquire knowledge about the different types of radiological examination used in interventional radiology.					<b>2,3</b>		

	<p>contraindications - patient preparation-positioning of the patient -patient care- contrast media - types of contrast - dosage - accessories catheters, guide wires pressure injection- control of radiographic and fluoroscopic equipment - exposure factors for serial programmes-programming injection protocols- outline on each radiological procedure, radiographer's role- patient management before -during and after the procedure - venography interventional angiography in hepatobiliary, GIT, urology and vascular system- coils/stents etc indications and contraindications - role of radiographer-radiation safety</p>			
III	<p>Nuclear Medicine Equipment Nuclear Physics - basics in Nuclear Medicine- Nuclear medicine equipment's - Gamma Cameras rectilinear scanners- radioisotope generators- SPECT-CT &amp; PET-CT introduction-basic physics and principle involved- equipment's basic structure—differences- fusion techniques- image formation storage devices– advantages limitations.</p>	12	To acquire knowledge about the basic nuclear physics.	3,4
IV	<p>Nuclear Scintiscan procedures: Basics of common clinical Nuclear Medici procedures/techniques. structural imaging studies advantages and limitations.</p>	6	To acquire knowledge about the scintiscan procedures used in PET and SPECT.	4,5
V	<p>Hybrid imaging: PET-CT and PET MRI</p>	5	To acquire knowledge about the PET – CT scan and PET MRI scan	4,5

### TEXT BOOKS:

T1. Physics in nuclear medicine by Simon R. Cherry, James A. Sorenson

T2. Interventional procedures in biopsy and drainage by Debra A, Gervais Tarun Sab harwal.

T3: DebraA,Gervais,Tarun Sabharwal 'Interventional procedures in biopsy and drainage' 1st Edition (2011)

#### **REFERENCE BOOKS:**

R1: Andy Adam, Robert N. Gibson 'Practical Interventional Radiology of the Hepatobiliary System and Gastrointestinal tract (practical interventional radiology series) 1st Edition(1994)

R2: Krishna Khandarpa, Lindsay Machah,Janette D.Dorham'Handbook of interventional radiologic procedures'India 5th edition (2016)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Comprehend the understanding on equipment used in interventional procedures.	<b>1,3</b>
<b>2</b>	Discuss the various procedures, techniques and guided procedures of interventional radiology.	<b>2</b>
<b>3</b>	Comprehend the understanding of basic nuclear physics and radiopharmaceuticals used in nuclear imaging.	<b>1,3,8</b>
<b>4</b>	Explain the different types of production of radionuclides.	<b>1,3,8</b>
<b>5</b>	Discuss the instrumentation used in nuclear medicine.	<b>1,3</b>

SEMESTER – VI										
BONE MINERAL DENSITOMETRY										
Course code	22BRIT324R	Total credits: 3	L	T	P	S	R	O/F	C	
		Total hours: 45	0	0	0	12	0	0	3	
Pre-requisite	Nil	Co-requisite	NIL							
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY									
SEMESTER	Autumn/ VI semester of first year of the programme									
Course Objectives	1. To study the importance of bone mineral density. 2. To learn about one density measurements by DEXA. 3. To learn and identify the diagnosis of osteoporosis.									
CO1	Understanding the concepts and the principle of bone mineral densitometry.									
CO2	Comprehensive knowledge on the instrumentation of DEXA and apply it's clinical understandings.									
CO3	Apply the procedures and techniques of bone mineral densitometry.									
CO4	Learn about the radiation protection used during DEXA scan.									
Unit-No.	Content	Contact Hour	Learning Outcome				KL			
I	History Introduction Principle of Bone Mineral Densitometry Bone mineral Content Bone mineral Density Bone Mineral Composition – Fats and mass	02	To understand the knowledge about History and principle of BMD.				1,2,3			
II	Instruments and Equipment's of DEXA scan Dual energy X-ray Clinical Applications of DEXA scan Advantages and disadvantages.	4	To acquire the knowledge about the instrumentation of BMD.				1,2,3			
III	Procedures: Clinical Indication Contra indication Patient preparation Procedures Types of procedures	8	To understand the knowledge about the procedures of BMD.				3,4			
IV	Radiation protection Aftercare of patients Complications due to technique. Limitations of Bone density scan	4	To acquire knowledge about radiation protection and the limitations of BMD.				4,5			

**TEXT BOOKS:**



## T1. Bone Mineral density and body composition by Ferant Zan, Kozar Nejc.

### REFERENCE BOOKS:

R1: Bone Mineral Density and Body Composition Paperback – 7 August 2014 by Ferant Zan (Author), Kozar Nejc (Author), Micetic-Turk Dusanka (Author)

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding the concepts and the principle of bone mineral densitometry.	1,
2	Comprehensive knowledge on the instrumentation of DEXA and apply it's clinical understandings.	2,3
3	Apply the procedures and techniques of bone mineral densitometry.	2,3
4	Learn about the radiation protection used during DEXA scan.	2,3,8

SEMESTER – VI									
Course Title	LAB BASED RESEARCH PROJECT								
Course code	22BRIT325R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			0	0	0	0	18	0	3
Pre-requisite	Nil	Co-requisite	NIL						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
SEMESTER	Autumn/ VI semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To determine the correct technique for image formation and to deliver radiological terminologies and film studies at its modest.</li> <li>Develop experimental and analytical skills.</li> <li>Develop hands-on training skills.</li> </ol>								
CO1	Understanding the concepts and the principle of bone mineral densitometry.								
CO2	Comprehensive knowledge on the instrumentation of DEXA and apply it's clinical understandings.								
CO3	Apply the procedures and techniques of bone mineral densitometry.								
CO4	Learn about the radiation protection used during DEXA scan.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Derivation of Radiological Terminology –word roots, prefixes, suffixes.	15	To acquire knowledge on derivation of Radiological Terminology	1,2					
II	Utilize diagnostic, surgical, and procedural terms and abbreviations related to imaging system.	15	To acquire knowledge on Utilize diagnostic, surgical, and procedural terms and abbreviations related to imaging system	1,2,3					
III	Data entry and management on electronic health record system HIS, RIS, DICOM, PACS	15	To acquire knowledge on Data entry and management on electronic health record system	1,2,					
IV	Interpretation of medical reports/ impression	15	To acquire knowledge on Interpretation of medical reports	2,3					

### TEXT BOOKS:

T1. Bone Mineral density and body composition by Ferant Zan, Kozar Nejc.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding the concepts and the principle of bone mineral densitometry.	1.
2	Comprehensive knowledge on the instrumentation of DEXA and apply it's clinical understandings.	2,3
3	Apply the procedures and techniques of bone mineral densitometry.	2,3
4	Learn about the radiation protection used during DEXA scan.	2,3,8

## MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BRIT321R	Magnetic Resonance Imaging	3	2	2	3	1	1		3
22BRIT322R	Computed Tomography	2	3	2	2	1	1		
22BRIT323R	Interventional Radiology And Nuclear Medicine	2	3	2					2
22BRIT324R	Bone Mineral Densitometry/ Techniques In Advanced Radiography	1	3	3	1				2
22BRIT325R	Lab Based Research Project	3		1	3		3	1	1



# Assam down town University

## Curriculum and Syllabus

### Bachelor of Dialysis Technology

OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**

July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022



*Chairperson  
Board of Studies*



*Member Secretary  
Academic Council*



## **Vision**

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## **Missions**

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community.

## **Programme Overview**

The Bachelor of Dialysis Technology program provides a comprehensive foundation in renal anatomy, physiology, kidney diseases, and patient care, complemented by extensive clinical placements within hospital premises. Through hands-on experience, students become proficient in conducting hemodialysis and peritoneal dialysis for individuals with end-stage kidney disease or acute kidney injury. Graduates are well-prepared for employment in private and public hospitals, as well as dialysis units, where they maintain equipment and administer dialysis treatments both in clinical settings and at patients' residences. Additionally, opportunities for further academic advancement, such as pursuing MSc, MPhil, or PhD studies become available.

### **I. Specific Features of the Curriculum**

**PSO1. Clinical Proficiency:** Ability to perform clinical assessment of patients and techniques of dialysis procedures in clinical practice during hospital posting and internship in the healthcare systems.

**PSO2. Techno-Professional Efficiency:** Apply comprehensive knowledge to operate modern dialysis equipment, employ various techniques, and maintain high standards in diverse medical settings to enhance health outcomes.

**PSO3. International Competency:** Attain global competency through interdisciplinary and industry-oriented certification courses.

**II. Eligibility Criteria:** Minimum 45% in 10+2 with English, Biology & Chemistry. 5% relaxation for SC/ST, EWS, and Specially abled candidates.

### **III. Program Educational Objectives (PEOs):**

**PEO1.** Graduates will be prepared for successful careers in dialysis technology of government/ corporate healthcare service sectors.

**PEO2.** Graduates will be academically prepared to contribute effectively to the growth and development of the healthcare service sectors.

**PEO3.** The graduates will be engaged in professional activities to enhance their competency and professional stature; and will be successful in higher education in interdisciplinary areas of dialysis and healthcare management if pursued.



#### IV. Program Outcome:

**PO1: Healthcare Knowledge:** Apply knowledge of kidney transplant, pharmacological, anatomical, physiological, biochemistry, pathology, microbiology, nutrition, and pathophysiological knowledge to navigate the complexities of renal dysfunction in dialysis care.

**PO2: Patient Care:** Demonstrate hospital practices in dialysis units including dialysis procedures, maintaining a sterile environment to prevent infections, monitoring the patient, and handling complications during dialysis.

**PO3: Equipment Proficiency:** Operate patient monitoring systems and devices including hemodialysis, peritoneal dialysis, and dialyzer reprocessing machine.

**PO4: Procedure and Quality Assurance:** Demonstrate proficiency in managing dialysis treatments, including hemodialysis, peritoneal dialysis, plasmapheresis, and specialized dialysis methods using vascular access sites to improve quality outcomes.

**PO5: Clinical Ethics:** Demonstrate clinical ethics in healthcare activities, adhere to codes of conduct at the workplace, maintain patient privacy and confidentiality, displaying professionalism, and compassion.

**PO6: Teamwork:** Demonstrate functional proficiency to practice independently and collaboratively within the multidisciplinary healthcare team.

**PO7: Communication:** Execute effective communication to educate them about dialysis procedures and lifestyle modifications to patients and healthcare professionals.

**PO8: Lifelong Learning:** Engage in continuous learning to be updated with advancements in dialysis technology.

#### V. Total Credits to be Earned:

<b>Credit distribution for Bachelor of Dialysis Technology</b>		
<b>SL. No.</b>	<b>Semester</b>	<b>Credit</b>
1.	1.	20
2.	2.	25
3.	3.	32
4.	4.	23
5.	5.	15
6.	6.	15
<b>Total</b>		<b>130</b>

#### VI. Career Prospects:

The Bachelor of Dialysis Technology program provides a comprehensive foundation in renal anatomy, physiology, kidney diseases, and patient care, complemented by extensive clinical placements within hospital premises. Through hands-on experience, students become proficient in conducting hemodialysis and peritoneal dialysis for individuals with end-stage kidney disease or acute kidney injury. Graduates are well-prepared for employment in private and public hospitals, as well as dialysis units, where they maintain equipment and administer dialysis treatments both in clinical settings and at patients' residences. Additionally, opportunities for further academic advancement, such as pursuing MSc, MPhil, or PhD studies become available.

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 40% or as prescribed by the programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Sem Exam – I (ISE-I) (Written Examination)*	30
2.	In-Sem Exam – II (ISE-II) (Written Examination)*	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

\*are compulsory

**Note:** Total Internal assessment should be out of 40

### INSTRUCTION

1. If a student fails to appear in any of the components without any valid reason, he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining grounds with genuine/valid reasons for the absence.
2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.
3. The program coordinators should upload the in-semester marks to the

ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

**B.SEMESTER END EXAMINATION:**

Time table for end semester examination is published at least 25 days prior to the start of Examination. **I.Pre-Examination:**

**Eligibility Criteria for a student to appear in University Examinations:**

The student shall only be allowed to appear in a University Examination, if:  
 i) He/ She is a registered student of the University; ii) He/ She is of good conduct and character; iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

**II. Admit Card:**

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds. **III. Pattern of Question Papers:**

The question paper shall follow the principles of Bloom's Taxonomy. Table

S. N.	Level	Questions /verbs for test
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine,

		modify
4	Analyze	Classify, outline, categorize, analyze, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.
6	Create	Design, Formulate, Modify, Develop, integrate, etc.

**Note:** No course is to be evaluated on basis of all 6 knowledge levels.

The format of the question paper across all the program follow a unique pattern and the total marks is 60

**Table 1: Question paper pattern for End semester examination**

Sl no	Question pattern	Total marks
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

#### **V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.

- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

#### **VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Officer-in-Charge of the center may take appropriate decisions as per the rules and procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

#### **VII. Instruction to the Students:**

- i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- ii) The students shall not receive any book or printed or handwritten or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.
- iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any

kind of paper to any other candidate in the examination-room, or to any person outside the room.

vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.

vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.

viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He / she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.

ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

#### **VIII. Provision for an Amanuensis (writer):**

i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.

ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.

iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process. **C.Credit Point:**

It is the product of grade point and number of credits for a course, thus, CP

= GP x CR

**i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

## **ii. Grade Point:**

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

## **iii. Letter Grade:**

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table:

### **1) Letter Grades:**

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

### **Table 2: Letter Grades and Grade Points**



Letter Grade	Grade Points	Description
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

#### iv. Grade Point Average:

##### a. SGPA (Semester Grade Point Average)

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades 'O' to 'F' as given in Table 1.

$$SGPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  registered Course and  $C_i$  is the Credit (weight) of that Course.

##### b. CGPA (Cumulative Grade Point Average)

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrollment in the Programme. In other words, taking into account all the Courses graded with 'O' to 'P' as given in Table

1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrollment.

- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where  $N$  is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i$ th completed Course and  $C_i$  is the Credit (weight) of that Course.

$$CGPA = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

- (iii) The CGPA shall be convertible into equivalent percentage of marks using Equation Conversion of CGPA to percentage marks: = CGPA\*10

## **D. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### **ii. Grievance Redress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his/her answer script to the Controller of Examination.

- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite proforma available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for reevaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.
- (vi) The marks/grades achieved by the students after the reevaluation shall be final and binding.
- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Reevaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.

(ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

## **INSTRUCTION TO TEACHERS AND STUDENTS**

### **(Teaching and Learning Methods)**

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

#### **1. Student-centric / Constructivist Approach:**

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these questions or search for answer which becomes the home work for the students "question-driven" learning approach. The teacher may look for

the correctness of the solution or the best possible answer and discuss in the successive class. This will help in the preparation for various competitive examination and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student-centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

### **The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures  
20%

Student-centric Approach, Students present and deliver lectures in the presence of  
teacher and supervised by teacher 60%

Students visit fields or perform experiments or teachers  
perform demonstration 05%

05%

**Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by  
the above-mentioned approaches and prepare a lesson plan for execution  
and maintain a file.





**Curriculum Framework**  
**Breakdown of Credits (for 2022-23 Syllabus)**

<b>Sl. No</b>	<b>Category</b>	<b>Total number of Credits</b>
1	University Core(UC)	20
2	University Elective (UE)	12
3	Program Core(PC)	98
4	Program Elective (PE)	0
5	Faculty Elective (FE)	0
<b>Total number of credit</b>		<b>130</b>

**Breakdown by categories of courses**

<b>SL no</b>	<b>Category</b>	<b>Credits</b>	<b>%</b>
1	Paramedical Science	120	92.30%
2	CLPDP	8	6.15%
3	FOCT	1	0.76%
3	Commerce and Management	1	0.76%
<b>Total</b>		<b>130</b>	<b>100%</b>

	S. N.	Course code	Course Title	Course Category	Engagement								Maximum Marks			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
Semester I	1.	22BDIT111R	Anatomy-I	FC	3	0	4	0	0	0	5	40	60	100	200	
	2	22BDIT112R	Physiology-I	FC	3	0	4	0	0	0	5	40	60	100	200	
	3	22BDIT113R	Biochemistry-I	FC	3	0	2	0	0	0	4	40	60	100	200	
	4	22BDIT114R	Hospital Duty and Patient Care-I	FC	2	0	0	0	0	0	2	40	60	0	100	
	5	22UBPD111R	Basic English	UC	0	0	4	0	0	0	2	40	60	0	100	
	6	22UBEC111	Extra-curricular (Non - CGPA)	UE	0	0	0	4	0	0	1	0	0	100	100	
	<b>Total</b>					<b>11</b>	<b>0</b>	<b>10</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>200</b>	<b>300</b>	<b>400</b>	<b>900</b>
	S. N.	Course code	Course Title	Course Category	L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
Semester II		22BDIT121R	Anatomy-II	FC	3	3	0	4	0	0	5	40	60	100	200	
		22BDIT122R	Physiology- II	FC	3	0	4	0	0	0	5	40	60	100	200	
		22BDIT123R	Biochemistry-II	FC	3	0	2	0	0	0	4	40	60	100	200	
		22BDIT124R	Hospital Duty and Patient Care-II	FC	0	0	0	0	0	0	2	40	60	0	100	
		22U BPD121R	Basic English	UC	0	0	4	0	0	0	2	40	60	0	100	
		22MOCEU101	MOOCS/ Exchange course	SE/FE	0	0	0	0	0	0	1	0	0	0	100	
		22 BDIT125R	Clinical Dialysis I	PC	0	0	0	2	0	0	1	0	0	100	100	
		22UUDL101R	Basic Digital Literacy	UC	0	0	0	2	0	0	1	0	0	100	100	
		22 UUVH104R	Universal Human Value + Professional ethics	UC	1	0	2	0	0	0	2	0	0	0	100	
		22UBECCI21	Co-curricular activities	UC	0	0	0	4	0	0	1	0	0	0	100	
		2 2UBEC121	Extra- curricular (Non CGPA)	UC	0	0	0	4	0	0	1	0	0	0	100	
	<b>Total</b>					<b>10</b>	<b>3</b>	<b>12</b>	<b>16</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>200</b>	<b>300</b>	<b>500</b>	<b>1400</b>
Semester III	Course Code	Course Title	Course Category	Course Engagement								Maximum Marks				
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total		
	1.	22BDIT211R	Applied Anatomy	PC	3	0	0	0	0	0	3	40	60	0	100	
	2	22BDIT212R	Applied Physiology	PC	3	0	0	0	0	0	3	40	60	0	100	
	3	22BDIT213R	Applied Biochemistry	PC	3	0	4	0	0	0	5	40	60	0	100	
	4	22BDIT214R	Pharmacology I	PC	2	0	4	0	0	0	2	0	0	0	100	
	5	22 BDIT215R	Pathology	PC	2	0	4	0	0	0	4	40	60	100	200	
	6	22BDIT216R	Biostatistics	PC	2	0	0	0	0	0	2	40	60	0	100	
	7	22 BDIT217R	Nutrition	PC	0	0	2	0	0	0	1	40	60	0	200	
	8	22UBPD211R	Basic English	UC	0	0	4	0	0	0	2	40	60	0	100	
	9	22UULS202R	Basic Life Saving Skills	UC	3	0	0	0	0	0	3	0	0	100	100	

	10	22BDIT226R	Generic Elective		2	0	0	0	0	0	2	0	0	0	100	
	11	22UBCC211	Co-curricular activities	UC	0	0	0	4	0	0	1	0	0	0	100	
	12	22UBEC211	Extra-curricular activities (Non CGPA)	UE	0	0	0	4	0	0	1	0	0	0	100	
	10	22BDIT226R	Generic Elective		2	0	0	0	0	0	2	0	0	0	100	
	11	22UBCC211	Co-curricular activities	UC	0	0	0	4	0	0	1	0	0	0	100	
	12	22BDIT219R	Generic Elective	GE	2	0	0	0	0	0	2	40	60	0	100	
	13	22UBCC211	Co-curricular activities	UC	0	0	0	4	0	0	1	0	0	0	100	
	14	22UBEC211	Extracurricular activities	UE	0	0	0	4	0	0	1	0	0	0	100	
		<b>Total</b>				<b>20</b>	<b>0</b>	<b>20</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>32</b>	<b>320</b>	<b>480</b>	<b>200</b>	<b>1600</b>
<b>Semester IV</b>		<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Course Engagement</b>							<b>Maximum Marks</b>				
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	<b>Total</b>	
		1.	22BDIT221R	Pharmacology II	PC	3	0	0	0	0	0	3	40	60	0	100
		2	22BDIT222R	Concept of Renal Disease	PC	3	0	0	0	0	0	3	40	60	0	100
		3	22B DIT223R	Basic of Dialysis Technology	PC	3	0	0	0	0	0	3	40	60	0	100
		4	22 BDIT224R	Microbiology	PC	2	0	4	0	0	0	4	40	60	100	200
		5	22UBPD221R	Basic English	UC	0	0	4	0	0	0	2	40	60	0	100
		6	22MOCEU103	MOOCS/Exchange course (Online course)	SE/FE	0	0	0	0	0	0	1	0	0	0	100
		7	22UULS201	Basic Acclimatizing Skills (BAS)	UC	0	2	0	0	0	0	1	0	0	0	100
		8	22UUF201R	Introduction to Financial Budgeting and Planning	UC	0	2	0	0	0	0	1	0	0	0	100
		9	22BDIT225R	Clinical Dialysis III	PC	0	0	2	0	0	0	1	0	0	100	100
		10	22BDIT226R	Generic Elective		2	0	0	0	0	0	2	0	0	0	100
		11	22UBCC211	Co-curricular activities	UC	0	0	0	4	0	0	1	0	0	0	100
		12	22UBEC211	Extra-curricular activities (Non CGPA)	UE	0	0	0	4	0	0	1	0	0	0	100
		<b>Total</b>			<b>13</b>	<b>4</b>	<b>10</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>200</b>	<b>300</b>	<b>200</b>	<b>1300</b>	
<b>Semester V</b>		<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Course Engagement</b>							<b>Maximum Marks</b>				
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	<b>Total</b>	
		1.	22BDIT311R	Applied Dialysis Technology- I	PC	3	0	4	0	0	0	5	40	60	100	200
		2	22BDIT312R	Applied Dialysis Technology- Ii	PC	3	0	0	0	0	0	3	40	60	0	100
		3	22BDIT313R	Basic Life Support, Management of Renal Failure	PC	3	0	0	0	0	0	3	40	60	0	100
	4	22 MOCEU104	MOOCS/ Exchange course (Online course)	PC	0	0	0	0	0	0	1	0	0	0	100	

	5	22BDIT314R	Clinical Dialysis IV	PC	0	0	2	0	0	0	1	0	0	100	100	
	6	22BDIT315R	Dialyzer/ CKD Management	UC	1	0	0	4	0	0	1	40	60	0	100	
	7		Co- curricular activities	FE	0	0	4	4	0	0	1	0	0	0	100	
	<b>Total</b>				<b>10</b>	<b>0</b>	<b>10</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>120</b>	<b>240</b>	<b>200</b>	<b>800</b>	
<b>Semester VI</b>		<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Course Engagement</b>							<b>Maximum Marks</b>				
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	<b>Total</b>	
		1	22BDIT321R	Applied Dialysis Technology- III	PC	3	0	3	0	0	0	5	40	60	100	200
		2	22BDIT322R	Renal Transplant	PC	3	0	0	0	0	0	3	40	60	0	100
		3	22B DIT323R	Medical Ethics Sterilization and Relevant Medico- Legal Aspects	PC	3	0	0	0	0	0	3	40	60	0	100
		4	22B DIT324R	Dialysis Practice	SEC	0	0	0	4	0	0	1	0	0	100	100
		5	22B DIT325R	Research project	Field /lab based research project	0	0	0	0	18	0	3	0	0	0	100
		<b>Total</b>				<b>9</b>	<b>0</b>	<b>3</b>	<b>4</b>	<b>18</b>	<b>0</b>	<b>15</b>	<b>120</b>	<b>180</b>	<b>300</b>	<b>600</b>

**\*IA: Internal Assessment, SEE: Semester End Examination, PE: Practical Examination**

Semester – I									
Course Title	Anatomy-I								
Course code	22BDIT111R	Total credits: 5 Total hours: 65T+ 5P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 1 <sup>st</sup> semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. To study the basic of anatomical structure of human body.</li> <li>2. To provide a comprehensive concept of all the anatomical systems of the human body.</li> <li>3. Able to understand the classification and description of the basic tissues of the body.</li> </ol>								
CO1	Able to explain anatomical positions, axis and plans, common anatomical terminology.								
CO2	Able to explain the musculo–skeletal system.								
CO3	Learn the structure of heart and blood vessels.								
CO4	Apply knowledge of the structure of gastro intestinal tract and accessory organs of digestion.								
CO5	Demonstrate a comprehensive understanding the classification and description of the basic tissues of the body.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
<b>I</b>	Introduction to anatomical terms: Organization of human body, anatomical positions, axis and plans, common anatomical terminology.	<b>6</b>	Describe, illustrate and explain organization of human body anatomical terminology.				1,8		
<b>II</b>	Musculo–skeletal system: Bones: Classification & types according to morphology & development structure and functions, description of bones of human body, blood supply of bones. Cartilage: Description. Joints: Definition, classification, structure and movements. Muscles: Types and structure of muscles, name of the muscles of the body with some important muscles' attachments.	<b>18</b>	Describe, illustrate and explain Musculo–skeletal system.				1,8		
<b>III</b>	Thorax: Mediastinum–division and contents. Structure of heart and blood vessels. Full description of Respiratory tract and lungs. Para nasal sinuses.	<b>10</b>	Describe, illustrate and explain the thorax.				1,8		

<b>IV</b>	Digestive system: Structure of Gastro Intestinal tract and accessory organs of digestion.	<b>16</b>	Describe, illustrate and explain the structure of digestion system.	1,8
<b>V</b>	Tissue: Classification and description of the basic tissues of the body. Histology: Epithelium, compact bone muscles, connective tissue, nervous tissue, artery, vein and lymphatic tissue.	<b>15</b>	Describe, illustrate and explain the basic knowledge of tissues in the body.	1,8
<b>Practical</b>	1. Study of anatomical plans and positions. 2. Study of skeleton and bones of human body (Skull, Vertebrae, Ribs and bone of upper limb.	<b>5</b>	Describe, illustrate and explain and apply anatomical plans, position and study the bones of human body.	1,8

#### TEXT BOOKS:

1. Fundamentals of Anatomy By Pamela K Levangie, Cynthia C Norkin, JP Bros Medical Publishers, New Delhi.
2. Fundamentals of Medical Anatomy by [Duane Knudson](#), 2nd ed. 2007 Publisher Springer

#### REFERENCE BOOKS:

1. Medical anatomy, JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997.
2. Clinical Anatomy, JP Bros Medical Publishers, Bangalore, 5th Ed 1996, 1st Indian Ed1998.

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain anatomical positions, axis and plans, common anatomical terminology.	<b>1, 8</b>
2	Able to explain the Musculo–skeletal system.	<b>1,8</b>
3	Learn the structure of heart and blood vessels.	<b>1,8</b>
4	Apply knowledge of the structure of Gastro Intestinal tract and accessory organs of digestion.	<b>1,8</b>
5	Demonstrate a comprehensive understanding the classification and description of the basic tissues of the body.	<b>1,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1 *	PO2	PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT111R	Anatomy- I	3							3

Semester – II									
Course Title	Physiology-I								
Course code	22BDIT112R	Total credits: 5 Total hours: 60T+ 5P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 1 <sup>st</sup> semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To provide concrete idea about the different physical system of human body.</li> <li>To understand the underlined mechanism that work to keep the human body alive and functioning.</li> <li>Able to learn the basic knowledge of the digestive system.</li> </ol>								
CO1	Able to explain the basic knowledge of human body, cell structure and organelle, tissues and functions.								
CO2	Able to explain the blood volume and body fluids.								
CO3	Learn the basic knowledge of the digestive system.								
CO4	Apply knowledge of the general organization, mechanics of respiratory system.								
CO5	Demonstrate a comprehensive understanding the cardiovascular system.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>General physiology:</b> <ul style="list-style-type: none"> <li>Organization of human body,</li> <li>Cell structure and organelle, tissues and functions.</li> </ul>	6	Describe, illustrate and explain basic knowledge of general physiology.				1,8		
II	<b>Blood:</b> <ul style="list-style-type: none"> <li>Blood volume and body fluids.</li> <li>Composition and functions of blood.</li> <li>Structure and formation and function of RBC, WBC and platelets.</li> <li>Haemoglobin. plasma, blood coagulation, Blood groups</li> </ul>	18	Describe, illustrate and explain the basic knowledge of haematological parameters.				1,8		



<b>III</b>	<b>Digestive System:</b> <ul style="list-style-type: none"> <li>• General introduction, organizational plan of digestive system. Movement of G.I. Tract and functions of various components.</li> <li>• Composition, functions and regulation of salivary, gastric, pancreatic, intestinal and biliary secretion.</li> <li>• Functions of liver, gallbladder and pancreas.</li> <li>• Digestion and absorption of carbohydrate, protein and fat.</li> </ul>	<b>16</b>	Describe, illustrate and explain Digestive System	1,8
<b>IV</b>	<b>Respiratory system:</b> <ul style="list-style-type: none"> <li>• General organization. Mechanics of respiration.</li> <li>• Regulation of respiration. Gaseous exchange in lung and tissues.</li> <li>• Pulmonary ventilation, volume and capacities.</li> <li>• Effect of exercise on respiration, hypoxia.</li> </ul>	<b>10</b>	Describe, illustrate and explain the respiratory system.	1,8
<b>V</b>	<b>Cardiovascular System:</b> <ul style="list-style-type: none"> <li>• General organization, structure and properties of cardiac muscles.</li> <li>• Cardiac output, cardiac cycle, conducting system of heart. Heart sounds, regulation of H.R., pulse, blood pressure and its regulation.</li> <li>• Systemic circulation, pulmonary circulation and coronary circulation. ECG, cardio respiratory changes during exercise.</li> </ul>	<b>10</b>	Describe, illustrate and explain the of cardiovascular system.	1,8
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Study of compound Microscope.</li> <li>• Arterial pulse</li> <li>• BP</li> <li>• Haemoglobin</li> <li>• Blood group</li> </ul>	<b>5</b>	Describe, illustrate and explain and apply the knowledge of compound microscope, arterial pulse, BP, haemoglobin, blood group.	1,2, 3,4

**TEXTBOOKS:**

1. A book of Physiology, Dr, Khurana Medical Physiology, Guyton and Hall

**REFERENCE BOOKS:**

1. Review of Medical Physiology–Ganong William F. Physiological basis of Medical practice–Best & Taylor

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of human body, cell structure and organelle, tissues and functions.	<b>1, 8</b>
<b>2</b>	Able to explain the blood volume and body fluids.	<b>1,8</b>
<b>3</b>	Learn the basic knowledge of the digestive system.	<b>1,2, 8</b>
<b>4</b>	Apply knowledge of the general organization, mechanics of respiratory system.	<b>1,8</b>
<b>5</b>	Demonstrate a comprehensive understanding the cardiovascular system.	<b>1,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT112R	Physiology-I	3		2					3

Semester – I									
Course Title	Biochemistry- I								
Course code	22BDIT113R	Total credits: 5 Total hours: 60T+ 5P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 1 <sup>st</sup> semester of first year of the programme								
Course Objectives (Minimum 3)	1. To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body fluids. 2. To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body fluids. 3. Able to apply the knowledge of acid base balance.								
CO1	Able to explain the basic knowledge of carbohydrate.								
CO2	Able to explain the proteins along with biological significance								
CO3	Learn the basic knowledge of the classification and functions of lipids.								
CO4	Apply knowledge of the structure of DNA and RNA, function of DNA and RNA.								
CO5	Demonstrate a comprehensive understanding the basic ideas of acids, bases, Ph, buffer. acid base balance.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>CARBOHYDRATES:</b> Definition and Classification of carbohydrates. Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch and their sources. Biological significance of carbohydrate.	6	Describe, illustrate and explain basic knowledge of carbohydrate.				1,8		
II	<b>PROTEINS:</b> Definition of proteins along with biological significance. Amino acids and its classification. Essential and non-essential amino acids.	18	Describe, illustrate and explain the basic knowledge of protein.				1,8		
III	<b>LIPIDS:</b> Definition and classification of lipids. Classification of Fatty Acids. Example and functions of common lipids (Phospholipids, Glyco-lipids, Steroids).	16	Learn the comprehensive knowledge of lipids.				1,8		
IV	<b>NUCLEIC ACIDS:</b> Basic idea of the structure of DNA and RNA. Function of DNA and RNA.	10	Describe, illustrate and explain the nucleic acid.				1,8		

<b>V</b>	<b>ACID –BASE BUFFERS:</b> Basic ideas of acids, bases, Ph, buffer. Acid base balance.	<b>10</b>	Describe, illustrate and explain the acid base buffers.	1,8
<b>Practical</b>	1. Identification test for mono and disaccharides. 2. Identification test for proteins, precipitation reaction Heller's test	<b>5</b>	Describe, illustrate and explain and apply the knowledge of mono disaccharides, proteins, precipitation reaction and Heller's test.	1,2,3,4

**TEXTBOOKS:**

1. Lehninger Principles of Biochemistry by David L Nelson and Michael M Cox.
2. Biochemistry by U Satyanaryana and U Chakrapani.

**REFERENCE BOOKS:**

1. Haper's Illustrated Biochemistry by Robert Murray, Daryl K Granner et al.
2. Biochemistry by Lubert Stryer, Jeremy M Berg, et al.
3. Biochemistry by David E Metzler.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of carbohydrate.	<b>1, 8</b>
<b>2</b>	Able to explain the proteins along with biological significance	<b>1,8</b>
<b>3</b>	Learn the basic knowledge of the classification and functions of lipids.	<b>1,3, 8</b>
<b>4</b>	Apply knowledge of the structure of DNA and RNA, function of DNA and RNA.	<b>1,8</b>
<b>5</b>	Demonstrate a comprehensive understanding the basic ideas of acids, bases, Ph, buffer. acid base balance.	<b>1,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT113R	Biochemistry-I	3		3					3

Semester – I									
Course Title	Hospital Duty and Patient Care-I								
Course code	22BDIT114R	Total credits: 2 Total hours: 52T	L	T	P	S	R	O/F	C
			2	0	2	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 1 <sup>st</sup> semester of first year of the programme								
Course Objectives (Minimum 3)	<p>1. The study of hospital duty and patient care is aimed at imparting a knowledge in providing patient care, meeting the highest standards of professional level of quality and efficiency prevailing in the society.</p> <p>2. To provide comprehensive knowledge about hospital and patient management.</p> <p>3. Able to learn about the vital signs in human body.</p>								
CO1	Able to explain the basic knowledge of hospital and records & reports.								
CO2	Able to explain the first aid.								
CO3	Learn the basic knowledge of hygiene and basic care needs of patients' personal hygiene and maintenance.								
CO4	Apply knowledge of the laboratory safety.								
CO5	Demonstrate a comprehensive understanding the vital signs of patient's body.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Hospital And Records &amp; Reports:</b> Definition and Functions of Hospitals Classification, Organization and Departments of Hospitals Management of Hospitals Definition of Records and Reports Different types of Records and Reports Values Objectives and Maintenance of records Principle of good record writing Difference of records & reports.	10	Describe, illustrate and explain basic knowledge of Hospital And Records & Reports.				1,8		

<p><b>II</b></p>	<p><b>First Aid:</b> Aims &amp; objectives of first aid  Priorities of first aid  Golden rules of first aid  Qualities &amp; responsibilities of first aider  Simple first aid measures in selected conditions like–  Food poisoning Snake bite  Scorpion bite Dog bite  Foreign bodies in various organs  burns &amp; haemorrhage.</p>	<p><b>8</b></p>	<p>Describe, illustrate and explain the basic knowledge of first aid</p>	
<p><b>III</b></p>	<p>Hygiene and basic care needs of patient's personal hygiene and maintenance of hygiene maintaining therapeutic environment safety factors for patients such as safety from mechanical injury, thermal &amp; chemical injury, radiation &amp; bacteriological injury, safety from allergens. Different positions of the body: supine position, prone position, cardiac position, lateral, position.</p>	<p><b>8</b></p>	<p>Learn the comprehensive knowledge of hygiene and basic care needs of patients personal hygiene and maintenance.</p>	<p>1,8</p>
<p><b>IV</b></p>	<p>Safety in the laboratory common laboratory accidents from physical injuries electrical shock chemical injury bleeding burn eye accidents biological hazards.</p>	<p><b>8</b></p>	<p>Describe, illustrate and explain the Safety In the laboratory.</p>	<p>1,8</p>
<p><b>V</b></p>	<p><b>Vital signs Of Patients Body:</b>  Temperature, Maintenance of body temperature Factors influencing body temperature. Different types off ever Stages of rigor Management of pyrexia Pulse Common pulse sites Factors influencing pulse rate. Characteristics of Pulse Abnormal pulses Reading of pulse Blood Pressure, Definition, Factors influencing B.P. Abnormalities of B.P. Recording of B.P.  Respiration, Regulation of respiration, Factors causing variations in respiration, Abnormal respirations, Reading of respiratory rate. Different methods of artificial respiration.</p>	<p><b>8</b></p>	<p>Describe, illustrate and explain the Vital signs Of Patients Body.</p>	<p>1,8</p>

**TEXTBOOKS:**

1. Fundamentals of Hospital Practice and Patients care by Vyakarnam Nageshwer

**REFERENCE BOOKS:**

1. Primary Health Care People, Practice, Place by Valorie Crooks, GavinJ. Andrews. Ashgate, Farnham, United Kingdom

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of hospital and records & reports.	<b>1, 3, 5, 8</b>
<b>2</b>	Able to explain the first aid.	<b>1, 2, 3, 5, 6, 8</b>
<b>3</b>	Learn the basic knowledge of Hygiene and basic care needs of patients personal hygiene and maintenance.	<b>1, 2, 3, 5, 6, 7,8</b>
<b>4</b>	Apply knowledge of the laboratory safety.	<b>1, 3, 4, 5, 8</b>
<b>5</b>	Demonstrate a comprehensive understanding the vital signs of patient body.	<b>1, 2, 3, 4, 5, 6,7, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO 1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT114R	Hospital Duty and Patient Care I	3	3	3	2	2	2	2	3



Semester – I									
Course Title	Basic English (Communicative English & Soft Skills)								
Course code	22UBPD111R	Total credits: 5 Total hours: 34	L	T	P	S	R	O/F	C
			2	0	2	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 1 <sup>st</sup> semester of first year of the programme								
Course Objectives (Minimum 3)	1. To introduce the students to the basics of English grammar and their application. 2. To enhance communication skills through list ending and speaking exercises. 3. To learn and understand the importance of pronunciation of words.								
CO1	Able to explain the application of grammatical rules will enable the student's to improve the speaking and writing skills.								
CO2	Able to explain the language effectively.								
CO3	Apply the basic knowledge of both listening and speaking skills.								
CO4	Able to apply their vocabulary and use of words.								
CO5	Demonstrate a comprehensive understanding the concept of communication, its importance and barriers.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Grammar:</b> Parts of Speech ii. Articles Affirmative and Negative Sentences	6	Describe, illustrate and explain basic knowledge of parts of speech, articles, affirmative and negative sentences				1,8		
II	<b>Grammar:</b> Determiners Sentence, Construction from jumbled words, Types of Sentences (Assertive Imperative etc.)	6	Describe, illustrate and explain the basic knowledge of Determiners, Sentence Construction from jumbled words				1,8		
III	<b>Building Vocabulary:</b> Synonyms & Antonyms	8	Learn the comprehensive knowledge of synonyms and antonyms				1,8		
IV	<b>Speaking Skills:</b> Introduction and greetings pronunciation asking and offering information video recording for self-analysis	6	Able to apply the speaking skills.				1,8		

<b>V</b>	<b>Communication Skills:</b> Introduction to communication, importance of communication skills, purpose of communication, types of communication, barriers to communication, how to improve/tips to improve communication skills	<b>8</b>	Describe, illustrate and explain the communication skills.	1,8
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**TEXT BOOKS:**

1. Wren & Martin. (2017).High School English Grammar and Composition. S. Chand Publishing.
2. Pal, Rajendra. Suri, Premlata (2022).English Grammar & Composition. Sultan Chand and Sons Publishing.
3. Debnath, Adhir.(2018).A Textbook of English Grammar and Composition. BinaLibray Reference Books:
4. Mitra,Barun.(2016)PersonalityDevelopmentandSoftSkills2/E,OxfordUniversity Press
5. Murphy, Raymond,.(2012)English Grammar in Use Book with Answers: A Self-Study and Practice Book for Intermediate Learners of English, Cambridge University Press

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Able to explain the application of grammatical rules will enable the student's to improve the speaking and writing skills.	<b>1, 7, 8</b>
<b>2</b>	Able to explain the language effectively.	<b>1, 7, 8</b>
<b>3</b>	Apply the basic knowledge of both listening and speaking skills.	<b>1, 7,8</b>
<b>4</b>	Able to apply their vocabulary and use of words.	<b>1, 7, 8</b>
<b>5</b>	Demonstrate a comprehensive understanding the concept of communication, its importance and barriers.	<b>1, 7, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO 1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22UBPD111R	Basic English	3						3	3

Semester – I									
Course Title	Extra-Curricular activities								
Course code	22UBEC111	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 15	0	0	0	4	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. It is to develop the social and soft skills and to promote a holistic development of the learners.</li> <li>2. Able to represent ADTU in various inter university, state and national level competitions.</li> <li>3. Able to participate in regular club activities like workshops, competitions as per their interest and hobbies.</li> </ol>								
CO1	Able to engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.								
CO2	Able to participate in regular club activities like workshops, competitions as per their interest and hobbies.								
CO3	Able to represent ADTU in various inter university, state and national level competitions.								
CO4	Able to earn from invited experts in their respective fields.								
CO5	Demonstrate an exposure of 360 degree learning methodology considering the overall growth along with the academics.								

Semester – II									
Course Title	Anatomy-II								
Course code	22BDIT12R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 66T+32P	3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 2 <sup>nd</sup> semester of first year of the programme								
Course Objectives (Minimum 3)	1. To study the basic anatomical structure of human body. 2. To provide a comprehensive concept of all the anatomical systems of the human body. 3. To have knowledge on nervous system.								
CO1	Able to explain the urinary system.								
CO2	Able to explain the pelvis and reproductive system.								
CO3	Learn the comprehensive knowledge of nervous system.								
CO4	Apply knowledge of sensory organ.								
CO5	Demonstrate a comprehensive understanding the lymphatic system.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Urinary System:</b> Structure of kidney, ureter, urinary bladder, male and female urethra.	10	Describe, illustrate and explain the urinary system.				1,8		
II	<b>Pelvis And Reproductive System:</b> General description of pelvic organs , Structure of male and female reproductive organs. Structure of breast.	16	Describe, illustrate and explain the pelvis and reproductive system.				1,8		
III	<b>Nervous System:</b> Classification of Nervous system. Central Nervous system – Brain and Spinal cord, blood supply of brain. Spinal nerves and Cranial nerves. Autonomic nervous System.	18	Describe, illustrate and explain the nervous system.				1,8		
IV	<b>SENSORY ORGAN:</b> Skin, Eye, Ear, Nose, Tongue	18	Describe, illustrate and explain the sensory organ.				1,8		
V	<b>Lymphatic System:</b> Lymphatic vessels	4	Describe, illustrate and explain the lymphatic system.				1,8		

<b>Practical</b>	Study of human bones (pelvic bones and bones of lower limbs.	32	Describe, illustrate and explain the human bones (pelvic Bones and bones of lower limbs.	1,2,3,4
	Study of human organs, Brain, heart, Lung, liver, Kidney, Spleen		Describe, illustrate and explain the human organs, Brain, heart, Lung, liver, Kidney, and Spleen.	

**TEXT BOOKS:**

1. Text Book of Anatomy and Physiology By Ross and Wilson

**REFERENCEBOOKS:**

1. Anatomy and Physiology By Inderbir Singh

**OTHERLEARNING RESOURCES:**

1. <https://www.khanacademy.org/science/biology/human-biology>
2. <https://open.oregonstate.education/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the urinary system.	1, 8
2	Able to explain the pelvis and reproductive system.	1,8
3	Learn the comprehensive knowledge of nervous system.	1,8
4	Apply knowledge of sensory organ.	1,8
5	Demonstrate a comprehensive understanding the lymphatic system.	1,8

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT121R	Anatomy- II	3							3

Semester – II									
Course Title	Physiology-II								
Course code	22BDIT12R	Total credits: 5 Total hours: 66T+ 32P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 2 <sup>nd</sup> semester of first year of the programme								
Course Objectives (Minimum 3)	1. To understand the underlined mechanism that work to keep the human body alive and functioning. 2. To provide a comprehensive concept of all physiological systems of the human body. 3. To have knowledge on immunological system.								
CO1	Able to explain the endocrine system.								
CO2	Able to explain the excretory system.								
CO3	Learn the comprehensive knowledge of reproductive system.								
CO4	Apply knowledge of nervous system and muscle.								
CO5	Demonstrate a comprehensive understanding the lymphatic and immunological system.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Endocrine System:</b> Structure and hormones of endocrine glands, pituitary, thyroid, parathyroid, Pancreas, Adrenal, testes and ovary. Functions and regulation of secretion of hormones.	10	Describe, illustrate and explain the urinary system.					1,8	
II	<b>Excretory System:</b> Structure and functions of kidneys, nephron, ureter, urinary bladder and urethra. Urine formation. Renal function tests. Structure of breast. kidneys, nephron, ureter, urinary bladder and urethra. Urine formation. Renal function tests. Structure of breast.	16	Describe, illustrate and explain the pelvis and reproductive system.					1,8	
III	<b>Reproductive System:</b> Male and female reproductive organs and changes during puberty. Menstrual cycle, ovulation. Physiological changes during pregnancy, Placenta and placental circulation.	18	Describe, illustrate and explain the nervous system.					1,2	

<b>IV</b>	<b>Nervous System And Muscle:</b> Organization of nervous system, structure and function of muscle and nerve cells. Functions of brain, spinal cord, cranial and spinal nerves, motor system. sensory system. ANS Synapse, neuromuscular transmission reflex arc, reflex action and reflexes, cerebro-spinal fluid, special senses:- Functions of skin, eye, ear, nose, tongue.	<b>18</b>	Describe, illustrate and explain the sensory organ.	1,2
<b>V</b>	<b>Lymphatic And Immunological System:</b> Lymph glands and circulation of lymph spleen structure and function Immunity – Formation of T-cells and B- cells, Antigen, Antibody and Immune response.	<b>4</b>	Describe, illustrate and explain the lymphatic system.	1,2
<b>Practical</b>	Blood Group, ESR , DLC Total count RBC and WBC	<b>32</b>	Demonstration the blood group, , ESR , DLC , Total count RBC and WBC	1,2,3,4

#### TEXT BOOKS:

1. Text Book of Anatomy and Physiology by Ross and Wilson

#### REFERENCEBOOKS:

1. Anatomy and Physiology By Inderbir Singh

#### OTHER LEARNING RESOURCES:

1. <https://www.khanacademy.org/science/biology/human-biology>
2. <https://open.oregonstate.edu/>

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOM

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Able to explain the endocrine system.	<b>1, 8</b>
<b>2</b>	Able to explain the excretory system.	<b>1,8</b>
<b>3</b>	Learn the comprehensive knowledge of reproductive system.	<b>1,8</b>
<b>4</b>	Apply knowledge of nervous system and muscle.	<b>1,8</b>
<b>5</b>	Demonstrate a comprehensive understanding the lymphatic and immunological system.	<b>1,8</b>

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT122R	Physiology- II	3							3



Semester – II									
Course Title	Biochemistry-II								
Course code	22BDIT123R	Total credits: 5 Total hours:48T+ 32P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 2 <sup>nd</sup> semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body fluids.</li> <li>To impart the knowledge on protein's metabolism.</li> <li>To have a comprehensive understanding about the vitamins and minerals.</li> </ol>								
CO1	Able to explain the basic knowledge of enzymes metabolism.								
CO2	Able to explain the carbohydrates metabolism.								
CO3	Learn the basic knowledge of the protein's metabolism.								
CO4	Apply knowledge of lipid metabolism.								
CO5	Express a comprehensive understanding the vitamins and minerals.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	ENZYMES; Definition and classification of enzyme. Basic idea of co-enzyme, iso-enzyme. Mechanism of enzyme Action. Factors affecting enzyme action	6	Describe, illustrate and explain basic knowledge of enzymes.					1,2	
II	CARBOHYDRATES METABOLISM: Glycolysis Kreb's Cycle Glyconeogenesis, Glcogenesis Glcogenolysis	10	Describe, illustrate and explain the basic knowledge of carbohydrates metabolism					1,2	
III	PROTEIN METABOLISM: Transudation Determination Urea Cycle and its Significance	10	Learn the comprehensive knowledge of protein metabolism.					1,2	
IV	LIPID METABOLISM: $\beta$ oxidation of Fatty Acids. Ketone bodies Ketosis and keto-acidosis.	10	Describe, illustrate and explain the lipid metabolism					1,2	
V	VITAMINS AND MINERALS: : Definition and classification of vitamins according to solubility. Sources and functions of individual vitamins. Deficiency. Individual minerals (calcium, phosphorus, iron, magnesium flu slide, copper , selenium, molybdenum etc) – their sources, function and properties. Liver function test. Renal function test.	12	Describe, illustrate and explain the vitamins and minerals					1,2	

Practical	Identification test for mono and di-saccharides. Identification test for proteins. Precipitation Reaction Heller's Test, Heat and Acidic Test. Indemnification test for lipids (solubility test)	32	Describe, illustrate and explain and apply the knowledge of monodi-saccharides, proteins, precipitation reaction, lipids and Heller's test, heat and acidic test,	1,2,3,4
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**TEXT BOOKS:**

1. Lehninger Principles of Biochemistry” by David L Nelson and Michael M Cox Biochemistry” by U Satyanaryana and U Chakrapani

**REFERENCE BOOKS:**

1. Haper’s Illustrated Biochemistry by Robert Murray, Daryl K Granner et al. Biochemistry by Lubert Stryer, Jeremy M Berg, Biochemistry by David E Metzler.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the basic knowledge of enzymes metabolism.	1, 8
2	Able to explain the carbohydrates metabolism.	1,8
3	Learn the basic knowledge of the protein’s metabolism.	1,2, 8
4	Apply knowledge of lipid metabolism.	1,8
5	Demonstrate a comprehensive understanding the vitamins and minerals.	1,8

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	*PO	PO4	PO5	PO6	PO7	*PO8
		*		3					
22BDIT123R	Biochemistry-II	3							3

**Semester – II**

<b>Semester – II</b>									
<b>Course Title</b>	<b>Hospital Duty and Patient Care- II</b>								
<b>Course code</b>	<b>22BDIT124R</b>	<b>Total credits: 5</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 42T</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 2<sup>nd</sup> semester of first year of the programme</b>								
<b>Course Objectives (Minimum-3)</b>	1. The study of HDPC is aimed at imparting a knowledge in providing patient care, meeting the highest standards of professional level of quality and efficiency prevailing in the society 2. To provide comprehensive knowledge about hospital and patient management. 3. To have a comprehensive understanding the laboratory investigation and laboratory setup.								
<b>CO1</b>	Able to explain the basic knowledge of poisoning.								
<b>CO2</b>	Able to explain the medical professional and legal hazards of medical profession.								
<b>CO3</b>	Learn the basic knowledge of shock.								
<b>CO4</b>	Apply knowledge of hyperglycemia and hypoglycaemia.								
<b>CO5</b>	Demonstrate a comprehensive understanding the laboratory investigation and laboratory setup.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Poisoning:</b> Definition, Causes of poisoning, Sources Of Poisoning, Symptoms of poisoning, First aid & Management, Antidotes, Common drugs poisoning, Carbon monoxide poisoning	<b>10</b>	Describe, illustrate and explain basic knowledge of poisoning.					<b>1,8</b>	
<b>II</b>	<b>Medical Professional and legal Hazards of Medical Profession:</b> Qualities and Function of medical Professional Ethics of Medical Profession Malpractice Civil negligence Clinical negligence Corporate negligence Consumer protection Act for medical Professional Act of commission, rashness, negligence & damage advantage & disadvantage of act and legal hazards of medical profession.	<b>8</b>	Describe, illustrate and explain the basic knowledge of medical professional					<b>1,8</b>	
<b>III</b>	<b>Shock:</b> Definition, Types of shock, General Features of shock, Investigations of shock , Initial management & first aid of shock	<b>8</b>	Learn the comprehensive knowledge of shock.					<b>1,8</b>	

<b>IV</b>	<b>Hyperglycemias and Hypoglycaemia:</b> Definition, Clinical features, Diabetes laboratory diabetes Different types of glycosuria, Ketone bodies, Glucose tolerance test. Definition, Etiology, Clinical Features, Investigation and Management Hypoglycaemia	<b>8</b>	Describe, illustrate and explain the hyperglycemia and hypoglycemia.	1,8
<b>V</b>	<b>Laboratory Investigation and Laboratory Setup:</b> Preparation of patients and equipments, Collection of Specimen of urine, stool, sputum, blood, CSF, Pericardial fluid, Peritoneal fluid, Pleural fluid, etc. Laboratory design and management, different laboratories.	<b>8</b>	Describe, illustrate and explain the laboratory investigation and laboratory setup.	1,8

#### TEXT BOOKS:

1. Fundamentals of Hospital Practice and Patients care by Vyakarnam Nageshwer

#### REFERENCE BOOKS:

1. Primary Health Care People, Practice, Place by Valorie A. Crooks, Gavin J. Andrews. Ashgate, Farnham, United Kingdom

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the basic knowledge of hospital and records & reports.	1, 3, 5, 8
2	Able to explain the first aid.	1, 2, 3, 5, 6, 8
3	Learn the basic knowledge of hygiene and basic care needs of patient personal hygiene and maintenance.	1, 2, 3, 5, 6, 7,8
4	Apply knowledge of the laboratory safety.	1, 3, 4, 5, 8
5	Demonstrate a comprehensive understanding the vital signs of patient body.	1, 2, 3, 4, 5, 6,7, 8

### MAPPING TABLE

Course code	Course Name	PO 1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT124R	Hospital Duty And Patient Care- II	3	3	3		2	3	3	3

Semester – II									
Course Title	Clinical Dialysis I								
Course code	22BDIT125R	Total credits: 2 Total hours: 16	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 2 <sup>nd</sup> semester of first year of the programme								
Course Objectives (Minimum 3)	1. Able to explain the personal safety in the dialysis unit/lab. 2. Apply knowledge of clinical instrumentation. 3. Able to understanding the biochemical tests for kidney profile.								
CO1	Able to explain the basic knowledge of code of conduct of the hospital.								
CO2	Able to explain the personal safety in the dialysis unit/lab.								
CO3	Learn the basic knowledge of basic laboratory instrumentation.								
CO4	Apply knowledge of clinical instrumentation.								
CO5	Demonstrate a comprehensive understanding the biochemical tests for kidney profile.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	Code of conduct of the hospital	2	Describe, illustrate and explain basic knowledge of code of conduct of the hospital					1,8	
II	Personal safety in the dialysis unit/lab	2	Describe, illustrate and explain the basic knowledge of personal safety in the dialysis unit/lab.					1,8	
III	Basic laboratory instrumentation	4	Learn the comprehensive knowledge of basic laboratory instrumentation					1,2	
IV	Clinical instrumentation	4	Describe, illustrate and explain the clinical instrumentation					1,2	
V	Biochemical tests for kidney profile	4	Describe, illustrate and explain the biochemical tests for kidney profile					1,2	

**TEXT BOOKS:**

1. Handbook for Dialysis Technician Dr. Anjani Sharma(Author), Faswal Pichan (Author)
2. Textbook on Renal Dialysis Technology By Dr. B. C. Bhagavan. New Delhi, India

**REFERENCE BOOKS:**

1. Davidson's Principles and Practice Of Medicine /24<sup>th</sup> 2<sup>nd</sup> Edition new York USA.
2. Henrich's Principles and Practice of Dialysis,5/e Hardcover by Matthew R. Weir Edgar  
L. Lerma, Austin, Texas ,USA

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of code of conduct of the hospital.	<b>1, 8</b>
<b>2</b>	Able to explain the personal safety in the dialysis unit/lab.	<b>1, 2, 3,4, 5, 6, 7,8</b>
<b>3</b>	Learn the basic knowledge of basic laboratory instrumentation.	<b>1, 3, 4,5, 6, 8</b>
<b>4</b>	Apply knowledge of clinical instrumentation.	<b>1, 3, 4, 8</b>
<b>5</b>	Demonstrate a comprehensive understanding the Biochemical tests for kidney profile.	<b>1, 3, 4,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT125R	Clinical Dialysis I	3	2	3	3	2			3

**Semester – II**

<b>Course Title</b>	<b>Effective English</b> (Communicative English & Soft Skills)								
<b>Course code</b>	<b>22UBPD121R</b>	<b>Total credits: 2</b> <b>Total hours: 34</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 2<sup>nd</sup> semester of first year of the programme</b>								
<b>Course Objectives (Minimum3)</b>	1. To enable students to learn and understand the different types of sentences. 2. To strengthens vocabulary of the students which will help in their writing and speaking. 3. To introduce with the Time Management technique.								
<b>CO1</b>	Able to explain the basic knowledge of grammar.								
<b>CO2</b>	Able to explain the vocabulary.								
<b>CO3</b>	Learn the basic knowledge of reading skills.								
<b>CO4</b>	Apply knowledge of conflicts management.								
<b>CO5</b>	Demonstrate a comprehensive understanding the time management skills.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Grammar:</b> Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences, Types of Tenses Common Errors	<b>6</b>	Describe, illustrate and apply the analyze and use the techniques in language use.					1,8	
<b>II</b>	<b>Vocabulary:</b> Homonyms Homophones	<b>6</b>	Describe, illustrate and explain the basic knowledge of communication and be have oral skills will boost their self reliance.					1,8	
<b>III</b>	<b>Reading Skills:</b> Techniques of effective reading gathering ideas and information from a text	<b>8</b>	Learn the comprehensive knowledge of the effective and efficient utilization of the time.					1,8	
<b>IV</b>	<b>Conflict Management:</b> Definition, type of conflict management effects of conflict management	<b>6</b>	Describe, illustrate and explain the strengthen their vocabulary and use of words.					1,8	
<b>V</b>	<b>Time-Management Skills:</b> Introduction to time Management, Basic tips to maintain time.	<b>8</b>	Describe, illustrate and explain the concept of communication, its importance and barriers.					1,8	



**TEXT BOOKS:**

1. Wren,P.CandMartin,H.1995.High School English Grammar and Composition, S Chand Publishing.
2. Barrett,Grant.2016.Perfect English Grammar: The Indispensible Guide to Excellent Writing and Speaking, Zephyrus Press.

**REFERENCE BOOKS:**

1. Swan,Michael.,(2014)PracticalEnglishUsage,CambridgeUniversityPress
2. TaylorJ.andWright,J.,IELTSAvantageReadingSkills:Astep-by-stepguidetoa high IELTS reading score , Delta Publishing by Klett.

**OTHER LEARNING RESOURCES:**

1. <https://clockify.me/time-management-techniques>
2. <https://www.peoplehum.com/glossary/conflict-management>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the basic knowledge of grammar.	1, 8
2	Able to explain the vocabulary.	1, 7,8
3	Learn the basic knowledge of reading skills.	1, 8
4	Apply knowledge of conflicts management.	1, 8
5	Demonstrate a comprehensive understanding the time management skills.	1, 8

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22UBPD121R	Effective English	3						2	3

<b>Semester – II</b>									
<b>Course Title</b>	<b>Co-Curricular activities</b>								
<b>Course code</b>	<b>22UBCC121</b>	<b>Total credits: 1 Total hours: 15</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 2<sup>nd</sup> semester of first year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. 2. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. 3. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.								
<b>CO1</b>	Able to engaged in co-curricular activities facilitate in the development of various domains of mind and personality such as, emotional development, social development, moral development and aesthetic development.								
<b>CO2</b>	Able to participate in Creativity, Enthusiasm, and Energetic, Positive thinking.								
<b>CO3</b>	Able to learn the intellectual development.								
<b>CO4</b>	Able to apply the personality development.								
<b>CO5</b>	Demonstrate an exposure the extracurricular activities.								

**Semester – II**

<b>Semester – II</b>									
<b>Course Title</b>	<b>Extra-Curricular Activities</b>								
<b>Course code</b>	<b>22UBEC121</b>	<b>Total credits: 1 Total hours: 15</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 2<sup>nd</sup> semester of first year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. Extra-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities.</li> <li>2. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning.</li> <li>3. Extra-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.</li> </ol>								
<b>CO1</b>	Able to engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.								
<b>CO2</b>	Able to participate in regular club activities like workshops, competitions as per their interest and hobbies.								
<b>CO3</b>	Able to represent ADTU in various inter university, state and national level competitions.								
<b>CO4</b>	Able to learn from invited experts in their respective fields.								
<b>CO5</b>	Demonstrate an exposure of 360-degree learning methodology considering the overall growth along with the academics.								

<b>Semester – II</b>									
<b>Course Title</b>	<b>MOOC</b>								
<b>Course code</b>	<b>22MOCEU101/2/3/ 4/5</b>	<b>Total credits: 1 Total hours:15</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 2<sup>nd</sup> semester of first year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>									
<b>CO1</b>									
<b>CO2</b>									
<b>CO3</b>									
<b>CO4</b>									
<b>CO5</b>									

Semester – II									
Course Title	Universal human values (UHV)+Professional								
Course code	22UUHV104R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 38	1	0	2	4	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 2 <sup>nd</sup> semester of first year of the programme								
Course Objectives (Minimum3)	<p>1.To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings</p> <p>2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.</p> <p>3.To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature Thus, this course is intended to provide a much needed orientation input in value education to the young enquiring minds.</p>								
CO1	Able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify right or wrong, and referring to any external source like text or instrument or any other person cannot enable them to verify with authenticity; it will only develop assumptions.								
CO2	Able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.								
CO3	Able to see that lack of right understanding leading to lack of relationship is the major cause of problems in their family and not the lack of physical facilities in most of the cases, while they have given higher priority to earning of physical facilities in their life ignoring relationships and not being aware that right understanding is the most important requirement for any human being.								
CO4	Able to see that they can enlist their desires and the desires are not vague. Also they are able to relate their desires to 'I' and 'Body' distinctly. If any desire appears related to both, they are able to see that the feeling is related to I while the physical facility is related to the body.								
CO5	Able to see that 'I' and 'Body' are two realities, and most of their desires are related to 'I' and not body, while their efforts are mostly centered on the fulfilment of the needs of the body assuming that it will meet the needs of 'I' too.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<p><b>Course Introduction: Need, Basic Guidelines, Content and Process for Value Education:</b></p> <p>1. Understanding the need, basic guidelines, content and process for Value Education</p> <p>2. Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential</p>	10	Describe, illustrate and apply the analyze and use the value of education.				1,8		

	<p>Validation as the mechanism for self exploration</p> <ol style="list-style-type: none"> <li>3. Continuous Happiness and Prosperity-A look at basic Human Aspirations</li> <li>4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority.</li> <li>5. Understanding Happiness and Prosperity correctly-A critical appraisal of the current scenario. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.</li> </ol>			
<b>II</b>	<p><b>Understanding Harmony in the Human Being- Harmony in Myself!:</b></p> <ol style="list-style-type: none"> <li>1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'</li> <li>2. Understanding the needs of Self('I')and 'Body' -Sukh and Suvidha</li> <li>3. Understanding the Body as an instrument of 'I'(I being the doer, seer and enjoyer)</li> <li>4. Understanding the characteristics and activities of 'I' and harmony in 'I'</li> <li>5. Understanding the harmony of I with the Body: Sanyamand Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail Programs to ensure Sanyam and Swasthya-Practice Exercises and Case Studies will be taken up in Practice Sessions.</li> </ol>	<b>10</b>	Describe, illustrate and explain the basic knowledge of understanding harmony in the human being-harmony in myself.	1,8
<b>III</b>	<p><b>Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship:</b></p> <ol style="list-style-type: none"> <li>1. Understanding Harmony in the family-the basic unit of human interaction</li> <li>2. Understanding values in human relationship; meaning of Nyaya and program for its fulfilment to ensure Ubhaytripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship</li> <li>3. Understanding the meaning of Vishwas; Difference between</li> </ol>	<b>10</b>	Learn the comprehensive knowledge of the understanding harmony in the family and society-harmony in human- human relationship	1,8

	<p>intention and competence</p> <ol style="list-style-type: none"> <li>4. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship</li> <li>5. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay,</li> <li>6. Sah-astitvaas comprehensive Human Goals Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!-Practice Exercises and Case Studies will be taken up in Practice Sessions.</li> </ol>			
<b>IV</b>	<p><b>Understanding Harmony in the Nature and Existence - Whole existence as Co-existence:</b></p> <ol style="list-style-type: none"> <li>1. Understanding the harmony in the Nature</li> <li>2. Inter connect edness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature</li> <li>3. Understanding Existence as Coexistence (Sah-astitva) of mutually interacting unitsinall-pervasive space</li> <li>4. Holistic perception of harmony at all levels of existence-Practice Exercises and Case Studies will be taken up in Practice Sessions.</li> </ol>	<b>10</b>	Describe, illustrate and explain the understanding harmony in the nature and existence - whole existence as co-existence.	1,8
<b>V</b>	<p><b>Implications of the above Holistic Understanding of Harmony on Professional Ethics:</b></p> <ol style="list-style-type: none"> <li>1. Natural acceptance of human values</li> <li>2. Definitiveness of Ethical Human Conduct</li> <li>3. Basis for Humanistic Education,</li> <li>4. Humanistic Constitution and Humanistic Universal Order</li> </ol> <p>Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people friendly and eco- friendly production systems, c) Ability to identify and</p>	<b>8</b>	Describe, illustrate and explain the concept of implications of the above holistic understanding of harmony on professional ethics	1,8

	<p>develop appropriate technologies and management patterns for above production systems.</p> <p>5. Case studies of typical holistic technologies, management models and production systems</p> <p>6. Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers b) At the level of society: as mutually enriching institutions and organizations</p>			
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**TEXT BOOKS:**

1. The textbook R.R.Gaur, R Sangal, GP Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-17446781-2
2. The teacher's manual R.R.Gaur, R Sangal, GP Bagaria, A foundation course in Human Values and Professional Ethics – Teachers Manual, Excel books, New Delhi, 2010

**REFERENCE BOOKS:**

1. BL Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
2. PL Dhar, R.R.Gaur, 1990, Science and Humanism, Common wealth Publishers.
3. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991 Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins USA
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth, Club of Rome's Report, Universe Books.
5. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
6. A. Nagaraj, 1998, Jeevan Vidyaek Parichay, Divya Path Sansthan, Amarkantak.
7. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
8. A.N. Tripathy, 2003, Human Values, New Age International Publishers

**OTHER LEARNING RESOURCES:**

1. Value Education websites, <http://uhv.ac.in>, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA IIT Delhi, Modern Technology – the Untold Story



## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify right or wrong, and referring to any external source like text or instrument or any other person cannot enable them to verify with authenticity; it will only develop assumptions.	<b>1, 8</b>
<b>2</b>	Able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.	<b>1, 7,8</b>
<b>3</b>	Able to see that lack of right understanding leading to lack of relationship is the major cause of problems in their family and not the lack of physical facilities in most of the cases, while they have given higher priority to earning of physical facilities in their life ignoring relationships and not being aware that right understanding is the most important requirement for any human being.	<b>1, 8</b>
<b>4</b>	Able to see that they can enlist their desires and the desires are not vague. Also they are able to relate their desires to 'I' and 'Body' distinctly. If any desire appears related to both, they are able to see that the feeling is related to I while the physical facility is related to the body.	<b>1, 8</b>
<b>5</b>	Able to see that 'I' and 'Body' are two realities, and most of their desires are related to 'I' and not body, while their efforts are mostly centered on the fulfilment of the needs of the body assuming that it will meet the needs of 'I' too.	<b>1, 8</b>

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22UUHV101R	Universal human values (UHV)+ Professional	3						2	3

Semester – III									
Course Title	Applied Anatomy								
Course code	22BDIT211R	Total credits: 3 Total hours: 24T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 3 <sup>rd</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. The study of applied anatomy is aimed at imparting a knowledge in anatomy and its clinical importance's.</li> <li>2. To provide a comprehensive concept of blood supply of kidney.</li> <li>3. Able to apply the knowledge of cardiovascular system in human body.</li> </ol>								
CO1	Able to explain the basic knowledge of anatomy of urinary system gross structural anatomy of kidney.								
CO2	Able to explain the microscopic structure and histology of kidney.								
CO3	Learn the basic knowledge of basic blood supply of kidney								
CO4	Apply knowledge of peritoneum with its anatomical distribution and abdominal hernias.								
CO5	Demonstrate a comprehensive understanding the anatomy of cardiovascular system anatomy of heart.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Anatomy of Urinary System Gross structural anatomy of kidney Ureter, Bladder, Urethra, Prostate.  a. Surface marking of kidney and abnormalities of kidney.	8	Describe, illustrate and explain basic knowledge of anatomy of urinary system.					1,8	
II	Microscopic structure and histology of kidney.	4	Describe, illustrate and explain the basic knowledge of microscopic structure and histology of kidney.					1,8	
III	Blood supply of kidney	4	Learn the comprehensive knowledge of blood supply of kidney					1,8	
IV	Peritoneum with its anatomical distribution and abdominal hernias.	4	Describe, illustrate and explain the peritoneum with its anatomical distribution and abdominal hernias.					1,8	

V	Anatomy of cardiovascular system anatomy of heart (in detail) areas of auscultation. Upper Limb vessels and branches – origin, course, distribution and abnormalities. Neck vessels and branches – origin, course, distribution and abnormalities. <i>a.</i> Lower limb vessels: Femoral triangle and contents, Femoral vessels: origin, branches, course, distribution and abnormalities.	4	Describe, illustrate and explain the anatomy of cardiovascular system anatomy of heart.	1,8
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**TEXTBOOKS:**

- 1 Fundamentals of Anatomy By Pamela K Levangie, Cynthia C Norkin, JP Bros Medical Publishers, New Delhi.
- 2 Fundamentals of Medical Anatomy by Duane Knudson, 2nd ed. 2007 Publisher Springer

**REFERENCE BOOKS:**

- 1 Medical anatomy, JP Bros Medical Publishers, Bangalore, 1st Indian Ed 1997.
- 2 Clinical Anatomy, JP Bros Medical Publishers, Bangalore, 5<sup>th</sup> Ed 1996, 1<sup>st</sup> Indian Ed 1998.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the basic knowledge of anatomy of urinary system gross structural anatomy of kidney ureter, bladder, urethra, prostate.	1, 8
2	Able to explain the microscopic structure and histology of kidney.	1, 8
3	Learn the basic knowledge of basic blood supply of kidney	1, 8
4	Apply knowledge of peritoneum with its anatomical distribution and abdominal hernias.	1, 8
5	Demonstrate a comprehensive understanding the anatomy of cardiovascular system anatomy of heart.	1, 3, 4, 8

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	*PO 8
22BDIT211R	Applied Anatomy	3							3

**Semester – III**

Semester – III									
Course Title	Applied Physiology								
Course code	22BDIT212R	Total credits: 3 Total hours: 32	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 3 <sup>rd</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	1. The study of applied physiology is aimed at imparting a knowledge in renal physiology and fluid homeostasis 2. To provide a comprehensive concept of all anatomy of human body of applied physiology. 3. Able to apply the knowledge of acid base balances.								
CO1	Able to explain the basic knowledge of renal circulation.								
CO2	Able to explain the mechanisms of urine formation and micturition,								
CO3	Learn the basic knowledge of physiology values.								
CO4	Apply knowledge of haemostasis.								
CO5	Demonstrate a comprehensive understanding the basic principles of acid base balance and physiological effects.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Renal Circulation – Factors contributing and modifying and Auto regulation of renal circulation.	4	Describe, illustrate and explain basic knowledge of renal circulation					1,8	
II	Mechanisms of Urine Formation and Micturition –Factors affecting urine formation Glomerular Filtration (GFR),	9	Describe, illustrate and explain the basic knowledge of Mechanisms of Urine Formation and Micturition					1,8	
III	Physiology Values: a. Composition of Urine and 24 hours indices – urea, creatinine electrolytes, calcium, magnesium. b. Values of Urea, creatinine, electrolytes, calcium, phosphorous, uric acid, magnesium, glucose in blood. Clearance Studies.	4	Learn the comprehensive knowledge of physiology values					1,8	
IV	Haemostasis: Coagulation cascade, coagulation factors, auto regulation, BT,CT,PT,PTT, Thrombine time.	5	Describe, illustrate and explain the haemostasis					1,8	

<b>V</b>	Basic principles of Acid base balance and common abnormalities like hypokalemia, hyperkalemia, hyponatremia, hypernatremia, hypocalcemia, hypercalcemia, hypoglycemia, hyperglycemia, PH. Hormones produced by Kidney and their physiological effects.	<b>10</b>	Describe, illustrate and explain the basic principles of acid base balance and physiological effects.	1,8
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**TEXTBOOKS:**

1. A book of Physiology, Dr. Khurana
2. Medical Physiology, Guyton and Hall

**REFERENCEBOOKS:**

1. Review of Medical Physiology–Ganong William F.
2. Physiological basis of Medical practice–Best & Taylor

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of renal circulation.	<b>1, 8</b>
<b>2</b>	Able to explain the mechanisms of urine formation and micturition	<b>1, 8</b>
<b>3</b>	Learn the basic knowledge of physiology values	<b>1, 8</b>
<b>4</b>	Apply knowledge of haemostasis.	<b>1, 8</b>
<b>5</b>	Demonstrate a comprehensive understanding the basic principles of acid base balance and physiological effects.	<b>1, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT212R	Applied Physiology	3							3

**Semester – III**

Semester – III									
Course Title	Applied Biochemistry								
Course code	22BDIT213R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours:17T+ 32P	3	0	0	0	0	0	3
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 3 <sup>rd</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body fluids.</li> <li>Able to learn about the laboratory apparatus.</li> <li>Able to understand the basic knowledge of quality control accuracy, precision, specificity, sensitivity</li> </ol>								
CO1	Able to explain the basic knowledge of specimen collections.								
CO2	Able to explain the quality control.								
CO3	Learn the laboratory apparatus and instruments								
CO4	Demonstrate preparation of buffer solutions using Ph meter.								
CO5	Demonstrate a comprehensive understanding the procedure for routine screening of urine								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Specimen collections Pre-Analytical variable, collection of blood, CSF and other body fluids (Urine collection). Use of preservatives and anticoagulants.	4	Describe, illustrate and explain basic knowledge of specimen collections					1,8	
II	Quality Control Accuracy, precision, specificity, sensitivity, Limits of error, allow able in laboratory, percentage error, normal values and interpretations	5	Describe, illustrate and explain the basic knowledge of quality control					1,8	
III	Introduction to laboratory apparatus and Instruments Water Distillation plant: Definition, Use, care and maintenance Centrifuge: Definition, principle, use, care and maintenance. Different types of centrifuge Laboratory Balances: Types of Balance: Manual balance (single pan, double pan, trip balance) and Direct read out electrical balance. Use, care, maintenance and precautions to be taken while weighing. Colorimeter and spectrophotometer: Principle, use, care and maintenance.	8	Learn the comprehensive knowledge of laboratory apparatus and instruments					1,3,8	

	Cuvette: significance of cuvette in colorimeter, visible and UV spectrophotometer. pH meter: principle, parts, types of electrode. Use, care, maintenance and precautions.			
<b>Practical</b>	Introduction of glass wares, plastic wares and laboratory wares	2	Describe, illustrate and explain the glass wares, plastic wares and laboratory wares	1,8
	Preparation of buffer solutions using pH meter.	4	Describe, illustrate and explain the Preparation of Buffer solutions using pH meter.	1,8
	Analysis of normal urine	6	Describe, illustrate and explain the analysis of normal urine	1,2,3
	Analysis of abnormal components of urine	6	Describe, illustrate and explain the analysis of abnormal components of urine	1,2,3
	Procedure for routine screening of urine	2	Describe, illustrate and explain the procedure for routine screening of urine	1,2,3
	Estimation of blood sugar	3	Describe, illustrate and explain the estimation of blood sugar	1,2,3
	Estimation of blood urea	3	Describe, illustrate and explain the estimation of blood urea	1,2,3
	Estimation of electrolytes	2	Describe, illustrate and explain the estimation of electrolytes	1,2,3
	Demonstration of urine analysis strip	2	Describe, illustrate and explain to demonstration of urine analysis strip	1,2,3
Demonstration of glucometer	2	Describe, illustrate and explain the demonstration of glucometer	1,2,3	

#### **TEXTBOOKS:**

1. Lehninger Principles of Biochemistry” by David L Nelson and Michael M Cox
2. Biochemistry” by U Satyanaryana and U Chakrapani
3. Text book of Biochemistry by Dr. D. M. Vasudevan, SreekumariS., Jaypee Publishers, New Delhi

#### **REFERENCEBOOKS:**

1. Haper’s Illustrated Biochemistry by Robert Murray, Daryl K Granner et al.
2. Biochemistry by Lubert Stryer, Jeremy M Berg, et al.
3. Biochemistry by David E Metzler.
4. Biochemistry by V. Satyanarayan, Books and Allied Pvt. Ltd. Calcutta
5. Textbook of Medical Biochemistry By Chatterjee and Shinde
6. Text of Medical Laboratory Technology By Prafula Godkar



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of specimen collections.	<b>1, 8</b>
<b>2</b>	Able to explain the quality control.	<b>1, ,8</b>
<b>3</b>	Learn the laboratory apparatus and instruments.	<b>1, 3,8</b>
<b>4</b>	Demonstrate preparation of buffer solutions using pH meter.	<b>1, 3,4,8</b>
<b>5</b>	Demonstrate a comprehensive understanding the procedure for routine screening of urine.	<b>1, 3,4,8</b>

**MAPPING TABLE**

Course code	Course Name	PO 1*	PO2	PO3	PO4	PO5	PO6	PO7	*PO 8
22BDIT213R	Applied Biochemistry	3		2	2				3

Semester – III									
Course Title	Pathology								
Course code	22BDIT215R	Total credits: 3 Total hours:48T+ 29P	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 3 <sup>rd</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	1. To impart the knowledge pathology cellular adaptation .cell injury & cell death 2. To learn about the technical aspects of pathological studies specially focusing on the clinical findings in various body fluids. 3. To impart of renal function test.								
CO1	Able to explain the basic knowledge of pathology cellular adaptation .cell injury & cell death								
CO2	Able to explain the hemodynamic disorder, thrombo embolic disease shock								
CO3	Learn the basic knowledge of Neoplasia.								
CO4	Apply knowledge of renal function test.								
CO5	Demonstrate a comprehensive understanding the basic principles of blood bank.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction To Pathology Cellular Adaptation. Cell Injury & Cell Death: cell injury and cell death. cellular adaptation of growth and differentiation. causes and mechanisms of cell injury. classification of cell injury reversible and irreversible. morphology of cell injury and necrosis. examples of cell injury and necrosis. apoptosis. intercellular accumulation, pathologic calcification cellular aging. Inflammation: definition, classification, classification of inflammation acute inflammation, chemical mediator, outcome and morphologic patterns of acute inflammation.	13	Describe, illustrate and explain basic knowledge of pathology cellular adaptation. cell injury & cell death					1,8	
II	Hemodynamic Disorder, Thromb-oembolic Disease Shock: Hyperemia /Ischemia and haemorrhage Oedema thrombosis and embolis infraction shock.	6	Describe, illustrate and explain the basic knowledge of hemodynamic disorder, thrombo-embolic disease shock.					1,8	
III	Neoplasia no manclature carcinogenic agents tumours. Tumours grading staging	6	Learn the comprehensive knowledge of Neoplasia					1,8	

<b>IV</b>	Renal Function Test: Overview of kidney function of kidney indication of renal function test, test based on glomerular filtration rate. Urinary disorders: congenital abnormalities of urinary system classification of renal diseases glomerular disease- cause, type & pathology tubule interstitial diseases renal vascular disorders end stage renal disease-causes & pathology of kidney in hypertension diabetes mellitus, pregnancy pathology of peritoneum-peritonitis- bacterial tubular & sclerosing peritonitis pathology of urinary tract infections pyelonephritis & tuberculous pyelonephritis	<b>15</b>	Describe, illustrate and explain the renal function test	1,8
<b>V</b>	Blood Bank: Blood grouping and Rh typing (in details) Landsteiner Law Indication of Blood Transfusion Contra indication of Blood transfusion Side effects of blood transfusions	<b>8</b>	Describe, illustrate and explain the basic principles of blood bank	1,8
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Introduction to Glass wares, plastic wares, and laboratory wares.</li> <li>• Introduction on Microscope.</li> <li>• Haemoglobin Estimation.</li> <li>• Analysis of normal urine.</li> <li>• Routine and Microscopical examination of urine sample.</li> <li>• Kidney function Test.</li> <li>• Estimation of electrolytes.</li> <li>• Demonstration of urine analysis trip.</li> <li>• Demonstration of glucometer.</li> <li>• Blood Grouping.</li> </ul>	<b>29</b>	Demonstration of different test on pathology.	1,2,3,4

#### TEXT BOOKS:

- 1 Text book pathology – Harsh Mohans
- 2 Basic Pathology – Edward Arnold
- 3 Basic Pathology – Edward Arnold Pathologic Basis of Disease-Robbina and Cotran

#### REFERENCE BOOK:

- 1 HandbookOfPathologyForPostgraduateStudents,2NdEditionbySandhyaSundaram, CBS Publishers and Distributors
- 2 Comprehensive Pathology by Parmeshwar Goswami (Author), Anand Raj Kalla (Author), Kishore Khatri (Author), Scientific Publishers (India)
- 3 Comprehensive Pathology by Parmeshwar Goswami (Author), Anand Raj Kalla (Author), Kishore Khatri (Author), Scientific Publishers (India)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of pathology cellular adaptation .cell injury & cell death	<b>1, 8</b>
<b>2</b>	Able to explain the Hemodynamic disorder, Thromboembolic disease shock	<b>1, 8</b>
<b>3</b>	Learn the basic knowledge of Neoplasia	<b>1, 8</b>
<b>4</b>	Apply knowledge of renal function test	<b>1, 8</b>
<b>5</b>	Demonstrate a comprehensive understanding the basic principles of blood bank.	<b>1, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO 1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT214R	Pathology	3							3

**Semester – III**

Semester – III									
Course Title	Pharmacology-I								
Course code	22BDIT214R	Total credits: 2 Total hours: 25	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 3 <sup>rd</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To have a comprehensive knowledge of pharmacological intervention in dialysis and its clinical importance's.</li> <li>To gather a specific knowledge on different diuretics and its pharmacodynamics.</li> <li>To enrich the specific knowledge about the diuretics.</li> </ol>								
CO1	Able to explain the basic knowledge of pharmacology.								
CO2	Able to explain the IV fluid therapy with special emphasis in renal diseases.								
CO3	Learn the basic knowledge of diuretics.								
CO4	Apply knowledge of antihypertensive.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	Introduction to basic pharmacology.	<b>4</b>	Describe, illustrate and explain basic knowledge of pharmacology					1,8	
<b>II</b>	IV Fluid Therapy with special emphasis in renal diseases.	<b>4</b>	Describe, illustrate and explain the basic knowledge of IV Fluid therapy with special emphasis in renal diseases.					1,8	
<b>III</b>	Diuretics: <ul style="list-style-type: none"> <li>• Classification.</li> <li>• Actions.</li> <li>• Side effects.</li> <li>• Contraindications</li> </ul>	<b>7</b>	Learn the comprehensive knowledge of diuretics					1,8	
<b>IV</b>	Antihypertensive: <ul style="list-style-type: none"> <li>• Classification</li> <li>• Actions and dosage</li> </ul>	<b>10</b>	Describe, illustrate and explain the antihypertensive.					1,8	

**TEXTBOOKS:**

1. Textbook of modern pharmacology 3<sup>rd</sup> edition by muniappanm, Cbs Publishers
2. Basic and clinical pharmacology 1 5ed, Mcgraw-Hill

**REFERENCE BOOK:**

1. Essential of Pharmacology By K.D Tripathi
2. Pharmacology for Allied Health Science By Padmaja Uday Kumar

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of pharmacology.	<b>1, 8</b>
<b>2</b>	Able to explain the IV Fluid therapy with special emphasis in renal diseases.	<b>1, 8</b>
<b>3</b>	Learn the basic knowledge of diuretics.	<b>1, 8</b>
<b>4</b>	Apply knowledge of antihypertensive.	<b>1, 8</b>
<b>5</b>	Able to explain the basic knowledge of pharmacology.	<b>1, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BDIT214R	Pharmacology I	3							3

**SEMESTER – III**

<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>Biostatistics</b>								
<b>Course code</b>	<b>22BDIT216R</b>	<b>Total credits: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 32</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 3<sup>rd</sup> semester of second year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. To have a comprehensive knowledge on different statistical methods and its applications 2. To have a comprehensive knowledge of statistical validation of data sets. 3. To have a specific knowledge about the statistical evaluation.								
<b>CO1</b>	Able to explain the basic knowledge of biostatistics.								
<b>CO2</b>	Able to explain the presentation of data, frequency distribution								
<b>CO3</b>	Learn the basic knowledge of descriptive statistics								
<b>CO4</b>	Apply knowledge of probability distribution								
<b>CO5</b>	Apply knowledge of sampling distribution								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	Introduction about biostatistics, variables, data, population and sample, parameters in statistics, scales of measurements.	<b>4</b>	Describe, illustrate and explain basic knowledge of biostatistics					1,8	
<b>II</b>	Classification and Presentation of data, Frequency distribution, Frequency polygon, diagrams, histogram, frequency distribution curve, of gives, percentile and quartiles	<b>5</b>	Describe, illustrate and explain the basic knowledge of classification and Presentation of data, frequency distribution					1,8	
<b>III</b>	Descriptive Statistics: Measures of location, range, measures of dispersion, coefficient of variation, correlation and regression.	<b>3</b>	Learn the comprehensive knowledge of descriptive statistics					1,8	
<b>IV</b>	Probability distribution: classical definition, conditional probability, random variable, binomial distribution, poisson distribution, normal distribution. Practical in SPSS and Ms. Excel.	<b>11</b>	Describe, illustrate and explain the probability distribution					1,8	
<b>v</b>	Sampling distribution, sampling errors and sampling statistics, types of sampling. Design of experiment, Analysis of variance (ANOVA)	<b>9</b>	Describe, illustrate and explain the sampling and analysis of ANOVA					1,8	

## TEXTBOOK

- 1 Method in Biostatistics By Dr. K. S Negi

## REFERENCE BOOK

- 1 Principles of Biostatistics 3rd Edition By Marcello Pagano, CRC Press

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the basic knowledge of biostatistics.	1, 8
2	Able to explain the presentation of data, frequency distribution	1, 8
3	Learn the basic knowledge of descriptive statistics	1, 8
4	Apply knowledge of probability distribution	1, 8
5	Apply knowledge of sampling distribution	1, 8

### MAPPING TABLE

Course code	Course Name	PO	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
		1*							
22BDIT216R	Biostatistics	3							3



**Semester – III**

Semester – III									
Course Title	Nutrition								
Course code	22BDIT217R	Total credits: 2 Total hours: 32	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/3 <sup>rd</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	1.To have a comprehensive knowledge nutrition and dietetics 2.To have a comprehensive macro nutrients and micro nutrients 3.To have a specific knowledge about the diet for dialysis patients								
CO1	Able to explain the nutrition science.								
CO2	Able to explain the macro nutrients.								
CO3	Learn the basic knowledge of micro nutrients.								
CO4	Apply knowledge of water & electrolyte balance								
CO5	Apply knowledge of balance diet								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	<b>Introduction to Nutrition Science:</b> definitions, history, role of nutrition in maintaining health, classification of food according to function, physiological, psychological and social function of food, RDA, factors affecting RDA, methods used to derive RDA, determination of RDA for different nutrients, requirements & allowances, food standards and food adulteration.	7	Describe, illustrate and explain basic knowledge of nutrition science					1,8	
<b>II</b>	<b>Macronutrients:</b> Carbohydrates, Proteins and fats there definition function, source, digestion and absorption in the body affect of deficiency and excess.	7	Describe, illustrate and explain the basic knowledge of macro nutrients					1,8	

<b>III</b>	<b>Micronutrients:</b> Vitamins and Minerals their definition, function, source, digestion and absorption in the body, affect of deficiency and excess.	<b>4</b>	Learn the comprehensive knowledge of micro nutrients	1,8
<b>IV</b>	<b>Water &amp; Electrolyte Balance-</b> distribution of body water, ECF/ICF, functions, different electrolytes-their functions, thirst mechanism, water/electrolyte balance, water-imbalance.	<b>7</b>	Describe, illustrate and explain the water & electrolyte balance	1,8
<b>V</b>	<b>Balance Diet:</b> Definition, My pyramid and my plate concept, Food groups, Nutritive value of food, Menu Planning, Budgeting Diet Planning: Modification of consistency, feeding techniques, hospital routine diet, different types of renal diets, role of nutrition in kidney disorders with special reference nutrition care during ESRD and dialysis.	<b>7</b>	Describe, illustrate and explain the balance diet	1,8

### TEXTBOOK:

- 1 Textbook of Nutrition and Dietetics by Ranjana Mahna & Seema Puri Kumud Khanna, Sharda Gupta, Santhosh Jain Passi, Rama Seth, ACS publication.
- 2 Oxford Handbook of Nutrition and Dietetics BY Joan Webster-Gandy (Editor), Angla Madden(Editor), Michelle Holdsworth (Editor), Oxford, UK.

### REFERENCE BOOK:

- 1 Sumathi R. Mudambi, Rajagopal, M.V., Fundamentals of food and nutrition, new age International (P) Ltd, Publishers, Third Edition,1997.
- 2 Srilakshmi B., Nutrition Science, New Age International (P) Ltd, Publisher, 2004.
- 3 Darshan Sohi, A Comprehensive textbook of nutrition & therapeutic diets. Jaypee brothers medical publishers (P) Ltd.201.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the nutrition science.	<b>1, 8</b>
<b>2</b>	Able to explain the macro nutrients.	<b>1, 8</b>
<b>3</b>	Learn the basic knowledge of micro nutrients.	<b>1, 8</b>
<b>4</b>	Apply knowledge of water & electrolyte balance	<b>1, 8</b>
<b>5</b>	Apply knowledge of balance diet	<b>1, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT217R	Nutrition	3							3

**Semester – III**

<b>Semester – III</b>									
<b>Course Title</b>	<b>Clinical Dialysis II</b>								
<b>Course code</b>	<b>22BDIT218R</b>	<b>Total credits: 1 Total hours: 16</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 3<sup>rd</sup> semester of second year of the programme</b>								
<b>Course Objectives (Minimum3)</b>	1. To have a comprehensive knowledge a holistic approach for the overall wellbeing of the patient in the dialysis unit 2. To have a comprehensive knowledge on medical ethics and the quality and functions of medical professionals for dialysis procedures. 3. To have a knowledge on functions of medical professionals for dialysis procedures.								
<b>CO1</b>	Able to explain the patient history taking.								
<b>CO2</b>	Able to explain the general examination of the patient.								
<b>CO3</b>	Learn the basic knowledge of clinical examination of the patient.								
<b>CO4</b>	Apply knowledge of manual preparation of dialysis solution.								
<b>CO5</b>	Apply knowledge of medical waste management.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	Patient history taking	<b>2</b>	Describe, illustrate and apply the patient history taking					1,2,8	
<b>II</b>	General examination of the patient	<b>2</b>	Describe, illustrate and explain the general examination of the patient					1,2,4,8	
<b>III</b>	Clinical examination of the patient	<b>4</b>	Learn the comprehensive knowledge of Clinical examination of the patient					1,2,4,8	
<b>IV</b>	Manual preparation of dialysis solution	<b>4</b>	Describe, illustrate and explain the manual preparation of dialysis solution					1,2,3,4,8	
<b>V</b>	Medical waste management	<b>4</b>	Describe, illustrate and explain the medical waste management					1,8	

**TEXTBOOKS**

- 1 Handbook for Dialysis Technician Dr. Anjani Sharma (Author), Faswal Pichan (Author)
- 2 Textbook On Renal Dialysis Technology By Dr. B. C. Bhagavan. New Delhi, India

**REFERENCEBOOKS**

- 1 Davidson's Principles And Practice Of Medicine / 24th 2<sup>nd</sup> Edition New York USA.
- 2 Henrich's Principles and Practice of Dialysis , 5/e Hard cover by Matthew R. Weir Edgar L. Lerma, Austin, Texas, USA

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the patient history taking.	<b>1, 2,8</b>
<b>2</b>	Able to explain the general examination of the patient..	<b>1, 2,4,8</b>
<b>3</b>	Learn the basic knowledge of clinical examination of the patient.	<b>1, 2,4,8</b>
<b>4</b>	Apply knowledge of manual preparation of dialysis solution.	<b>1, 2, 3,4,8</b>
<b>5</b>	Apply knowledge of medical waste management.	<b>1, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT218R	Clinical Dialysis II	3	3	2	2				3

Semester – III									
Course Title	General Elective I (EVS)								
Course code	22BDIT219R	Total credits: 2 Total hours: 32	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 3 <sup>rd</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.</li> <li>Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.</li> <li>Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.</li> </ol>								
CO1	Able to explain the multidisciplinary nature of environmental studies.								
CO2	Able to explain the natural resources.								
CO3	Learn the basic knowledge of ecosystem.								
CO4	Apply knowledge of environmental pollution.								
CO5	Apply knowledge of field trip								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	Multidisciplinary nature of environmental studies: Definition, scope and importance Need for public awareness.	2	Describe, illustrate and apply the knowledge of multidisciplinary nature of environmental studies.				1,8		
II	Natural Resources : Renewable and non-renewable resources :Natural resources and associated problems: Forest resources : Use and overexploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources : Use and overutilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Growing energy needs,	10	Describe, illustrate and apply the knowledge of natural resources				1,8		

	renewable and non renewable energy sources, use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.			
<b>III</b>	Ecosystems: Concept of an ecosystem; Structure and function of an ecosystems; Producers, consumers and decomposers; Energy flow in the ecosystem; Ecological succession; Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of the following ecosystem:- Forest ecosystem Grassland ecosystem Desert ecosystem Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) Biodiversity and its conservation: Introduction – Definition : genetic, species and ecosystem diversity; Bio-geographical classification of India; Value of biodiversity :consumptive use, productive use, social, ethical, aesthetic and option values; Biodiversity at global, National and local levels; Inida as a mega- diversity nation; Hot-spots of biodiversity; Threats to biodiversity : habitat loss, poaching of wildlife, man-wild life conflicts; Endangered and endemic species of India; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	<b>8</b>	Describe, illustrate and apply the knowledge of ecosystem	1,8
<b>IV</b>	Environmental Pollution: Definition: Cause, effects and control measures of:- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards; Solid waste Management : Causes, effects and control measures of urban and industrial wastes; Role of an individual in prevention of pollution; Pollution case studies; Disaster management : floods, earthquake, cyclone and landslides. Human Population and the Environment: Population growth, variation among nations; Population explosion – Family Welfare Programme; Environment and human health; Human Rights; Value Education; HIV/AIDS; Women and	<b>8</b>	Describe, illustrate and apply the knowledge of environmental pollution	1,8

	Child Welfare; Role of Information Technology in Environment and human health; Case Studies.			
V	Field trip: Visit to a local area to document environmental assets river/forest/grassland/hill/ mountain Visit to a local polluted site- Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)	4	Describe, illustrate and apply the knowledge of field trip	1,8

### TEXTBOOK

- 1 Textbook of environmental studies by Erach Bharucha, UGC
- 2 A textbook of environmental studies by DKA sthana, Meera Asthana, S Chand.

### REFERENCE BOOKS:

- 1 Environmental studies by RB Singh, Dr. DK Thakur and Dr. JPS Chauhan.
- 2 Perspective in environmental studies by Anubha Loushik, CP Kaushik

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the multidisciplinary nature of environmental studies	1, 8
2	Able to explain the natural resources	1, 8
3	Learn the basic knowledge of ecosystem	1, 8
4	Apply knowledge of Environmental Pollution	1, 8
5	Apply knowledge of field trip	1, 8



**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT219R	General Elective I (EVS)	3							3

SEMESTER – III									
Course Title	Basic English (Communicative English & Soft skills)								
Course code	22UBPD211R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 40	0	0	4	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 3 <sup>rd</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	1. To introduce the students to the basics of English grammar and their application. 2. To enhance communication skills through list ending and speaking exercises. 3. To learn and understand the importance of pronunciation of words.								
CO1	Able to explain the application of grammatical rules will enable the student's to improve the speaking and writing skills.								
CO2	Able to explain the language effectively.								
CO3	Apply the basic knowledge of both listening and speaking skills.								
CO4	Able to apply their vocabulary and use of words.								
CO5	Demonstrate a comprehensive understanding the concept of communication, its importance and barriers.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Grammar:</b> Parts of speech , articles affirmative and negative sentences	6	Describe, illustrate and explain basic knowledge of parts of speech, articles affirmative and negative sentences				1,7,8		
II	<b>Grammar:</b> Determiners, Sentence Construction from jumbled words Types of Sentences (Assertive Imperative etc.)	, 8	Describe, illustrate and explain the basic knowledge of Sentence Construction from jumbled words and types of Sentences				1,7,8		
III	<b>Building Vocabulary:</b> Synonyms, Antonyms	8	Learn the comprehensive knowledge of synonyms and antonyms				1,7,8		
IV	<b>Speaking Skills:</b> Introduction and greetings, pronunciation, asking and offering information, video recording for self analysis	8	Able to apply the speaking skills.				1,7,8		

<b>V</b>	<b>Communication Skills:</b> Introduction to Communication, Importance of Communication Skills, Purpose of Communication, Types of Communication, Barriers to Communication, How to improve/tips to improve Communication skills.	<b>10</b>	Describe, illustrate and explain the communication skills.	1,7,8
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**TEXT BOOKS:**

1. Wren & Martin. (2017). High School English Grammar and Composition. S. Chand Publishing.
2. Pal, Rajendra. Suri, Premlata (2022). English Grammar & Composition. Sultan Chand and Sons Publishing.
3. Debnath, Adhir. (2018). A Textbook of English Grammar and Composition. BinaLibray

**REFERENCE BOOKS:**

1. Mitra, Barun.(2016) Personality Development and Soft Skills 2/E, Oxford University Press
2. Murphy, Raymond,.(2012) English Grammar in Use Book with Answers: A Self-Study and Practice Book for Intermediate Learners of English, Cambridge University Press

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the application of grammatical rules will enable the students to improve the speaking and writing skills.	<b>1, 7, 8</b>
<b>2</b>	Able to explain the language effectively.	<b>1, 7, 8</b>
<b>3</b>	Apply the basic knowledge of both listening and speaking skills.	<b>1, 7,8</b>
<b>4</b>	Able to apply their vocabulary and use of words.	<b>1, 7, 8</b>
<b>5</b>	Demonstrate a comprehensive understanding the concept of communication, its importance and barriers.	<b>1, 7, 8</b>

**MAPPING TABLE**

Course Code	Course Name	PO1 *	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22UBPD211R	Basic English	3						3	3

**Semester – III**

<b>Course Title</b>	<b>Extra-Curricular Activities</b>								
<b>Course code</b>	<b>22UBEC111</b>	<b>Total credits: 1 Total hours:15</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 3rd semester of second year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. Able to develop the social and soft skills and to promote a holistic development of the learners.</li> <li>2. Able to develop in respective fields.</li> <li>3. Able to develop in various competitions.</li> </ol>								
<b>CO1</b>	Able to engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.								
<b>CO2</b>	Able to participate in regular club activities like workshops, competitions as per their interest and hobbies.								
<b>CO3</b>	Able to represent ADTU in various inter university, state and national level competitions.								
<b>CO4</b>	Able to earn from invited experts in their respective fields.								
<b>CO5</b>	Demonstrate an exposure of 360 degree learning methodology considering the overall growth along with the academics.								

<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>Co-Curricular Activities</b>								
<b>Course code</b>	<b>22UBCC121</b>	<b>Total credits: 1</b> <b>Total hours: 15</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 3<sup>rd</sup> semester of second year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	<p>1. Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities.</p> <p>2. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning.</p> <p>3. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.</p>								
<b>CO1</b>	Able to engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.								
<b>CO2</b>	Able to participate in regular club activities like workshops, competitions as per their interest and hobbies.								
<b>CO3</b>	Able to represent ADTU in various inter university, state and national level competitions.								
<b>CO4</b>	Able to learn from invited experts in their respective fields.								
<b>CO5</b>	Demonstrate an exposure of 360-degree learning methodology considering the overall growth along with the academics.								

**SEMESTER – III**

<b>Course Title</b>	<b>Generic Elective</b>								
<b>Course code</b>	<b>22 BDIT219R</b>	<b>Total credits: 2</b> <b>Total hours: 30</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 3<sup>rd</sup> semester of second year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>									
<b>CO1</b>									
<b>CO2</b>									
<b>CO3</b>									
<b>CO4</b>									
<b>CO5</b>									

<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>MOOC</b>								
<b>Course code</b>	<b>22MOCEU101/2/3/4/5</b>	<b>Total credits: 1 Total hours: 15</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Science in Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 3<sup>rd</sup> semester of second year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>									
<b>CO1</b>									
<b>CO2</b>									
<b>CO3</b>									
<b>CO4</b>									
<b>CO5</b>									



SEMESTER – IV									
Course Title	Pharmacology-II								
Course code	22BDIT221R	Total credits:3 Total hours: 34	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 4 <sup>th</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To have a comprehensive knowledge of pharmacological intervention in dialysis and its clinical importance's</li> <li>To gather a specific knowledge on different diuretics and its pharmacodynamics.</li> <li>To gather the specific knowledge about anticoagulants.</li> </ol>								
CO1	Able to explain the Drugs & Dialysis Dose								
CO2	Able to explain the It enables to Erythropoietin								
CO3	Apply the basic knowledge of heparin								
CO4	Able to apply Antiseptic & disinfectants								
CO5	Demonstrate a comprehensive understanding the Haemodialysis concentrates								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Drugs & Dialysis Dose and duration of administration of drugs. Vitamin D & its analogue. Phosphate binders Iron Folic acid & other vitamins. Dialyzable drugs Phenobarbitone. Lithium Methanol, etc.	6	Describe, illustrate and explain basic knowledge of drugs & dialysis dose.					1,2,8	
II	Erythropoietin <ul style="list-style-type: none"> <li>• Indications</li> <li>• Side effects</li> <li>• Preparations &amp; dosage.</li> </ul>	6	Describe, illustrate and explain the basic knowledge of erythropoietin					1,2,8	
III	Heparin <ul style="list-style-type: none"> <li>• Indications</li> <li>• Side effects</li> <li>• Dosage</li> <li>• Antagonists</li> </ul>	8	Learn the comprehensive knowledge of heparin.					1,2,4,8	
IV	Antiseptic & disinfectants Formalin, sodium hypochlorite, Hydrogen peroxide. Role as disinfectant. Residual effects.	6	Able to apply the antiseptic & disinfectants					1,2,4,8	

<b>V</b>	Haemodialysis concentrates (Acetate & bicarbonates) Composition & dilution Peritoneal dialysis fluid (hypertonic solutions) composition. Potassium exchange Resins - Mode of action. Use Side effects	<b>8</b>	Describe, illustrate and explain the hemodialysis concentrates	1,2,4,8
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**TEXTBOOKS:**

1. Textbook of Modern Pharmacology 3<sup>rd</sup> Edition By Muniappan M, CBS Publishers
2. Basic and Clinical Pharmacology 15 Ed, Mcgraw-Hill

**REFERENCE BOOK:**

1. Essential of Pharmacology By K. D Tripathi
2. Pharmacology for Allied Health Science By Padmaja Uday Kumar

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the drugs & dialysis dose	<b>1, 2, 8</b>
<b>2</b>	Able to explain the It enables to erythropoietin	<b>1,2, 8</b>
<b>3</b>	Apply the basic knowledge of heparin	<b>1, 2,4,8</b>
<b>4</b>	Able to apply antiseptic & disinfectants	<b>1, 2,4,8</b>
<b>5</b>	Demonstrate a comprehensive understanding the haemodialysis concentrates	<b>1, 2,48</b>

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT221R	Pharmacology -II	3							3

Semester – IV									
Course Title	Concept of Renal Disease								
Course code	22BDIT222R	Total credits: 3 Total hours: 48	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 4 <sup>th</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	1. To have a comprehensive perception about the cause, diagnosis and treatment of the disease 2. To have a comprehensive knowledge of the different renal pathological conditions 3. To have specific knowledge on congenital renal diseases.								
CO1	Able to explain the acute and chronic renal failure nephrotic syndrome.								
CO2	Able to explain the It enables to urinary tract infection, asymptomatic urinary abnormalities.								
CO3	Apply the basic knowledge of renal stone diseases, obstructive uropathies.								
CO4	Able to apply congenital renal diseases, tumours of kidney. pregnancy associated renal diseases.								
CO5	Demonstrate a comprehensive understanding the renal vascular disorders.								
Unit-No.	Content	Contact Hour	Learning Outcome					K L	
I	Acute and Chronic Renal failure. Nephrotic Syndrome.	6	Describe, illustrate and explain basic knowledge of acute and chronic renal failure					1,8	
II	Urinary tract infection. asymptomatic urinary abnormalities.	6	Describe, illustrate and explain the basic knowledge of urinary tract infection. asymptomatic urinary abnormalities.					1,8	
III	Renal stone diseases. obstructive uropathies	8	Learn the comprehensive knowledge of renal stone diseases. obstructive uropathies					1,8	
IV	Congenital renal diseases. Tumors of kidney. pregnancy associated renal diseases.	16	Able to apply the congenital renal diseases. tumours of kidney					1,8	
V	Renal vascular disorders. renal diseases due to hypertension. mode of action. use side effects	12	Describe, illustrate and explain the renal vascular disorders.					1,8	

**TEXTBOOKS:**

1. Clinical text of Nephrology By John Fegally
2. Text book of Nephrology- Oxford and Brenner Recto

**REFERENCES BOOKS:**

1. Chronic renal disease, paull. Kimmel, marke. Rosenberg
2. ChronicKidneyDisease,Dialysis,andTransplantationbyBrennerandRector,Academic Publishers, USA

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the acute and chronic renal failure. nephrotic syndrome.	<b>1, 8</b>
<b>2</b>	Able to explain the It enables to urinary tract infection, asymptomatic urinary abnormalities.	<b>1, 8</b>
<b>3</b>	Apply the basic knowledge of renal stone diseases, obstructive uropathies.	<b>1, 8</b>
<b>4</b>	Able to apply congenital renal diseases, tumours of kidney. pregnancy associated renal diseases.	<b>1, 8</b>
<b>5</b>	Demonstrate a comprehensive understanding the renal vascular disorders.	<b>1, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT222R	Concept of Renal Disease	3							3

Semester – IV									
Course Title	Basic of Dialysis Technology								
Course code	22BDIT223R	Total credits: 3 Total hours: 48	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Prerequisite	Nil	Co-requisite	Nil						
Program me	Bachelor of Dialysis Technology								
Semester	Fall/ 4 <sup>th</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To have a comprehensive perception about working principle and mechanism of dialysis machines</li> <li>Students will get a clear concept about the patient monitoring and specific clinical care</li> <li>To provide adequate knowledge on hemodialysis.</li> </ol>								
CO1	Able to explain the indications. types of dialysis. principles of dialysis.								
CO2	Able to explain the hemodialysis apparatus								
CO3	Apply the basic knowledge of type of priming of dialysis apparatus, vascular access in haemodialysis.								
CO4	Able to apply dialyser reuse.								
CO5	Demonstrate a comprehensive understanding the monitoring of patients during dialysis.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	Introduction, definition, indications. types of dialysis. principles of dialysis.	14	Describe, illustrate and explain basic knowledge of indications. types of dialysis. principles of dialysis.				1,2,3,4,8		
II	Haemodialysis Apparatus Introduction to Haemodialysis Machine. Common Complications Haemodialysis.	16	Describe, illustrate and explain the basic knowledge of hemodialysis apparatus				1,2,3,4,8		
III	Type of priming of dialysis apparatus. vascular access in haemodialysis.	6	Learn the comprehensive knowledge of type of priming of dialysis apparatus. vascular access in haemodialysis.				1,3,4,8		
IV	Dialyser Reuse.	6	Able to apply the dialyser reuse				1,3,4,8		

V	Monitoring of patients during dialysis.	6	Describe, illustrate and explain the monitoring of patients during dialysis.	1,3,4,8
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**TEXTBOOKS:**

1. Clinical text of Nephrology By John Fegally
2. Text book of Nephrology- Oxford and Brenner Recto

**REFERENCES BOOKS:**

1. Chronic renal disease, paull. Kimmel, marke. Rosenberg
2. Chronic Kidney Disease, Dialysis, and Transplantation by Brenner and Rector, Academic Publishers, USA

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the indications. types of dialysis, principles of dialysis.	1, 2, 3,4,8
2	Able to explain the hemodialysis apparatus	1,2,3,4 8
3	Apply the basic knowledge of type of priming of dialysis apparatus, vascular access in haemodialysis.	1, 3,4,8
4	Able to apply dialyser reuse.	1, 3,4,8
5	Demonstrate a comprehensive understanding the monitoring of patients during dialysis.	1, 3,4,8

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT223R	Basic of Dialysis Technology	3	2	3	3				3

SEMESTER – IV									
Course Title	Microbiology								
Course code	22BDIT224R	Total credits: 5 Total hours: 58T+ 32P	L	T	P	S	R	O/F	C
			3	0	2	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 4 <sup>th</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. To gather a specific knowledge on different pathogens and its disease mechanisms</li> <li>2. To provide an understanding of the structure of the pathogen involves in various disease and form foundation forth scientific study and practice of dialysis therapy practice.</li> <li>3. 3.To provide adequate knowledge on bacteriology</li> </ol>								
CO1	Able to explain the bacteriology.								
CO2	Able to explain the basic knowledge of systemic bacteriology.								
CO3	Apply the comprehensive knowledge of virology.								
CO4	Able to explain the parasitological.								
CO5	Understanding a comprehensive of the infection and immunology.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Bacteriology:</b> a. Introduction to bacteriology: Classification of microorganisms, size, Shape and structure of bacteria. Use of microscope in the study of bacteria. b. Growth and nutrition: Nutrition, growth and multiplications of bacteria, use of culture mediain diagnostic bacteriology. c. Culture media: Use of culture mediain anti –microbial sensitivity test.	18	Describe, illustrate and explain basic knowledge of bacteriology.				1,8		



<p><b>II</b></p>	<p>d.Systemic bacteriology : Morphology, cultivation, diseases Specimen collection of the following bacteria i.Staphylococci ii.Streptococci iii.Pneumococci iv.Gonococci v.Meningococci vi.Mycobacteria vii.Clostridia viii.Shigella ix.Salmonella x.Eschcoli xi.Klebsiella Proteus xiii.Vibrio xiv.Cholera xv.Pseudomonas Spirochetes, Microbiology of Urinary Tract Infections.</p>	<p><b>12</b></p>	<p>Describe, illustrate and explain the basic knowledge of systemic bacteriology.</p>	<p>1,8</p>
<p><b>III</b></p>	<p>Virology: General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.</p>	<p><b>10</b></p>	<p>Learn the comprehensive knowledge of virology</p>	<p>1,8</p>
<p><b>IV</b></p>	<p>Parasitology: Morphology, life- cycle, laboratory diagnosis of following parasites: E. Histolytica, Plasmodium, tape worms, Intestinal nematodes</p>	<p><b>10</b></p>	<p>Able to explain the parasitological</p>	<p>1,8</p>
<p><b>V</b></p>	<p><b>Infection and Immunology:</b> Sterilization and Disinfection: Principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptic and disinfectants.  Hospital infection: Causative agents, transmission methods, investigation, prevention and control of hospital infection, Microbiology of Catheter related infections. Immunology: Cells and Organs of the Immune System, Antigens, Immunoglobulins, Immunity, vaccines, types of vaccine and immunization</p>	<p><b>8</b></p>	<p>Describe, illustrate and explain the infection and immunology</p>	<p>1,8</p>

	<p>schedule, principles and interpretation of common serological tests namely</p> <p><i>i.</i>Widal</p> <p><i>ii.</i>VDRL</p> <p><i>iii.</i>ASLO</p> <p><i>iv.</i>CRP</p> <p><i>v.</i>RF</p> <p><i>vi.</i>ELISA.</p> <p>Rapid tests for HIV and HBsAg (excluding technical details), HLA Typing.</p>			
<b>Practical</b>	<p>a. Gram Staining</p> <p>b. Acid Fast Staining</p> <p>c. Capsule Staining</p> <p>d. Endospore Staining</p> <p>e. LPCB</p> <p>f. Leishmiam Staining</p> <p>g. IMVIC</p> <p>h. Sugar Fermentation Test (Lactose/Glucose)</p> <p>i. TSL</p> <p>j. Catalase Test</p> <p>k. Oxidase Test</p> <p>l. Coagulase Test</p>	<b>32</b>	<p>Demonstrate on gram staining acid fast staining capsule staining Endospore staining IPCB leishmiam staining IMVIC sugar fermentation test TSL catalase test, oxidase test coagulase test.</p>	1,2,3,4

**TEXTBOOKS:**

- 1 Medical Microbiology By David Green Wood Richard Slack & John Peuther. Churchill Livingstone Company.
- 2 Parasitology K.P Chatterry Medical Microbiology By Jawelz, Melnick Geo R. Brokes Me Graw-Hill Company.

**REFERENCES BOOKS:**

- 1 Medical Microbiology By Anantanarayan & Panekar Orient Longman Limited.
- 2 Textbook Of Microbiology, By Sunindar Kumar, Jaypee Medical Publisher

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the bacteriology.	<b>1,8</b>
<b>2</b>	Able to explain the basic knowledge of systemic bacteriology.	<b>1, 8</b>
<b>3</b>	Apply the comprehensive knowledge of virology.	<b>1, 8</b>
<b>4</b>	Able to explain the parasitological.	<b>1, 8</b>
<b>5</b>	Understanding a comprehensive of the infection and immunology.	<b>1,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	*PO 3	PO4	PO5	PO6	PO7	*PO8
22BDIT224R	Microbiology	3			2				3

**Semester – IV**

<b>Course Title</b>	<b>Clinical Dialysis-III</b>								
<b>Course code</b>	<b>22BDIT225R</b>	<b>Total credits: 1 Total hours: 16 P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 4<sup>th</sup> semester of second year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. The study of Clinical Dialysis is aimed at imparting a knowledge in providing patient care.</li> <li>2. Learn to perform the highest standards of professional level of quality.</li> <li>3. Able to apply the efficiency prevailing in the society during the dialysis procedures.</li> </ol>								
<b>CO1</b>	Able to explain the pre-dialysis patient evaluation.								
<b>CO2</b>	Able to explain the basic knowledge of patient evaluation during dialysis.								
<b>CO3</b>	Apply the comprehensive knowledge of post-dialysis patient evaluation.								
<b>CO4</b>	Able to explain the operating hemodialysis machine.								
<b>CO5</b>	Understanding a comprehensive of the operating peritoneal-dialysis machine.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	Pre-dialysis patient evaluation	<b>2</b>	Describe, illustrate and explain basic knowledge of pre-dialysis patient evaluation.				1,2,4,8		
<b>II</b>	Patient evaluation during dialysis	<b>2</b>	Describe, illustrate and explain the basic knowledge of patient evaluation during dialysis.				1,2,4,8		
<b>III</b>	Post-dialysis patient evaluation	<b>4</b>	Learn the comprehensive knowledge of post-dialysis patient evaluation.				1,2,3,4,8		
<b>IV</b>	Operating hemodialysis machine	<b>4</b>	Able to apply the operating hemodialysis machine.				1,2,3,4,8		
<b>V</b>	Operating peritoneal-dialysis machine	<b>4</b>	Describe, illustrate and explain the operating peritoneal dialysis machine.				1,2,3,4,8		

**TEXTBOOKS:**

- 1 Handbook for Dialysis Technician Dr. Anjani Sharma (Author), Faswal Pichan (Author)
- 2 Textbook On Renal Dialysis Technology By Dr. B.C. Bhagavan. New Delhi, India

**REFERENCE BOOKS:**

- 1 Davidson's Principles And Practice Of Medicine /24<sup>th</sup> 2<sup>nd</sup> Edition New York USA.
- 2 Henrich's Principles and Practice of Dialysis, **5/e** Hard cover by Matthew R. Weir EdgarL. Lerma, Austin, Texas ,USA

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the pre-dialysis patient evaluation.	<b>1,2,4,8</b>
<b>2</b>	Able to explain the basic knowledge of patient evaluation during dialysis.	<b>1,2,4, 8</b>
<b>3</b>	Apply the comprehensive knowledge of post-dialysis patient evaluation.	<b>1, 2,3,4,8</b>
<b>4</b>	Able to explain the operating hemodialysis machine.	<b>1,2,3,4, 8</b>
<b>5</b>	Understanding a comprehensive of the operating peritoneal- dialysis machine.	<b>12,3,4,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT225R	Clinical Dialysis-III	3	3	2	3				3

Semester – IV									
Course Title	General Elective II (EVS)								
Course code	22BDIT226R	Total credits: 2 Total hours: 32 T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 4 <sup>th</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	1. Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions. 2. Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving. 3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.								
CO1	Able to explain the multidisciplinary nature of environmental studies								
CO2	Able to explain the natural resources.								
CO3	Learn the basic knowledge of ecosystem.								
CO4	Apply knowledge of Environmental Pollution.								
CO5	Apply knowledge of field trip.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	Multidisciplinary nature of environmental studies: Definition, scope and importance Need for public awareness.	2	Describe, illustrate and apply the knowledge of multidisciplinary nature of environmental studies.					1,8	
II	Natural Resources : Renewable and non-renewable resources :Natural resources and associated problems: Forest resources : Use and overexploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources : World food	10	Describe, illustrate and explain the natural resources.					1,8	

	<p>problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.</p> <p>Energy resources: Growing energy needs, renewable and non- renewable energy sources, use of alternate energy sources.</p> <p>Case studies. Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.</p> <p>Natural Resources : Renewable and non-renewable resources :Natural resources and associated problems:</p> <p>Forest resources: Use and overexploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.</p> <p>Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.</p> <p>Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.</p> <p>Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.</p> <p>Energy resources: Growing energy needs, renewable and non- renewable energy sources, use of alternate energy sources.</p> <p>Case studies. Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification. natural resources. Role of an individual in conservation of Equitable use of resources for sustainable lifestyles.</p>			
<p><b>III</b></p>	<p>Ecosystems: Concept of an ecosystem;  Structure and function of an ecosystems;  Producers, consumers and decomposers; Energy flow in the ecosystem; Ecological succession;  Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of the following ecosystem:- Forest ecosystem Grassland ecosystem Desert ecosystem Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)</p>	<p><b>8</b></p>	<p>Learn the comprehensive knowledge of ecosystem</p>	<p>1,8</p>

	<b>Biodiversity and its conservation:</b> Introduction Definition : genetic, species and ecosystem diversity; Biogeographically classification of India; Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values; Biodiversity at global, National and local levels; India as a mega- diversity nation; Hot-spots of biodiversity; Threats to biodiversity : habitat loss, poaching of wildlife, man- wildlife conflicts; Endangered and endemic species of India; Conservation of biodiversity			
<b>IV</b>	Environmental Pollution: Definition: Cause, effects and control measures of:- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards; Solid waste Management : Causes, effects and control measures of urban and industrial wastes; Role of an individual in prevention of pollution; Pollution case studies; Disaster management : floods, earthquake, cyclone and landslides. Human Population and the Environment: Population growth, variation among nations; Population explosion – Family Welfare Programme; Environment and human health; Human Rights; Value Education; HIV/AIDS; Women and Child Welfare; Role of Information Technology in Environment and human health; Case Studies.	<b>8</b>	Describe, illustrate and explain the environmental pollution.	1,8
<b>v</b>	Field trip: Visit to a local area to document environmental assets river/forest/grassland/hill/ mountain Visit to a local polluted site- Urban/Rural/Industrial/Agricultural Study of common plants,	<b>4</b>	Describe, illustrate and explain the field trip	1,8

### TEXTBOOK

1. Textbook of environmental studies by Erach Bharucha, UGC
2. A textbook of environmental studies by DKA sthana, Meera Asthana, S Chand.

### REFERENCE BOOKS:

1. Environmental studies by RB Singh, Dr. DK Thakur and Dr. JPS Chauhan.
2. Perspective in environmental studies by Anubha Loushik, CP Kaushik Dr. B.C. Bhagavan. New Delhi, India



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the multidisciplinary nature of environmental studies	<b>1, 8</b>
<b>2</b>	Able to explain the natural resources	<b>1, 8</b>
<b>3</b>	Learn the basic knowledge of ecosystem	<b>1, 8</b>
<b>4</b>	Apply knowledge of Environmental Pollution	<b>1, 8</b>
<b>5</b>	Apply knowledge of field trip	<b>1, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BDIT219R	General Elective II (EVS)	3							3

Semester – IV									
Course Title	Basic English								
Course code	22UBPD221R	Total credits: 2 Total hours: 40 P	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 4 <sup>th</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. To enable students to learn and comprehend about the proficiency of the English language.</li> <li>2. To improve the writing skill of the learners and enable them to prepare CV and cover letter for professional development.</li> <li>3. To evaluate certain attributes in a candidate that can be otherwise difficult for time consuming to ascertain.</li> </ol>								
CO1	Able to explain the use of preposition.								
CO2	Able to explain the basic knowledge of active and passive, direct and indirect speech.								
CO3	Apply the comprehensive knowledge of writing skills.								
CO4	Able to explain the self - management skills.								
CO5	Understanding a comprehensive of the non-verbal communication sciences of body language.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Grammar:</b> Use of Prepositions Tag questions	6	Describe, illustrate and explain basic knowledge of grammar.				1,8		
II	<b>Grammar:</b> Active and passive voice direct and indirect speech	8	Describe, illustrate and explain the basic knowledge of active and passive voice direct and indirect speech.				1,7,8		
III	<b>Writing Skills:</b> The basics of writing; avoid ambiguity and vagueness paragraph writing resume, CV and cover letter	8	Learn the comprehensive knowledge of writing skills.				1,8		
IV	<b>Self-Management Skills:</b> SWOT Analysis Goal Setting Personal Hygiene	8	Able to apply the self management skills.				1,8		

V	<b>Non-Verbal Communication- Sciences of Body Language:</b> i.What is Non- Verbal Communication & Body Language, ii.Types of Body Language, iii.Importance and Impact of Body Language, iv.Types of Communication through Body Language, i. Body Language Do's and Don'ts, Doubt Clearing Session Basic Tips to Maintain Time.	10	Describe, illustrate and explain the non-verbal communication sciences of body language.	
VI	<b>Group Discussion (Theory):</b> Importance, ii. Planning, Elements, and Skills assessed; iii. Effectively disagreeing, Summarizing and Attaining the Objective	8	Describe, illustrate and explain the non-verbal communication sciences of body language.	1,8

**TEXTBOOKS:**

1. Lata, P., Kumar, S.(2015). Communication Skills, Second Edition. India: Oxford University Press.
2. Barrett, Grant.2016.Perfect English Grammar: The Indispensible Guide to Excellent Writing and Speaking, Zephyros Press.
3. Mc Dowell, Gayle Laakmann. 2008 .Cracking the Coding Interview (Indian Edition).

**REFERENCE BOOKS:**

1. Zinsser, William.(2006) On Writing Well: The Classic Guide to Writing Nonfiction, Harper Perennial
2. Lacinai, Antonio.(2016) Understanding Body Language: 51 gestures and what they signal, Bookson Demand

**OTHER LEARNING RESOURCES:**

- 1 <https://learning.shine.com/talenteconomy/career-help/top-group-discussion-skills/>
- 2 <https://www.thoughtco.com/what-is-nonverbal-communication-16913>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the use of preposition.	<b>1,8</b>
<b>2</b>	Able to explain the basic knowledge of active and passive, direct and indirect speech.	<b>1,7, 8</b>
<b>3</b>	Apply the comprehensive knowledge of writing skills.	<b>1, 8</b>
<b>4</b>	Able to explain the self - management skills.	<b>1, 8</b>
<b>5</b>	Understanding a comprehensive of the nonverbal communication sciences of body language.	<b>1,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22UBPD221R	Basic English	3						2	3

Semester – IV									
Course Title	Co-Curricular Activities								
Course code	22UBCC221	Total credits: 1 Total hours: 15	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 4 <sup>th</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<p>1. Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities.</p> <p>2. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning.</p> <p>3. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.</p>								
CO1	Able to engaged in Co-curricular activities facilitate in the development of various domains of mind and personality such as, emotional development, social development, moral development and aesthetic development.								
CO2	Able to participate in creativity, enthusiasm, and energetic, positive thinking.								
CO3	Able to learn the intellectual development.								
CO4	Able to apply the personality development.								
CO5	Demonstrate an exposure the extracurricular activities.								

Semester – IV									
Course Title	Extra-Curricular Activities								
Course code	22UBEC211	Total credits: 1 Total hours: 15	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 4 <sup>th</sup> semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. It is to develop the social and soft skills and to promote a holistic development of the learners.</li> <li>2. ExtracurricularActivitiesareenabledtosupplementandcomplementthecurricularor main syllabi activities.</li> <li>3. To develop the students' personality as well as to strengthen the classroom learning and extra-curricular activities have wide horizon to cater to the cultural, social, aesthetic development of the child.</li> </ol>								
CO1	Able to engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.								
CO2	Able to participate in regular club activities like workshops, competitions as per their interest and hobbies.								
CO3	Able to represent ADTU in various inter university, state and national level competitions.								
CO4	Able to earn from invited experts in their respective fields.								
CO5	Demonstrate an exposure of 360 degree learning methodology considering the overall growth along with the academics.								

<b>Course Title</b>	<b>MOOC/ONLINE(SELFSTUDYMODEONPRESCRIBEDONLINE PLATFORMS)</b>								
<b>Course code</b>	<b>22MOCEU101/2/3/ 4/5</b>	<b>Total credits: 1 Total hours:15</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/4<sup>th</sup> semester of second year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>									
<b>CO1</b>									
<b>CO2</b>									
<b>CO3</b>									
<b>CO4</b>									
<b>CO5</b>									

Semester-V									
Course Title	Applied Dialysis Technology-I								
Course code	22BDIT311R	Total credits: 5 Total hours: 46T+ 70P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 5 <sup>th</sup> semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To gather a specific knowledge about the order appropriate test towards confirmation of diagnosis, initiate therapy and screening for renal disease in the community and hospital patients.</li> <li>To gather information about haemodialysis process.</li> <li>To gather knowledge on complications of dialysis process.</li> </ol>								
CO1	Able to explain the use of history of dialysis.								
CO2	Able to explain the basic knowledge of hemodialysis such as principles, types of dialysis, and vascular access.								
CO3	Apply the comprehensive knowledge of physiology peritoneal, types of catheter, insertion techniques and associated complications.								
CO4	Able to apply the complication of dialysis.								
CO5	Understanding a comprehensive of the biochemical investigations required for renal diseases.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	History of Dialysis <ul style="list-style-type: none"> <li>Types of dialysis.</li> <li>Indications of dialysis.</li> <li>Dialysis machine mechanism functioning and management</li> </ul> Hemodialysis machine peritoneal dialysis machine	10	Describe, illustrate and explain basic knowledge of history of dialysis.				1,8		
II	Hemodialysis : Diffusion, osmosis, ultra filtration ,and solvent drugs. Haemodialysis apparatus-Type dialysis and membrane. Vascular access for hemodialysis and associate complication	12	Describe, illustrate and explain the basic knowledge of hemodialysis such as principles, types of dialysis, and vascular access.				1,2,3,4,6,8		



<b>III</b>	Peritoneal Dialysis: Physiology Types of catheter, Insertion techniques and associated complications	<b>12</b>	Learn the comprehensive knowledge of physiology peritoneal, types of catheter, insertion techniques and associated complications.	1,2,3,6,8
<b>IV</b>	Complications of dialysis: Haemodialysis–Acute and long term complications Peritoneal dialysis- Mechanical and metabolic complications.	<b>8</b>	Able to apply the complication of dialysis.	1,8
<b>V</b>	Biochemical investigations required for renal diseases	<b>4</b>	Describe, illustrate and explain the biochemical investigation are required for renal diseases.	1,8
<b>Practical</b>	Setting up dialysis machine for dialysis.	16	Apply the knowledge of dialysis machine.	1,2,3,4,8
	A.V. Cannulation.	6	Apply the knowledge of A.V Cannulation	1,2,8
	AV. Fistula / AV Cannulation	6	Apply the knowledge of A.V Cannulation and AV Fistula	1,2,3,8
	Initiation of dialysis through central venous catheter like internal jugular, femoral, and subclavian vein.	12	Apply the knowledge of initiation of dialysis.	1,2,3,8
	Packings and sterilization of dialysis trays.	8	Apply the knowledge of packing and sterilization.	1,4,8
	Setting up dialysis machine for dialysis.	16	Apply the knowledge of the dialysis machine for dialysis treatment.	1,2,3,4,8
	Closing of dialysis.	8	Apply the knowledge of closing of dialysis.	1,2,8
	Preparation of concentrates depending on the situations.	8	Apply the knowledge of preparations of the dialysis solutions.	1,4,8

### TEXT BOOKS

1. Handbook of Dialysis-Jon T Daugirdas
2. Textbook of Dialysis Therapy-Nissenson
3. Textbook Peritoneal Dialysis-Ram Gokal
4. NANT and Oxford-Textbook of Dialysis for Technologist

**REFERENCE BOOKS:**

1. The Essentials of Clinical Dialysis by Hideki Kawanishi (Editor), Yong-Lim Kim(Editor), Springer, USA
2. Essentials of Nephrology 3ed By Visweswaran RK (Author, CRS Publication, Newdelhi, India

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the use of history of dialysis.	<b>1,8</b>
<b>2</b>	Able to explain the basic knowledge of hemodialysis such as principles, types of dialysis, and vascular access.	<b>1,2,3,4,6, 8</b>
<b>3</b>	Apply the comprehensive knowledge of physiology peritoneal, types of catheter, insertion techniques and associated complications.	<b>1,2,3,4,6, 8</b>
<b>4</b>	Able to apply the complication of dialysis.	<b>1,2, 8</b>
<b>5</b>	Understanding a comprehensive of the biochemical investigations required for renal diseases.	<b>1,4,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1 *	PO2	*PO 3	PO4	PO5	PO6	PO7	*PO8
22BDIT311R	Applied Dialysis Technology -I	3	2	2	2		2		3

Semester-V									
Course Title	Applied Dialysis Technology II								
Course code	22BDIT312R	Total credits: 5 Total hours:32	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 5 <sup>th</sup> semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To impart the basic knowledge of dialysis special situations and clinical evaluation of patients with renal disease.</li> <li>To gather knowledge on special dialysis procedures.</li> <li>To gather knowledge on trained dialysis technicians who provide strong paramedical support system to hospitals for providing specialized care to renal failure patients.</li> </ol>								
CO1	Able to explain the use of dialysis in special situations.								
CO2	Able to explain the basic knowledge of dialysis in infants and children.								
CO3	Apply the comprehensive knowledge of special dialysis procedures.								
CO4	Able to apply the plasmapheresis procedures.								
CO5	Understanding a comprehensive of the special problems in dialysis patients.								
Unit-No.	Content			Contact Hour	Learning Outcome			KL	
I	<b>Dialysis in special situations:</b> Patients with congestive cardiac failure. Advanced liver diseases. HIV,HBs Ag & HCV- Positive patients. Failed transplant. Poisoning cases. Pregnancy.			7	Describe, illustrate and explain basic knowledge of dialysis in special situations			1,2,8	
II	<b>Dialysis in infants and children. Special Dialysis Procedures:</b> Continuous therapies in hemodialysis. Different modalities of peritoneal dialysis. Hemodiafiltration. Hemoperfusion. SLED. MARS-Type dialysis and membrane, Dialysis in infants and children.			2	Describe, illustrate and explain the basic knowledge of special dialysis procedures			1,2,3,4,6,8	
III	<b>Special Dialysis Procedures:</b> Continuous therapies in haemodialysis. Different modalities of peritoneal dialysis.			8	Learn the comprehensive knowledge of special situation.			1,2,3,4,6,8	
IV	<b>Plasmapheresis:</b> Latest Haemodialysis Machine Conventional and Portable machine Wearable Artificial Kidney Bio-artificial Kidney Home Dialysis Machine and Patient Training.			6	Able to apply the knowledge of Plasmapheresis.			1,2,3,4,6,8	
V	<b>Special problems in dialysis patients:</b> Diabetes Hypertension, infection, bone diseases, psychology & rehabilitation aluminium toxicity renal anaemia management: chronic dialysis.			9	Describe, illustrate and explain the special problems in dialysis patients			1,2,3,4,6,8	

**TEXT BOOKS:**

1. Handbook of Dialysis-Jon T Daugirdas
2. Textbook of Dialysis Therapy-Nissenson
3. Textbook Peritoneal Dialysis-Ram Gokal NANT and Oxford-Textbook of Dialysis for Technologist

**REFERENCE BOOKS:**

1. The Essentials of Clinical Dialysis by Hideki Kawanishi (Editor),Yong-Lim Kim (Editor), Springer, USA
2. Essentials of Nephrology 3ed By Visweswaran RK (Author, CRS Publication, Newdelhi, India

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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the use of dialysis in special situations.	<b>1,2,8</b>
<b>2</b>	Able to explain the basic knowledge of dialysis in infants and children.	<b>1,2,3,4,6, 8</b>
<b>3</b>	Apply the comprehensive knowledge of special dialysis procedures.	<b>1,2,3,4,6, 8</b>
<b>4</b>	Able to apply the plasmapheresis procedures.	<b>1,2,3,4,6, 8</b>
<b>5</b>	Understanding a comprehensive of the special problems in dialysis patients.	<b>1,2,3,4,6, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BDIT312R	Applied Dialysis Technology-II	3	2	3	3		3		3

Semester- V									
<b>Course Title</b>	<b>Basic Life Support, Management of Renal Failure in ICU</b>								
<b>Course code</b>	<b>22BDIT313R</b>	<b>Total credits: 5 Total hours: 49</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 5<sup>th</sup> semester of third year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. To provide or to train the students for medical emergencies. 2. To gather a specific knowledge about the emergency care for the victim of life- threatening illness or injuries until they can be fully getting medical care in hospital. 3. To gather knowledge about ACLS and BLS.								
<b>CO1</b>	Able to explain the BLS. ACLS theory and practical.								
<b>CO2</b>	Able to explain the basic knowledge of ECG theory practical.								
<b>CO3</b>	Apply the comprehensive knowledge of respiratory system advanced, and cardiovascular system advanced.								
<b>CO4</b>	Able to apply the dialysis CPR.								
<b>CO5</b>	Understanding a comprehensive of the Describe, illustrate and explain the disaster preparedness and management.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	Introduction to BLS. ACLS Theory & practical (Endotracheal Tube, Ventilator, & Instrument related to ACLS).	<b>11</b>	Describe, illustrate and explain basic knowledge of BLS. ACLS theory and practical				1,2,8		
<b>II</b>	ECG theory practical.	<b>7</b>	Describe, illustrate and explain the basic knowledge ECG theory practical.				1,2, 8		
<b>III</b>	Respiratory system Advanced. Cardiovascular system Advanced.	<b>12</b>	Learn the comprehensive knowledge of respiratory system advanced. Cardiovascular system advanced.				1,28		

<b>IV</b>	Shock-in dialysis CPR	<b>7</b>	Able to apply the Shock-in dialysis CPR	1,2, 8
<b>V</b>	Disaster Preparedness And Management Fundamentals of Emergency Management Psychological Impact Management Resource Management Preparedness and Risk Reduction.	<b>12</b>	Describe, illustrate and explain the disaster preparedness and management.	1,8

**TEXT BOOKS:**

1. Text Book of BLS and ACLS By Gvkemri
2. Text Book of Emergency Care in the Street By Nancy Carolin

**REFERENCE BOOKS:**

1. Essentials of Anaesthesiology Critical Care And Resuscitation by MUKUL CHANDRA KAPOOR, Jaypee Brothers Medical Publishers
2. Basic Life Support#2 Trauma Skills by Delmar Thomson Learning, Delmar Publishers ,Delmar Learning , Cengage Learning

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the BLS. ACLS theory and practical.	<b>1,2,8</b>
<b>2</b>	Able to explain the basic knowledge of ECG theory practical.	<b>1,2, 8</b>
<b>3</b>	Apply the comprehensive knowledge of respiratory system advanced. Cardiovascular system advanced.	<b>1,2,8</b>
<b>4</b>	Able to apply the dialysis CPR.	<b>1,2, 8</b>
<b>5</b>	Understanding a comprehensive of the disaster preparedness and management.	<b>1, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT313R	Basic Life Support, Management Renal Failure in ICU	3	2						3

Semester – V									
Course Title	Clinical Dialysis IV								
Course code	22BDIT314R	Total credits:5 Total hours: 16	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 5 <sup>th</sup> semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. Able to apply the knowledge in a holistic approach for the overall wellbeing of the patient in the dialysis unit.</li> <li>2. Able to understand comprehensive about medical ethics and the quality and functions of medical professionals for dialysis procedures.</li> <li>3. Able to apply the clinical management of dialysis patient.</li> </ol>								
CO1	Able to explain the basic knowledge of management of patient with various homo-dialysis complications.								
CO2	Able to explain the personal safety in the dialysis in special cases– Diabetic patients.								
CO3	Learn the basic knowledge of basic dialysis in special cases– cardiac patients.								
CO4	Apply knowledge of dialysis in special cases– AIDS and Hepatitis- B.								
CO5	Demonstrate a comprehensive understanding the dialysis in children.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	Immediate management of patient with various homo-dialysis complication	2	Describe, illustrate and explain basic knowledge of management of complication				1,2, 3, 4, 8		
II	Dialysis in special cases– Diabetic patients	2	Describe, illustrate and explain the basic knowledge of dialysis in special cases in diabetic’s patients.				1,2, 3, 4, 8		
III	Dialysis in special cases– cardiac patients	4	Learn the comprehensive knowledge of dialysis in special cases in cardiac patients.				1,2, 3, 4, 8		
IV	Dialysis in special cases– AIDS and Hepatitis- B	4	Describe, illustrate and explain the AIDS and Hepatitis- B				1,2, 3, 4, 8		



V	Dialysis in children	4	Describe, illustrate and explain the dialysis in children.	1,2, 3, 4, 8
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**TEXT BOOKS:**

1. Handbook for Dialysis Technician Dr. Anjani Sharma (Author), Faswal Pichan (Author)
2. Textbook on Renal Dialysis Technology By Dr. B.C. Bhagavan. Newdelhi, India

**REFERENCE BOOKS:**

- 1 Davidson’s Principles And Practice of Medicine/ 24<sup>th</sup> 2<sup>nd</sup> Edition New York USA.
- 2 Henrich'sPrinciplesandPracticeofDialysis,5/e Hard cover by Matthew R. Weir EdgarL. Lerma, Austin, Texas ,USA

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the basic knowledge of management of patient with various hemodialysis complication.	1, 2,3,4,8
2	Able to explain the personal safety in the dialysis in special cases– Diabetic patients.	1, 2, 3,4, 8
3	Learn the basic knowledge of basic dialysis in special cases– cardiac patients.	1,2, 3, 4, 8
4	Apply knowledge of Dialysis in special cases– AIDS and Hepatitis- B.	1, 2,3, 4, 8
5	Demonstrate a comprehensive understanding the dialysis in children.	1, 2, 3, 4,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BDIT314R	Clinical Dialysis IV	3	3	3	3				3

SEMESTER – V									
Course Title	Dialyzer								
Course code	22BDIT315R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 16	2	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 5 <sup>th</sup> semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. Able to apply the knowledge about the dialysis technology and initiation of dialysis.</li> <li>2. Able to understand comprehensive about conduction of dialysis.</li> <li>3. Able to apply the closure of dialysis.</li> </ol>								
CO1	Able to explain the basic knowledge of a hemodialysis unit.								
CO2	Able to explain the personal safety initiation of dialysis								
CO3	Learn the basic knowledge of conduction of dialysis								
CO4	Apply knowledge of dialysis closure.								
CO5	Demonstrate a comprehensive understanding the washing, cleaning, and reuse.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	A Hemodialysis unit	2	Describe, illustrate and explain basic knowledge of a hemodialysis unit				1,2		
II	Initiation of Dialysis	2	Describe, illustrate and explain the basic knowledge of Initiation of Dialysis				1, 2, 3,4, 8		
III	Conduction of Dialysis	4	Learn the comprehensive knowledge of Conduction of Dialysis				1, 2, 3,4, 8		
IV	Dialysis-closure	4	Describe, illustrate and explain the Dialysis-closure				1, 2, 3,4, 8		
V	Washing, cleaning, reuse	4	Describe, illustrate and explain the washing, cleaning, reuse				1, 2, 3,4, 8		

**TEXT BOOKS:**

1. Handbook for Dialysis Technician Dr. Anjani Sharma (Author), Faswal Pichan (Author)
2. Textbook on Renal Dialysis Technology By Dr. B. C. Bhagavan. Newdelhi, India

**REFERENCE BOOKS:**

- 1 Davidson's Principles and Practice of Medicine/24<sup>th</sup> 2<sup>nd</sup> Edition New York USA.
- 2 Henrich's Principles and Practice of Dialysis,5/e Hard cover by Matthew R. Weir Edgar  
L. Lerma, Austin, Texas ,USA

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the basic knowledge of a hemodialysis unit.	1, 8
2	Able to explain the personal safety initiation of dialysis.	1, 2, 3,4, 8
3	Learn the basic knowledge of conduction of dialysis.	1,2, 3, 4,5 8
4	Apply knowledge of dialysis closure.	1, 2,3, 4, 8
5	Demonstrate a comprehensive understanding the washing, cleaning, and reuse.	1, 2, 3, 4,8

**MAPPING TABLE**

Course code	Course Name	PO 1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT315R	Dialyzer	3	2	2	2	1			3

<b>Semester – V</b>									
<b>Course Title</b>	<b>Co-Curricular Activities</b>								
<b>Course code</b>		<b>Total credits: 1</b> <b>Total hours: 15</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 5<sup>th</sup> semester of third year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities.</li> <li>2. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning.</li> <li>3. Co-curricular activities have wide horizon to cater to the cultural, social, aesthetic development of the child.</li> </ol>								
<b>CO1</b>	Able to engaged in Co-curricular activities facilitate in the development of various domains of mind and personality such as, emotional development, social development, moral development and aesthetic development.								
<b>CO2</b>	Able to participate in Creativity, Enthusiasm, and Energetic, Positive thinking.								
<b>CO3</b>	Able to learn the intellectual development.								
<b>CO4</b>	Able to apply the personality development.								
<b>CO5</b>	Demonstrate an exposure the extracurricular activities.								

<b>Course Title</b>	<b>MOOC/ONLINE(SELFSTUDYMODEONPRESCRIBEDONLINE PLATFORMS)</b>									
<b>Course code</b>	<b>22MOCEU101/2/3/4/5</b>	<b>Total credits: 1</b> <b>Total hours: 15</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>	
			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>							
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>									
<b>Semester</b>	<b>Fall/ 5<sup>th</sup> semester of third year of the programme</b>									
<b>Course Objectives (Minimum 3)</b>										
<b>CO1</b>										
<b>CO2</b>										
<b>CO3</b>										
<b>CO4</b>										
<b>CO5</b>										

SEMESTER – VI									
Course Title	Applied Dialysis Technology-III								
Course code	22BDIT321R	Total credits: 5 Total hours: 51 T+ 64P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 6 <sup>th</sup> semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. Able to apply the knowledge about test towards confirmation of diagnosis, initiate therapy and screening for renal disease in the community and hospital patients.</li> <li>2. Able to understand comprehensive about peritoneal access.</li> <li>3. Able to apply the telemedicine.</li> </ol>								
CO1	Able to explain the basic knowledge of vascular access for hemodialysis and associated complications.								
CO2	Able to explain the peritoneal access.								
CO3	Learn the basic knowledge of complication of dialysis.								
CO4	Apply knowledge of recent advances and research in hemodialysis.								
CO5	Demonstrate a comprehensive understanding of telemedicine in dialysis practice.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	Vascular access for hemodialysis & associated complications	8	Describe, illustrate and explain the vascular access for hemodialysis and associated complications.				1,2,3,4,8		
II	<b>Peritoneal access devices:</b> types of catheter, insertion technique & associated complications. Peritonitis & exit site infection	15	Describe, illustrate and explain the basic knowledge of peritoneal access				1,2,3,4,8		
III	<b>Complications of dialysis:</b> Hemodialysis: acute & long term complications. Peritoneal dialysis: mechanical & metabolic complications	10	Learn the comprehensive knowledge of complication of dialysis				1,2,3,4,8		
IV	Recent advances and research in Hemodialysis. Nocturnal dialysis Online dialysis. Daily dialysis.	9	Describe, illustrate and explain the recent advances and research in hemodialysis				1,2,3,4,8		

<b>V</b>	Telemedicine in dialysis practice complications.	<b>6</b>	Describe, illustrate and explain the telemedicine in dialysis practice.	1,2,3,4,8
<b>Practical</b>	Reuse of dialysis apparatus.	8	Able to apply the reuse of dialysis apparatus.	1,3,4
	Isolated ultra filtration.	6	Able to apply the isolated ultra filtration	
	Performance of peritoneal dialysis exchange manually.	6	Able to apply the performance of peritoneal dialysis exchange manually.	
	Setting up of automated peritoneal dialysis equipment.	12	Able to apply the setting up of automated peritoneal dialysis equipment.	
	First assistant in minor procedures.	8	Able to apply the first assistant minor procedures	
	Skin suturing. CPR demonstrations	8	Able to apply the skin suturing	
	Introduction to tissue typing laboratory and witness metrology for 1) HLA typing methods, tissue cross-match (X- match), panel reactive antibodies(PRA) and Detection of donor Specific antibodies (DSA).	16	Able to apply the introduction to tissue typing laboratory and witness metrology.	

**TEXT BOOKS:**

1. Handbook for Dialysis Technician Dr. Anjani Sharma (Author), Faswal Pichan (Author)
2. Textbook on Renal Dialysis Technology By Dr. B. C. Bhagavan. Newdelhi, India

**REFERENCE BOOKS:**

1. Davidson's Principles And Practice Of Medicine/ 24<sup>th</sup> 2<sup>nd</sup> Edition New York USA.
2. Henrich's Principles and Practice of Dialysis,5/e Hard cover by Matthew R. Weir Edgar L. Lerma, Austin, Texas ,USA



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of vascular access for hemodialysis and associated complications.	<b>1, 2,3,4,8</b>
<b>2</b>	Able to explain the peritoneal access.	<b>1, 2, 3,4, 8</b>
<b>3</b>	Learn the basic knowledge of complication of dialysis.	<b>1,2, 3, 4,8</b>
<b>4</b>	Apply knowledge of recent advances and research in hemodialysis.	<b>1, 2,3, 4, 8</b>
<b>5</b>	Demonstrate a comprehensive understanding the telemedicine in dialysis practice.	<b>1, 2, 3, 4,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	*PO3	PO4	PO5	PO6	PO7	*PO8
22BDIT321R	Applied Dialysis Technology-III	3	3	3	3				3

**SEMESTER – VI**

<b>SEMESTER – VI</b>									
<b>Course Title</b>	<b>Renal Transplantation</b>								
<b>Course code</b>	<b>22BDIT322R</b>	<b>Total credits: 3 Total hours: 50 T</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 6<sup>th</sup> semester of third year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. Able to learn about the transplantation.</li> <li>2. Able to learn the various forms of renal replacement therapy and successful performance of the same in patients with renal failure.</li> <li>3. Able to learn about the different types of graft.</li> </ol>								
<b>CO1</b>	Able to explain the basic knowledge of kidney transplant.								
<b>CO2</b>	Able to explain the history of transplantation.								
<b>CO3</b>	Learn the basic knowledge of types of graft and rejection.								
<b>CO4</b>	Apply knowledge of tissue matching and investigation to transplant								
<b>CO5</b>	Able to understand the live donor and cadaver donor in renal transplant.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	Introduction to kidney transplantation immunology, procedure and Immunosuppressive medications	<b>10</b>	Describe, illustrate and explain the basic knowledge of kidney transplant.					1,8	
<b>II</b>	History of transplantation What is renal transplantation? Indications. contraindication	<b>6</b>	Describe, illustrate and explain the history of transplantation					1,8	
<b>III</b>	Transplantation Descriptive terms. Types of grafts. Graft rejection. Types of tissue and organs transplanted	<b>8</b>	Learn the comprehensive knowledge of types of graft and rejection.					1,8	
<b>IV</b>	Tissue matching and other relevant investigation to transplant Prevention & treatment of rejection. dialysis.	<b>10</b>	Describe, illustrate and explain the tissue matching and investigation to transplant.					1,8	
<b>V</b>	Live donor and cadaver transplantation, paired exchange transplantation and ABO incompatible transplantation, transplant in sensitized recipients.	<b>6</b>	Describe, illustrate and explain the live donor and cadaver donor in renal transplant.					1,8	

**TEXT BOOKS:**

1. Handbook for Dialysis Technician Dr, Anjani Sharma (Author), Faswal Pichan (Author)
2. Textbook on Renal Dialysis Technology By Dr. B. C. Bhagavan. Newdelhi, India

**REFERENCE BOOKS:**

1. Davidson's Principles And Practice Of Medicine/ 24<sup>th</sup> 2<sup>nd</sup> Edition New York USA.
2. Henrich's Principles and Practice of Dialysis,5/e Hard cover by Matthew R. Weir Edgar L. Lerma, Austin, Texas ,USA

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOME**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of kidney transplant.	<b>1, 8</b>
<b>2</b>	Able to explain the history of transplantation.	<b>1, 8</b>
<b>3</b>	Learn the basic knowledge of types of graft and rejection.	<b>1,</b>
<b>4</b>	Apply knowledge of tissue matching and investigation to transplant	<b>1, 8</b>
<b>5</b>	Able to understand the live donor and cadaver donor in renal transplant.	<b>1, 8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BDIT322R	Renal Transplant	3							3

SEMESTER – VI									
Course Title	Medical Ethics Sterilization and Relevant Medico-Legal Aspects								
Course code	22BDIT323R	Total credits: 3 Total hours: 48 T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 6 <sup>th</sup> semester of third year of the programme								
Course Objectives (Minimum 3)	1. Able to learn about the basic concept on essential elements is professional competence and medical ethics. 2. Able to learn about the sterilization. 3. Able to learn about the mandatory reporting.								
CO1	Able to explain the basic knowledge of sterilization.								
CO2	Able to explain the ethics.								
CO3	Learn the basic knowledge of different types of sterilization.								
CO4	Apply knowledge of sterilization.								
CO5	Able to understand the mandatory reporting.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Sterilization-Introduction	4	Describe, illustrate and explain the basic knowledge of Sterilization					1,8	
II	Types of sterilization and details of different types of sterilization.	8	Describe, illustrate and explain the different types of sterilization.					1,8	
III	Introduction, What is Ethics, Definition, Types of Medical Ethics, & Difference between law & Ethics? Medical Ethics- Overall review in Ethics for emergency Medical Technician (EMT) (in details)	15	Learn the comprehensive knowledge of ethics.					1,8	
IV	Types of Law-in brief and legal system. Medical Practice Act. Health Insurance Portability & Accountability. Emergency Vehicle laws. Medical Examination cases. Decision making capacity	15	Describe, illustrate and explain the types of law.					1,8	
V	Mandatory Reporting	6	Describe, illustrate and explain the mandatory reporting.					1,8	

## TEXT BOOKS

1. Textbook of Emergency Care in the Street By Nancy Caroline

## REFERENCE BOOKS:

1. The Essentials of Clinical Dialysis by Hideki Kawanishi (Editor), Yong- Lim Kim (Editor), Springer, USA
2. Essentials Of Nephrology 3ed By Visweswaran R K (Author, CRS Publication, Newdelhi, India

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to explain the basic knowledge of sterilization.	1,2,8
2	Able to explain the ethics.	1,3,5, 8
3	Learn the basic knowledge of different types of sterilization.	1,2,8
4	Apply knowledge of types of law.	1, 2,5,8
5	Able to understand the mandatory reporting.	1,5,8

## MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BDIT323R	Medical Ethics Sterilization and relevant Medico-Legal Aspects	3	3	2		3			3

SEMESTER – VI									
Course Title	Dialysis Practice								
Course code	22BDIT324R	Total credits: 1 Total hours: 48	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ 6 <sup>th</sup> semester of third year of the programme								
Course Objectives (Minimum 3)	1. Able to learn about the practice of hemodialysis. 2. Able to learn the various performance of the practice of peritoneal dialysis. 3. Able to learn about preparation of dialysis model								
CO1	Able to explain the basic knowledge of practice of hemodialysis.								
CO2	Able to explain the peritoneal dialysis.								
CO3	Learn the basic knowledge of preparation of dialysis model.								
CO4	Apply knowledge of preparation of dialysis model.								
CO5	Able to understand the preparation of dialysis model.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Practice of hemodialysis	8	Describe, illustrate and explain the basic knowledge of practice of hemodialysis					1,8	
II	Practice of peritoneal dialysis	15	Describe, illustrate and explain the practice of peritoneal dialysis					1,8	
III	Preparation of dialysis model	10	Learn the comprehensive knowledge of preparation of dialysis model					1,8	
IV	Preparation of dialysis model	9	Describe, illustrate and explain the preparation of dialysis model					1,8	
V	Preparation of dialysis model	6	Describe, illustrate and explain the preparation of dialysis model					1,8	

**TEXT BOOKS:**

- 1 Handbook for Dialysis Technician Dr. Anjani Sharma (Author), Faswal Pichan (Author)
- 2 Textbook on Renal Dialysis Technology By Dr. B. C. Bhagavan. Newdelhi, India

**REFERENCE BOOKS:**

- 1 Davidson's Principles And Practice Of Medicine/ 24th 2nd Edition New York USA.
- 2 Henrich's Principles and Practice of Dialysis,5/e Hard cover by Matthew R. Weir Edgar L. Lerma, Austin, Texas ,USA

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the basic knowledge of practice of hemodialysis.	<b>1,2,3,4,8</b>
<b>2</b>	Able to explain the peritoneal dialysis.	<b>1, 2,3,4,8</b>
<b>3</b>	Learn the basic knowledge of preparation of dialysis model.	<b>1, 2,3,4,8</b>
<b>4</b>	Apply knowledge of preparation of dialysis model.	<b>1, 2,3,4,8</b>
<b>5</b>	Able to understand the preparation of dialysis model.	<b>1,2,3,4,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BDIT324R	Dialysis Practice	3	2	3	3				3

<b>Semester – VI</b>									
<b>Course Title</b>	<b>Research project</b>								
<b>Course code</b>	<b>22BDIT32R</b>	<b>Total credits: 3</b> <b>Total hours: 45</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>18</b>	<b>0</b>	<b>3</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Dialysis Technology</b>								
<b>Semester</b>	<b>Fall/ 6<sup>th</sup> semester of third year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>									
<b>CO1</b>									
<b>CO2</b>									
<b>CO3</b>									
<b>CO4</b>									
<b>CO5</b>									





# Assam down town University

## Curriculum and Syllabus

### Bachelor of Trauma, Emergency and Disaster Management

OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**


July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022

  
*Chairperson*  
*Board of Studies*

  
*Member Secretary*  
*Academic Council*



## ***Vision***

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## ***Missions***

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community.

# Programme Details

## Programme Overview (not more than 100 words)

The Bachelor of Trauma Emergency and Disaster Management is a three-year graduate programme that deals with the knowledge of disease processes and specific bedside procedures, as well as technical skills for handling critical emergencies, including cardiac, neurological, polytrauma, and paediatric emergencies. Upon completion of the programme, students will be equipped to handle serious medical and surgical emergencies and can be recruited by hospital and ambulance services, such as 108 and air ambulance.

## Specific Features of the Curriculum

The curriculum provides skill enhancement and value-added courses along with the core papers.

## Eligibility Criteria: (To be aligned with the admission office)

Minimum 45% in 10+2 with arts or sciences or equivalent examination recognized by any Indian University or a duly constituted Board with 45% of marks

## Program Educational Objectives (PEOs):

**PEO-1:** AdtU BEDM graduates will be well prepared for successful careers in healthcare settings both government and private sector in areas of emergency dept, ambulances service in hospital and pre-hospital setting.

**PEO-2:** BEDM graduates will be engaged in professional activities to enhance their own stature and simultaneously contribute to the profession and society at large.

**PEO-3:** Graduates will be academically well prepare for higher education and ensuring requisite knowledge and proficiency to thrive in advanced academic and clinical settings within these critical areas of healthcare

## I. Program Specific Outcomes (PSOs):

### II.

**PSO1: : Practice Industry-in:** Demonstrate a comprehensive understanding of emergency response strategies, including the ability to assess and prioritize immediate needs in various disaster and trauma scenarios in different emergency care settings through practice in simulation labs and internships in industry setting.

**PSO2:Disaster Preparedness and Mitigation:** Possess the skills to identify potential risks, assess vulnerabilities, and design effective strategies to reduce the impact of disasters on communities and infrastructure.

**PSO3: Global Competency:** Exhibit international competency to excel in the profession through international emergency and disaster management and interdisciplinary certification courses.

### **III. Program Outcome: (8-12)**

**PO1: Human Health Knowledge:** Apply the comprehensive knowledge of human anatomy, physiology, biochemistry, medical conditions, disaster scenarios, drug interventions, emergency care procedures and sterile practices in real-life emergency care situations.

**PO2: Patient care:** Demonstrate emergency healthcare protocols, encompassing critical care procedures and aseptic techniques within and outside hospital settings to ensure patient well-being

**PO3: Procedures and Techniques:** Utilize skills to assess vital signs, maintenance of airway, breathing, circulation, and transportation of the patient from the site of incident/accident to the emergency ward of the hospital.

**PO4: : Equipment Proficiency:** Operate modern patient monitoring systems and life-saving instruments like Defibrillators and Automated External Defibrillators effectively

**PO5: Teamwork:** Perform efficiently as a member or leader in diverse teams/multidisciplinary settings.

**PO6: Professional and Ethical Practices:** Prepare and maintain patient information, and apply ethical principles in the profession

**PO7: Communication:** Use effective communication within the healthcare team rendering seamless collaboration and timely sharing of critical information.

**PO8: Sustainable and Lifelong Learning:** Able to engage in independent and lifelong learning in the broadest sense to benefit the environment and human kind

#### **I. Total Credits to be Earned:**

- II.** Total credit need to score for the successful completion of BSc Trauma Emergency and Disaster Management degree program is 141.

### **Career Prospects:**

Graduates of Trauma, Emergency, and Disaster Management have a range of career opportunities available to them. They can work as Disaster Management Officers, where they plan and coordinate disaster response activities. Emergency Management Specialists focus on preparing for and mitigating the impact of emergencies. Those who choose to become Emergency Medical Technicians provide critical pre-hospital care. Fire Inspectors and Fire Investigators ensure fire safety and investigate fire-related incidents, respectively. Forest

Fire-fighters specialize in combating wildfires and responding to and extinguishing fires to save lives of the people

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 40% or as prescribed by the programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Sem Exam – I (ISE-I) (Written Examination) *	30
2.	In-Sem Exam – II (ISE-II) (Written Examination) *	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*are compulsory*

**Note:** Total Internal assessment should be out of 40

### INSTRUCTION

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.
2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.
3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

### B. SEMESTER END EXAMINATION:

Time table for end semester examination is published at least 25 days prior to the start of Examination.

## I. Pre-Examination:

### Eligibility Criteria for a student to appear in University Examinations:

The student shall only be allowed to appear in a University Examination, if:

- i) He/ She is a registered student of the University;
- ii) He/ She is of good conduct and character;
- iii) He/ She have completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

## II. Admit Card:

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds.

## III. Pattern of Question Papers:

The question paper shall follow the principles of Bloom's Taxonomy.

Table

S. N.	Level	Questions /verbs for test
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify
4	Analyze	Classify, outline, categorize, analyze, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.
6	Create	Design, Formulate, Modify, Develop, integrate, etc.

**Note:** No course is to be evaluated on basis of **all 6 knowledge levels**.

The format of the question paper across all the program follow a unique pattern and the total marks is 60

**Table 1: Question paper pattern for End semester examination**



<b>Sl no</b>	<b>Question pattern</b>	<b>Total marks</b>
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

#### **V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

#### **VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Office-in-Charge of the centre may take appropriate decisions as per the rules and procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

#### **VII. Instruction to the Students:**

- (i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- (ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- (iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.

- (iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- (v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- (vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- (vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.
- (viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- (ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

### **VIII. Provision for an Amanuensis (writer):**

- (i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.
- (ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.
- (iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process.

### **C. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times CR$

### **i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

### **ii. Grade Point:**

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

### **iii. Letter Grade:**

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

<b>Letter Grade</b>	<b>Grade Points</b>	<b>Description</b>
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

#### iv. Grade Point Average:

##### a. SGPA (Semester Grade Point Average)

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades 'O' to 'F' as given in Table 1.

$$\text{SGPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  registered Course and  $C_i$  is the Credit (weight) of that Course.

##### b. CGPA (Cumulative Grade Point Average)

(i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrolment in the Programme. In other words, taking into account all the Courses graded with 'O' to 'P' as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrolment.

(ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  completed Course and  $C_i$  is the Credit (weight) of that Course.

$$\text{CGPA} = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

(iii) The CGPA shall be convertible into equivalent percentage of marks using Equation Conversion of CGPA to percentage marks: = CGPA\*10

## **D. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### **ii. Grievance Readdress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.
- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite proforma available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.
- (vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.
- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.
- (ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# INSTRUCTION TO TEACHERS AND STUDENTS

## (Teaching and Learning Methods)

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

### 1. Student- centric / Constructivist Approach:

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer and discuss in the successive class. This will help in the preparation for various competitive examinations and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see,

the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student- centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

### **The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures	20%
Student-centric Approach, Students present and deliver lectures in the presence of teacher and supervised by teacher	60%
Students visit fields or perform experiments or teachers perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

### **Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned approaches and prepare a lesson plan for execution and maintain a file.

**Curriculum Framework**  
**Breakdown of Credits (for 2022-23 Syllabus)**

<b>Sl. No</b>	<b>Category</b>	<b>Total number of Credits</b>
1	University Core(UC)	17
2	University Elective (UE)	5
3	Program Core(PC)	109
4	Program Elective (PE)	1
5	Faculty Elective (FE)	9
<b>Total number of credit</b>		<b>141</b>

**Breakdown by categories of courses**

<b>Sl no</b>	<b>Category</b>	<b>Credits</b>	<b>%</b>
1	Paramedical Sciences	110	78%
2	Science	22	15.6%
3	Engineering	1	0.7%
4	Commerce and Management & Humanities and Social Science	8	5.67%
<b>Total</b>		<b>141</b>	<b>100%</b>



**SEMESTER WISE COURSE DISTRIBUTION**

	S. No.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
<b>Semester I</b>	1.	22BEDM111R	ANATOMY I	PC	3	0	4	0	0	0	5	40	60	100	200
	2	22BEDM112R	PHYSIOLOGY I	PC	3	0	4	0	0	0	5	40	60	100	200
	3	22BEDM113R	BIOCHEMISTRY I	PC	3	0	2	0	0	0	4	40	60	100	200
	4	22BEDM114R	HDPC I	PC	2	0	0	0	0	0	2	40	60	0	100
	5	22UBPD112R	ELEMENTARY ENGLISH	UE	0	0	4	0	0	0	2	00	0	100	100
	6	22UBEC111	EXTRA-CURRICULAR (NON -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
	<b>Total</b>					<b>11</b>	<b>0</b>	<b>14</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>160</b>	<b>240</b>	<b>500</b>
<b>Semester II</b>	1.	22BEDM121R	ANATOMY II	PC	3	0	4	0	0	0	5	40	60	100	200
	2	22BEDM122R	PHYSIOLOGY II	PC	3	0	4	0	0	0	5	40	60	100	200
	3	22BEDM123R	BIOCHEMISTRY II	PC	3	0	2	0	0	0	4	40	60	100	200
	4	22BEDM124R	HDPC II	PC	2	0	0	0	0	0	2	40	60	0	100
	5	22BEDM125R	TECHNO PROFESSIONAL SKILLS	PC	0	0	2	0	0	0	1	00	00	100	100
	7	22UBCC121	Co-curricular (non -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
	8	22UBEC121	Extra-curricular (non -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
	9	22UBPD122R	IMPLICIT ENGLISH(COMMUNICATIVE ENGLISH&SOFT SKILLS (CICT)	PC	0	0	4	0	0	0	2	0	0	100	100
	10	22UCDL102R	DIGITAL PROFICIENCY	UE	0	0	2	0	0	0	1	0	0	100	100
	11	22UUHV104R	UHV+PROFESSIONAL ETHICS	UE	1	0	2	0	0	0	2	40	60	0	100
	12	MOBEDMR123	(MOOCS) SCIENTIFIC WITING IN HEALTH RESEARCH	UC	1	0	0	0	0	0	1	0	0	100	100

Total				13	0	20	8	0	0	25	200	300	900	1400
S. No.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
1.	22BEDM211R	PATIENT ASSESSMENT, VENOUS ACCESS & DRUG ADMINISTRATION	PC	4	0	4	0	0	0	6	40	60	100	200
2	22BEDM212R	AIRWAY MANAGEMENT AND RESPIRATORY EMERGENCIES	PC	4	0	4	0	0	0	6	40	60	100	200
3	22BEDM213R	MEICAL EMERGENCIES I	PC	3	0	4	0	0	0	5	40	60	100	200
4	22BEDM214R	PHARMACOLOGY I	PC	2	0	0	0	0	0	2	40	60	0	100
5	22BEDM215R	SYSTEMIC EXAMINATION OF THE PATIENT(TPS)	PC	0	0	2	0	0	0	1	00	00	100	100
6	22BEDMGE01	INTRO TO AR/VR/MR/XR: TECHNOLOGIES, APPLICATIONS & ISSUES	UE	2	0	0	0	0	0	2	00	00	100	100
7	22BEDMMO01	PREHOSPITAL CARE OF ACUTE STROKE AND PATIENT SELECTION FOR ENDOVASCULAR TREATMENT USING THE RACE SCALE		1	0	0	0	0	0	1	00	00	100	100
8	22UBCC211	CO-CURRICULAR (NON -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
9	22UBEC211	EXTRA-CURRICULAR (NON -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
10	22UBPD211R	EXECUTIVE ENGLISH	UC	0	0	2	0	0	0	1	0	0	100	100
11	22UULS211R	BASIC ACCLIMATIZING SKILLS	PC	0	0	2	0	0	0	1	0	0	100	100
<b>Total</b>				<b>16</b>	<b>0</b>	<b>18</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>27</b>	<b>160</b>	<b>240</b>	<b>1000</b>	<b>1400</b>

**Semester III**

S No	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
1.	22BEDM221R	CARDIOVASCULAR & NEUROLOGICAL EMERGENCY MANAGEMENT	PC	3	0	4	0	0	0	5	40	60	100	200
2	22BEDM222R	SPECIAL CONSIDERATION I	PC	3	0	4	0	0	0	5	40	60	100	200
3	22BEDM223R	PHARMACOLOGY II	PC	2	0	0	0	0	0	2	40	60	0	100
4	22BEDM224R	TRAUMA EMERGENCY (TECHNO PROFESSIONAL SKILLS)	PC	0	0	2	0	0	0	1	0	0	100	100
5	22BEDMGE21	QUALITY IMPROVEMENT IN HEALTHCARE SPECIALIZATION	FE	2	0	0	0	0	0	2	0	100	0	100
6	22BEDMMO21	CLOUD COMPUTING LAW SPECIALIZATION	FE	1	0	0	0	0	0	1	0	100	0	100
7	22UBCC221	CO-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	100	100
8	22UBEC221	EXTRA-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	100	100
9	22UBES201R	EVS	UC	2	0	0	0	0	0	2	40	60	0	100
10	22UBPD221R	ENHANCED PROFESSIONAL SKILLS	UC	0	0	2	0	0	0	1	0	0	100	100
11	22UUFL223R	PERSONAL FINANCIAL PLANNING	UC	0	0	2	0	0	0	1	0	0	100	100
12	22UULS222R	BASIC LIFE SAVING SKILLS	UC	0	0	2	0	0	0	1	0	0	100	100
	<b>TOTAL</b>			13	0	16	8	0	0	23				1400

Semester IV

	S No	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
<b>Semester V</b>	1.	22BEDM311R	TRAUMA CARE	PC	4	0	4	0	0	0	6	40	60	100	200	
	2	22BEDM312R	MEDICAL EMERGENCIES II AND SPECIAL CONSIDERATION II	PC	4	0	4	0	0	0	6	40	60	100	200	
	3	22BEDM313R	MEDICAL EQUIPMENT USAGE AND MANAGEMENT	PC	4	0	4	0	0	0	6	40	60	100	200	
	4	22BEDM314R	TECHNO PROFESSIONAL SKILLS	PC	0	0	2	0	0	0	1	0	0	100	100	
	5	22UBEC311	EXTRA-CURRICULAR	UC	1	0	0	0	0	0	1	40	60	0	100	
	6	22UBCC311	CO-CURRICULAR	UC	0	0	0	4	0	0	1	0	0	100	100	
	7	22BEDMMO31	MOOCS	FE	1	0	0	0	0	0	1	0	100	0	100	
	<b>Total</b>					<b>14</b>	<b>0</b>	<b>14</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>22</b>	<b>160</b>	<b>240</b>	<b>600</b>	<b>1000</b>
	S No	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
<b>Semester VI</b>	1	22BEDM321R	EMS SYSTEM AND INTRODUCTION TO AIR AMBULANCE	PC	4	0	0	0	0	0	4	40	60	0	100	
	2	22BEDM322R	DISASTER MANAGEMENT AND AMBULANCE OPERATION	PC	4	0	0	0	0	0	4	40	60	0	100	
	3	22BEDM323R	CLINICAL EXPOSURE	FE	0	0	20	0	0	0	10	0	0	100	100	

	4	22BEDM324 R	FIELD/LAB BASED RESEARCH		0	0	0	0	3 6	0	6			0	0	100	100
	5	22BEDMMO 32	MOOCS	FE	1	0	0	0	0	0	1			0	100	0	100
		TOTAL			9		2 0	0	3 6	0	25			80	220	200	500

**\*IA: Internal Assessment, SEE: Semester End Examination,  
PE: Practical Examination**

SEMESTER – I									
Course Title	Anatomy I								
Course code	22BEDM111R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	I semester of first year of the programme								
Course Objectives (Minimum 3)	1. To learn about the anatomical position, gross and microscopic structure of the organs and skeleton in the human body. 2. To provide a strong anatomical foundation about the human body 3. To assist students in developing a better grasp of the anatomical structure and relationships in various body regions								
CO1	Understand basic anatomical terms and positions.								
CO2	Develop fundamental knowledge on the musculoskeletal system.								
CO3	Discuss the components and functions of organs in the thoracic cavity.								
CO4	Explain the different structures and components of the digestive system.								
CO5	Understand and classify the human body tissues.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>INTRODUCTION TO ANATOMICAL TERMS:</b> Organization of human body, Anatomical positions, axis and plans, common anatomical terminology		7	Describe, illustrate and explain the different anatomical positions and terms.				1,2	
II	<b>MUSCULO – SKELETAL SYSTEM:</b> <b>Bones:</b> Classification & types according to morphology & development structure and functions, description of bones of human body, blood supply of bones. <b>Cartilage:</b> Description. <b>Joints:</b> Definition, classification, structure and movements. <b>Muscles:</b> Types and structure of Muscles, name of the muscles of the body with some important muscle's attachments.		10	Describe, illustrate and classify the musculoskeletal system along with their functions.				1,2	
III	<b>THORAX:</b> Mediastinum – division and contents, Structure of heart and blood vessels, Full description of Respiratory tract and lungs, Para nasal sinuses.		10	Describe, illustrate and explain the structure of organs inside the thoracic cavity.				1,2	
IV	<b>DIGESTIVE SYSTEM:</b> Structure of Gastro Intestinal tract and accessory organs of digestion		8	Describe, illustrate and explain the structure and composition of the digestive system.				1,2	

<b>V</b>	<b>TISSUE:</b> Classification and description of the basic tissues of the body. <b>Histology:</b> Epithelium, compact bone muscles, connective tissue, nervous tissue artery, vein and lymphatic tissue	<b>10</b>	Describe, classify and explain the tissues of the body.	1,2
<b>Practical</b>	1. Study of anatomical planes and positions. 2. Study of Skelton and bones of human body. (Skull, Vertebrae, Ribs and bone of upper limb)	<b>60</b>	Discuss the anatomical planes, positions, and the major bones of the human skeleton, including the skull, vertebrae, ribs, and upper limb bones and explain the significance of these planes and bones of human anatomy	3,4,5

### TEXT BOOKS:

T1: Allison Wynn Grant, Anne Waugh, and Kathleen J. W. Wilson ‘Ross and Wilson Anatomy and Physiology’, Elsevier, Amsterdam, Netherlands, 13<sup>th</sup> Edition (2020)

T2: Richard Drake, A. Wayne Vogl, Adam Mitchell, ‘Gray's Anatomy for Students’, Elsevier, Amsterdam, Netherlands, 4<sup>th</sup> Edition (2019).

### REFERENCE BOOKS:

R1: BD CHAURASIAS., ‘HUMAN ANATOMY’ CBS publisher, New Delhi, 8<sup>th</sup> Edition (2017)..

R2: Inderbir Singh. ‘Anatomy and Physiology’ CBS Publisher, Newdelhi 2<sup>nd</sup> Edition (2004)

R3: Frederic Martini, Judi Nath, Robert Tallitsch, ‘Human Anatomy’, pearson Publisher, USA, 1<sup>st</sup>edition( 2017).

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand basic anatomical terms and positions.	1,3,4,8
2	Develop fundamental knowledge on the musculoskeletal system.	1,3,4,8
3	Discuss the components and functions of organs in the thoracic cavity.	1,3,4,8
4	Explain the different structures and components of the digestive system.	1,3,4,8
5	Understand and classify the human body tissues.	1,3,4,8

## MAPPING TABLE

Course code	Course Name	PO 1*	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
22BEDM111R	Anatomy I	3		2	2				2

SEMESTER – I											
<b>Course Title</b>	<b>Physiology I</b>										
<b>Course code</b>	<b>22BEDM112R</b>	<b>Total credits: 5</b>			<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 45T+60P</b>			3	0	4	0	0	0	5
<b>Pre-requisite</b>	<b>NIL</b>	<b>Co-requisite</b>			<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Trauma, Emergency and Disaster Management</b>										
<b>Semester</b>	<b>I semester of first year of the programme</b>										
<b>Course Objectives (Minimum 3)</b>	1. To comprehend how tissues, organelles, cells, and the organ system are put together and function. 2. To provide a thorough understanding of all physiological systems in the human body 3. To examine intricate topics such as blood composition, hormonal control mechanisms, and physiological adaptations to environmental factors										
<b>CO1</b>	Develop fundamental knowledge on the components of cells and tissue structure.										
<b>CO2</b>	Describe the different composition and functions of the blood.										
<b>CO3</b>	Understand the process of the digestive system along with the organs involved and their significance.										
<b>CO4</b>	Explain the mechanism of the respiratory system.										
<b>CO5</b>	Understand the cardiovascular system along with the human circulatory system.										
<b>Unit-No.</b>	<b>Content</b>				<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>	
<b>I</b>	<b>GENERAL PHYSIOLOGY:</b> Organization of human body, cell structure and organelle, Tissues and functions.				<b>7</b>	Describe, illustrate and explain the functions of cells and tissues in the human body.				1,2	
<b>II</b>	<b>BLOOD:</b> Blood volume and body fluids, Composition and functions of blood, Structure and formation and function of RBC, WBC and platelets, Haemoglobin, Plasma, blood coagulation, Blood groups.				<b>10</b>	Describe, illustrate and explain the composition of body fluids and blood along with their functions.				1,2	
<b>III</b>	<b>DIGESTIVE SYSTEM:</b> General introduction, organizational plan of digestive system, Movement of G.I. Tract and functions of various components, Composition, functions and regulation of salivary, gastric,				<b>10</b>	Describe, illustrate and explain the functions and mechanism of the digestive system.				1,2	



	pancreatic, intestinal and biliary secretion, Functions of liver, gallbladder and pancreas, Digestion and absorption of carbohydrate, protein and			
<b>IV</b>	<b>RESPIRATORY SYSTEM:</b> General organization, Mechanics of respiration, Regulation of respiration, Gaseous exchange in lung and tissues, Pulmonary ventilation, volumes and capacities. Effect of exercise on respiration, hypoxia	<b>8</b>	Describe, illustrate and explain the mechanism of the human respiratory system.	1,2
<b>V</b>	<b>CARDIOVASCULAR SYSTEM:</b> General organization, structure and properties of cardiac muscles, Cardiac output, cardiac cycle, conducting system of heart, heart sounds, regulation of H.R., pulse, blood pressure and its regulation, Systemic circulation, pulmonary circulation and coronary circulation, ECG, cardio respiratory changes during exercise.	<b>10</b>	Describe, illustrate and explain the functions and mechanism of the cardiovascular system.	1,2
<b>Practical</b>	1. Study of compound Microscope. 2. Arterial pulse 3. Measurement of blood pressure 4. Hemoglobin 5. Blood group	<b>60</b>	Identify; explain the concepts and methods related to the use of a compound microscope, arterial pulse, blood pressure measurement, hemoglobin, and blood grouping and apply this knowledge in practical settings	2,3,4,5

### TEXT BOOKS:

T1: K Sembulingam, Prema Sembulingam, Essentials of Medical Physiology, Jaypee Publication, Sixth Edition

T2: Anne Waugh, Allison Grant 'Ross and Wilson Anatomy and Physiology' 10<sup>th</sup> Edition (2008)

T3: Ross and Wilson Anatomy and Physiology in Health and Illness 13<sup>th</sup> Edition

### REFERENCE BOOKS:

R1: Inderbir Singh, A text book of Anatomy and Physiology

R2: Gyton, A text Book of Physiology

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Develop fundamental knowledge on the components of cells and tissue structure.	<b>1,3,4,8</b>
2	Describe the different composition and functions of the blood.	<b>1,3,4,8</b>
3	Understand the process of the digestive system along with the organs involved and their significance.	<b>1,3,4,8</b>
4	Explain the mechanism of the respiratory system.	<b>1,3,4,8</b>
5	Understand the cardiovascular system along with the human circulatory system.	<b>1,3,4,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO 1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>22BEDM112R</b>	Physiology I	3		2	3				2

SEMESTER – I									
Course Title	Biochemistry I								
Course code	22BEDM113R	Total credits:4 Total hours: 45T+30P	L	T	P	S	R	O/F	C
			3	0	2	0	0	0	4
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	I semester of first year of the programme								
Course Objectives (Minimum 3)	1. To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites 2. To understand the energy flow in the form on ATP in the human body and cells. 3. To give a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids								
CO1	Explain the sources, functions and metabolism process of Carbohydrates.								
CO2	Identify various classifications of amino-acids and recognize the significance of Protein.								
CO3	Describe the significance, classification and functions of lipids.								
CO4	Comprehend the structure and functions of Nucleic Acids.								
CO5	Explain the fundamentals and importance of acid, base and buffers.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>CARBOHYDRATES:</b> Definition and classification of carbohydrates, Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) and their sources, Biological significance of Carbohydrate		7	Define, classify and describe the sources and types of carbohydrates along with their functions in the body.				1,2	
II	<b>PROTEINS:</b> Definition of Proteins along with the Biological Significance, Amino acids and its classification, Essential and non-essential amino acids		10	Define, classify and explain the mechanism of proteins along with their functions in the body.				1,2	
III	<b>LIPIDS:</b> Definition and classification of lipids, Classification of Fatty Acids, Examples and functions of some common lipids (Phospholipids, Glycolipids, Steroids).		10	Define and classify types of lipids along with their functions in the body.				1,2	
IV	<b>NICLEIC ACIDS:</b> Basic idea of the structure of DNA and RNA Function of DNA and RNA		8	Describe, illustrate and explain the basic structure and functions of nucleic acids in the body.				1,2	
V	<b>ACID-BASE BUFFERS:</b> Basic idea of acids, bases, Ph, buffer. Acid base balance		10	Define, explain and describe acid-base buffers.				1,2	
Practical	1. To identification and demonstration of biochemistry laboratory glassware's and apparatus. 2. To identification and demonstration of biochemistry laboratory instruments (Principle and Applications)		30	Demonstrate and explain the identification and use of biochemistry laboratory glassware, apparatus, qualitative tests such as Molisch's, Fehling's, and Benedict's to accurately				2,3, 4,5	

	<p>3. Qualitative test for carbohydrates:</p> <ul style="list-style-type: none"> <li>To perform Molisch's test for determination of sugar in an unknown sample.</li> <li>To perform Fehling's test for determination of reducing and non-reducing sugar in an unknown sample.</li> <li>To perform Benedict's test for determination of reducing and non-reducing sugar in an unknown sample.</li> </ul>		<p>determine the presence of sugars and classify them as reducing or non-reducing in unknown samples..</p>	
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain the sources, functions and metabolism process of Carbohydrates.	1,4,8
2	Identify various classifications of amino-acids and recognize the significance of Protein.	1,4,8
3	Describe the significance, classification and functions of lipids.	1,4,8
4	Comprehend the structure and functions of Nucleic Acids.	1,4,8
5	Explain the fundamentals and importance of acid, base and buffers.	1,4,8

### MAPPING TABLE

Course code	Course Name	PO 1	PO 2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
22BEDM113R	Biochemistry I	3			2				2

SEMESTER – I									
Course Title	HDPC I								
Course code	22BEDM114R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	I semester of first year of the programme								
Course Objectives (Minimum 3)	1. To impart the knowledge in patient in a holistic approach for the overall wellbeing of the patient. 2. To impart a comprehensive knowledge on medical ethics and the quality and functions of medical professionals. 3. To provide a gross knowledge on the legal hazardous of medical profession.								
CO1	Discuss different functions, process of record keeping, reporting and essential components of hospital management.								
CO2	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.								
CO3	Understand and implement safety measures and hygiene in patient care.								
CO4	Describe different body positions and the mechanism and management of fever.								
CO5	Identify various sites to measure pulse, blood pressure and assess respiration.								
Unit- No.	Content			Contact Hour	Learning Outcome				KL
I	<b>Hospital &amp; Records &amp; Reports:</b> Introduction, Functions of Hospitals, Classification of Hospitals, Organization of Hospitals, Department of Hospitals, Management of Hospitals, Different services in a Hospital, Definition, Different types of records, Values & Objectives, Maintenance of records, Principle of good record writing, Difference of records & reports.			5	Describe, illustrate and explain the different types of record and reports maintained in the hospital.				1,2,3,
II	<b>First Aid &amp; Safety in the Laboratory :</b> <ul style="list-style-type: none"> <li>● Introduction</li> <li>● Aims &amp; objectives of first aid</li> <li>● Priorities of first aid</li> <li>● Golden rules of first aid</li> <li>● Qualities &amp; responsibilities of first aider</li> <li>● Simple first aid measures in selected conditions like –               <ul style="list-style-type: none"> <li>▪ Food poisoning</li> <li>▪ Snake bite</li> <li>▪ Scorpion bite</li> <li>▪ Dog bite</li> <li>▪ Foreign bodies in various organs</li> </ul> </li> </ul>			7	Explain the objectives of first aid and demonstrate the management of various medical emergencies.				2,3,4,5

	<ul style="list-style-type: none"> <li>▪ Burns &amp; scald</li> <li>▪ Haemorrhage</li> <li>● Common laboratory accidents from</li> <li>● Physical injuries</li> <li>● Electrical shock</li> <li>● Chemical injury</li> <li>● Bleeding</li> <li>● Burn</li> <li>● Eye accidents</li> <li>● Biological hazards.</li> </ul>			
<b>III</b>	<p><b>Artificial respiration &amp; Hygiene, Care of Patient, Basic care needs of patients:</b></p> <p>Different methods</p> <ul style="list-style-type: none"> <li>● Personal Hygiene</li> <li>● Maintenance of Hygiene</li> <li>● Maintaining therapeutic environment</li> <li>● Safety factors for patients such as</li> <li>● Safety from mechanical injury</li> <li>● Safety from thermal &amp; chemical injury</li> <li>● Safety from radiation &amp; bacteriological injury</li> <li>● Safety from allergens.</li> </ul>	<b>6</b>	Describe, illustrate and explain the significance of maintaining safety and hygiene in patient care.	2,3, 4,5
<b>IV</b>	<p><b>Body temperature &amp; Comfort measures for patients:</b></p> <ul style="list-style-type: none"> <li>● Supine position</li> <li>● Prone Position</li> <li>● Cardiac position</li> <li>● Lateral Position</li> <li>● Fowlers position <ul style="list-style-type: none"> <li>● Maintenance of body temperature</li> <li>● Factors influencing body temperature</li> <li>● Different types of fever</li> <li>● Stages of rigor</li> <li>● Management of pyrexia</li> <li>● Maintenance of body temperature</li> <li>● Factors influencing body temperature</li> <li>● Different types of fever</li> <li>● Stages of rigor</li> <li>● Management of pyrexia</li> </ul> </li> </ul>	<b>6</b>	Describe, define and explain the different positions of the body along with the management of temperature for patients.	2,3, 4,5
<b>V</b>	<p><b>Pulse &amp; Blood Pressure &amp; Respiration:</b></p> <ul style="list-style-type: none"> <li>● Common pulse sites</li> <li>● Factors influencing pulse rate</li> </ul>	<b>6</b>	Describe, explain and demonstrate the assessment of pulse and respiration along with the factors	2,3, 4,5

	<ul style="list-style-type: none"> <li>● Characteristics of Pulse</li> <li>● Abnormal pulses</li> <li>● Reading of pulse</li> <li>● Definition</li> <li>● Factors influencing B.P.</li> <li>● Abnormalities of B.P.</li> <li>● Recording of B.P.</li> <li>● Regulation of respiration</li> <li>● Factors causing variations in respiration</li> <li>● Abnormal respirations</li> <li>● Reading of respiratory rate.</li> </ul>		affecting them.	
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**TEXTBOOKS:**

T1: Emergency Care in the Streets by Nancy Caroline.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss different functions, process of record keeping, reporting and essential components of hospital management.	<b>1,2,3,4,7,8</b>
<b>2</b>	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	<b>2,3,4</b>
<b>3</b>	Understand and implement safety measures and hygiene in patient care.	<b>1,6,8</b>
<b>4</b>	Describe different body positions and the mechanism and management of fever.	<b>1,2,3,4,6</b>
<b>5</b>	Identify various sites to measure pulse, blood pressure and assess respiration.	<b>1,2,3,4</b>

**MAPPING TABLE**

Course code	Course Name	PO 1*	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
<b>22BEDM114R</b>	HDPC I	3	3	3	2		2	2	2

SEMESTER – I									
Course Title	Elementary English								
Course code	22UBPD112R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 60P	0	0	4	0	0	0	2
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	I semester of first year of the programme								
Course Objectives (Minimum 3)	1. To introduce the students to the basics of English grammar and their application. 2. To enhance communication skills through listening and speaking exercises. 3. To learn and understand the importance of pronunciation of words.								
CO1	Speak confidently and articulate ideas clearly with correct pronunciation.								
CO2	Expand their vocabulary and use synonyms and antonyms appropriately.								
CO3	Apply grammatical rules to construct grammatically correct sentences and paragraphs.								
CO4	Identify different types of communication and strategies to overcome communication barriers.								
CO5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
<b>I</b>	<b>Grammar</b> i. Parts of Speech ii. Articles iii. Affirmative and Negative Sentences		<b>7</b>	Identify ,explain and classify different parts of speech in sentences, and their roles and functions				1,2, 3	
<b>II</b>	<b>Grammar</b> i. Determiners ii. Sentence Construction from jumbled words iii. Types of Sentences(Assertive, Imperative etc.		<b>10</b>	Differentiate between assertive, imperative, and analyze their functions and structures.				2,3, 4	
<b>III</b>	<b>Building vocabulary</b> i. Synonyms ii. Antonyms		<b>10</b>	Identify, analyze and apply the synonyms for given words and their contextual meanings, to enhance language fluency and expression				3,4, 5	
<b>IV</b>	<b>Speaking skills</b> i. Introduction and greetings ii. Pronunciation iii. Asking and offering information iv. Video Recording for self-analysis		<b>8</b>	Demonstrate effective techniques for introducing themselves and greeting others in diverse contexts				2,3, 4,5	
<b>V</b>	<b>Communication skills</b> i. Introduction to Communication, ii. Importance of Communication Skills, iii. Purpose of Communication, iv. Types of Communication, v. Barriers to Communication,		<b>10</b>	Identify different types and purposes of communication, analyze barriers, and propose strategies for improving communication in personal and professional contexts.				1,2, 3,4, 5	



	vi. How to improve/tips to improve Communication skills			
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**TEXT BOOKS:**

1. Wren&Martin.(2017).*HighSchoolEnglishGrammarandComposition..S*.ChandPublishing.
2. Pal, Rajendra.Suri, Premlata(2022).*EnglishGrammar& Composition*. Sultan ChandanSonsPublishing.
3. Debnath,Adhir.(2018).*ATextbookofEnglishGrammarandComposition*.BinaLibrary

**REFERENCE BOOKS:**

1. Mitra,Barun.(2016)*PersonalityDevelopmentandSoftSkills2/E*,OxfordUniversityPress
2. Murphy, Raymond,.(2012) *English Grammar in Use Book with Answers: A Self-Study and Practice Book for Intermediate Learners of English*, Cambridge University Press

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Speak confidently and articulate ideas clearly with correct pronunciation.	6,7,8
2	Expand their vocabulary and use synonyms and antonyms appropriately.	6,7,8
3	Apply grammatical rules to construct grammatically correct sentences and paragraphs.	6,7,8
4	Identify different types of communication and strategies to overcome communication barriers.	6,7,8
5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.	6,7,8

**MAPPING TABLE**

Course code	Course Name	PO 1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
22UBPD112R	Elementary English						2	3	

SEMESTER – I									
Course Title	Extra-Curricular								
Course code	22UBEC111	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma Emergency and Disaster Management								
Semester	I semester of first year of the programme								
Course Objectives (Minimum 3)	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<ul style="list-style-type: none"> <li>AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>		60	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2,3,4	
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								

	<ul style="list-style-type: none"> <li>The students members of the club are trained represent AdtU in various inter University student and national level competitions.</li> </ul>			
	<ul style="list-style-type: none"> <li>Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.</li> </ul>			

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy	5,6,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests	5,6,7,8
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	5,6,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,6,7,8
5	Evaluate overall growth alongside academic development.	5,6,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
22UBEC111	Extra-Curricular					2	2	2	

SEMESTER – II									
<b>Course Title</b>	<b>Anatomy II</b>								
<b>Course code</b>	<b>22BEDM121R</b>	<b>Total credits: 4</b> <b>Total hours:</b> <b>45T+30P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			3	0	2	0	0	0	4
<b>Pre-requisite</b>	<b>NIL</b>	<b>Co-requisite</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Trauma, Emergency and Disaster Management</b>								
<b>Semester</b>	<b>II semester of first year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. To study the basic anatomical structure of human body 2. To provide a comprehensive concept of all the anatomical systems of the human body 3. To give a illustrative overview about the human bones and its anatomical significance								
<b>CO1</b>	CO1: Explain the components and significance of organs in the pelvis.								
<b>CO2</b>	CO2: Understand the anatomical structure of the urinary system.								
<b>CO3</b>	CO3: Develop fundamental knowledge on the human reproductive organs.								
<b>CO4</b>	CO4: Classify the nervous system of the human body.								
<b>CO5</b>	CO5: Describe the sensory organs and the composition of the lymphatic system.								
<b>Unit- No.</b>	<b>Content</b>		<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>
<b>I</b>	<b>PELVIS:</b>  • General description of pelvic organs.		<b>7</b>	Describe, define and explain the different structure of organs in the pelvis.					1,2
<b>II</b>	<b>URINARY SYSTEM:</b>  • Structure of kidney, ureters, urinary bladder, male and female urethra.		<b>10</b>	Explain, define and classify the structure of organs involved in the urinary system.					1,2
<b>III</b>	<b>REPRODUCTIVE SYSTEM:</b>  • Structure of male and female reproductive organs. • Structure of breast.		<b>10</b>	Describe, illustrate and explain the different parts of the human reproductive system.					1,2
<b>IV</b>	<b>NERVOUS SYSTEM:</b>  • Classification of Nervous system. • Central Nervous system – Brain and Spinal cord, blood supply of brain. • Spinal nerves and Cranial nerves. • Autonomic nervous System.		<b>8</b>	Describe, classify and explain the nervous system of the human body.					1,2
<b>V</b>	<b>SENSORY ORGAN:</b> • Skin • Eye • Ear • Nose • Tongue <b>LYMPHATIC SYSTEM:</b>		<b>10</b>	Classify, differentiate and explain various sensory organs along with the lymphatic system of the body.					1,2

	<ul style="list-style-type: none"> <li>Lymphatic vessels and lymph, lymph nodes</li> <li>Spleen</li> </ul>			
<b>Practical</b>	Study of pelvic bones and bones of lower limbs of human body. Study of organs: Brain, heart, lung, liver, kidney.	<b>30</b>		1,2,3,4,5

### TEXT BOOKS:

T1: Allison Wynn Grant, Anne Waugh, and Kathleen J. W. Wilson ‘Ross and Wilson Anatomy and Physiology’, Elsevier, Amsterdam, Netherlands, 13th Edition (2020)

T2: Richard Drake, A. Wayne Vogl, Adam Mitchell, ‘Gray's Anatomy for Students’, Elsevier, Amsterdam, Netherlands, 4 th Edition (2019).

### REFERENCE BOOKS:

R1: BD CHAURASIAS., ‘HUMAN ANATOMY’ CBS publisher, New Delhi, 8 th Edition (2017)..

R2: Inderbir Singh. ‘Anatomy and Physiology’ CBS Publisher, Newdelhi 2 nd Edition (2004)

R3: Frederic Martini, Judi Nath, Robert Tallitsch, ‘Human Anatomy’, pearson Publisher,

USA, 1st edition( 2017).

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain the components and significance of organs in the pelvis.	1,3,4,8
2	Understand the anatomical structure of the urinary system.	1,3,4,8
3	Develop fundamental knowledge on the human reproductive organs.	1,3,4,8
4	Classify the nervous system of the human body.	1,3,4,8
5	Describe the sensory organs and the composition of the lymphatic system.	1,3,4,8

### MAPPING TABLE

Course code	Course Name	PO 1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
22BEDM121R	Anatomy II	3	1	2	2	1	1	1	2

SEMESTER – II									
Course Title	Physiology II								
Course code	22BEDM122R	Total credits: 4 Total hours: 45T+30P	L	T	P	S	R	O/F	C
			3	0	2	0	0	0	4
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To understand the underlined mechanism that work to keep the human body alive and functioning.</li> <li>To provide a comprehensive concept of all physiological systems of the human body.</li> <li>To develop abilities to analyze problems, conduct experiments, and interpret findings in physiology.</li> </ol>								
CO1	Develop fundamental knowledge on the endocrine system along with the hormones they secrete.								
CO2	Understand the human excretory system and their functions.								
CO3	Explain the structure and functions of male and female reproductive system.								
CO4	Describe the muscle and nervous system along with their functions.								
CO5	Classify the different types of lymph and immune cells in the body and their function.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>ENDOCRINE SYSTEM:</b> <ul style="list-style-type: none"> <li>Structure and hormones of endocrine glands, pituitary, thyroid, parathyroid, Pancreas, Adrenal, testes and ovary.</li> <li>Functions and regulation of secretion of hormones.</li> </ul>		7	Describe, explain and define the different endocrine glands along with the hormones secreted in the human body.				1,2,	
II	<b>EXCRETORY SYSTEM:</b> <ul style="list-style-type: none"> <li>Structure and functions of kidneys, nephron, ureters, urinary bladder and urethra.</li> <li>Urine formation.</li> <li>Renal function tests</li> </ul>		10	Describe, explain and define the various structures of organs in the excretory system along with their functions.				1,2,3	
III	<b>REPRODUCTIVE SYSTEM:</b> <ul style="list-style-type: none"> <li>Male and female reproductive organs and changes during puberty</li> <li>Menstrual cycle, ovulation.</li> <li>Physiological changes during pregnancy, Placenta and placental circulation</li> </ul>		10	Describe, illustrate and explain the different parts of the human reproductive system along with the changes that occurs during puberty and pregnancy.				1,2,3,4	
IV	<b>NERVOUS SYSTEM AND MUSCLE:</b> <ul style="list-style-type: none"> <li>Organization of nervous system.</li> <li>Structure and function of muscle and</li> </ul>		8	Classify and explain the different structures of the nervous system along with the functions and				1,2,3,4	

	nerve cells. <ul style="list-style-type: none"> <li>• Functions of brain, Spinal cord, cranial and spinal nerves</li> <li>• Motor system.</li> <li>• Sensory system</li> <li>• Synapse, neuromuscular transmission reflex arc, reflex action and reflexes</li> <li>• Cerebra spinal fluid</li> </ul>		structures involved in the muscular system.	
<b>V</b>	<b>LYMPHATIC AND IMMUNOLOGICAL SYSTEM:</b> <ul style="list-style-type: none"> <li>• Lymph glands and circulation of lymph</li> <li>• Spleen structure and function</li> <li>• Immunity – Formation of T- cells and B- cells, Antigen, Antibody and Immune response.</li> </ul>	<b>10</b>	Classify, differentiate and explain various mechanism of the lymphatic system and the immune system of the human body.	1,2, 3,4
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Blood group</li> <li>• DLC</li> <li>• Total count of RBC and WBC</li> </ul>	<b>30</b>	Identify, differentiate and analyze different types of blood group, RBC, WBC and apply this knowledge to understand and interpret medical test results accurately.	2,3, 4,5

**TEXT BOOKS:**

T1: Allison Wynn Grant, Anne Waugh, and Kathleen J. W. Wilson ‘Ross and Wilson Anatomy and Physiology’, Elsevier, Amsterdam, Netherlands, 13th Edition (2020)

T2: Richard Drake, A. Wayne Vogl, Adam Mitchell, ‘Gray's Anatomy for Students’, Elsevier, Amsterdam, Netherlands, 4 th Edition (2019).

**REFERENCE BOOKS:**

R1: BD CHAURASIAS., ‘HUMAN ANATOMY’ CBS publisher, New Delhi, 8 th Edition (2017)..

R2: Inderbir Singh. ‘Anatomy and Physiology’ CBS Publisher, Newdelhi 2 nd Edition (2004)

R3: Frederic Martini, Judi Nath, Robert Tallitsch, ‘Human Anatomy’,pearson Publisher,

USA, 1st edition( 2017).

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop fundamental knowledge on the endocrine system along with the hormones they secrete.	<b>1,3,4,8</b>
<b>2</b>	Understand the human excretory system and their functions.	<b>1,3,4,8</b>
<b>3</b>	Explain the structure and functions of male and female reproductive system.	<b>1,3,4,8</b>
<b>4</b>	Describe the muscle and nervous system along with their functions.	<b>1,3,4,8</b>
<b>5</b>	Classify the different types of lymph and immune cells in the body and their function.	<b>1,3,4,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
<b>22BEDM122R</b>	Physiology II	3	1	2	3				2



SEMESTER– II									
Course Title	Biochemistry-II								
Course code	22BEDM123R	Total credits: 4 Total hours: 45T+30P	L	T	P	S	R	O/F	C
			3	0	2	0	0	0	4
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	1.To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites 2. To understand the energy flow in the form on ATP in the human body and cells. 3. To provide a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids.								
CO1	Describe classification, mechanism of enzymes, and factors affecting enzyme actions.								
CO2	Define the mechanism of carbohydrate metabolism in the body.								
CO3	Explain the metabolism of protein and its significant effects on different organs of body.								
CO4	Describe the process of Lipids metabolism and associated clinical conditions.								
CO5	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	ENZYMES:		7	Describe, classify and explain the types of enzymes along with the factors affecting their actions.				1,2,3	
	<ul style="list-style-type: none"> <li>Definition and classification of enzyme.</li> <li>Basic idea of co-enzyme, iso-enzyme.</li> <li>Mechanism of enzyme Action.</li> <li>Factors affecting enzyme action</li> </ul>								
II	CARBOHYDRATES METABOLISM		10	Describe and explain the mechanism of carbohydrates in the body.				2,3,4	
	<ul style="list-style-type: none"> <li>Glycolysis</li> <li>Kreb's Cycle</li> <li>Gluconeogenesis</li> <li>Glycogenesis</li> <li>Glycogenolysis</li> </ul>								
III	PROTEIN METABOLISM		10	Describe, illustrate and explain the metabolism of protein and their significance.				2,3,4,5	
	<ul style="list-style-type: none"> <li>Transamination</li> <li>Deamination</li> <li>Urea Cycle and its Significance</li> </ul>								
IV	LIPID METABOLISM, CLINICAL BIOCHEMISTRY		8	Define and explain the metabolism of lipids along with the clinical diagnostic tests and their significance.				3,4,5,	
	<ul style="list-style-type: none"> <li><math>\beta</math> oxidation of Fatty Acids.</li> <li>Ketone bodies</li> <li>Ketosis and ketoacidosis</li> <li>Liver function test.</li> </ul>								

	<ul style="list-style-type: none"> <li>Renal function test</li> </ul>			
<b>V</b>	<b>VITAMINS AND MINERALS:</b> <ul style="list-style-type: none"> <li>Definition and classification of vitamins according to solubility.</li> <li>Sources and functions of individual vitamins.</li> <li>Deficiency.</li> <li>Individual minerals (calcium, phosphorus, iron, magnesium flu slide, copper, selenium, molybdenum etc) – their sources, function and properties.</li> </ul>	<b>10</b>	Describe, explain and classify the different types of vitamins and minerals along with their sources and functions.	12, 3,4
<b>Practical</b>	<ul style="list-style-type: none"> <li>To perform precipitation test to determine the presence of proteins in an unknown urine sample.</li> <li>To perform heat and acetic acid test to determine the presence of proteins in an unknown urine sample.</li> <li>To perform Heller's test to determine the presence of proteins in an unknown urine sample.</li> <li>To perform lipid solubility test.</li> </ul>	<b>30</b>	Demonstrate biochemical tests—including precipitating, heating with acetic acid, and conducting Heller's tests to identify the presence of proteins in unknown urine samples.	3,4, 5

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe classification, mechanism of enzymes, and factors affecting enzyme actions.	1,4,8
2	Define the mechanism of carbohydrate metabolism in the body.	1,4,8
3	Explain the metabolism of protein and its significant effects on different organs of body.	1,4,8
4	Describe the process of Lipids metabolism and associated clinical conditions.	1,4,8
5	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body.	1,4,8

### MAPPING TABLE

Course code	Course Name	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
22BEDM123R	Biochemistry II	3	1	1	2	1	1	1	2

SEMESTER – II									
Course Title	HDPC II								
Course code	22BEDM124R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	1. To identify and manage poisoning cases, administer first aid, and understand legal responsibilities. 2. Understand drug types, administration methods, and ethical considerations in safe drug handling. 3. To gain development skills in specimen collection, diagnostic testing, and ensure compliance with quality standards in the lab.								
CO1	Describe signs and symptoms of common poisonings and its immediate management.								
CO2	Explain the medical ethics and its importance on the healthcare system.								
CO3	Identify the different types of shock along with the management.								
CO4	Classify the different types of emergency drugs along with the dosage and effects.								
CO5	Proficient in performing quality laboratory investigation process and laboratory management.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Poisoning:</b> <ul style="list-style-type: none"> <li>● Definition</li> <li>● Causes of poisoning</li> <li>● Sources of Poisoning</li> <li>● Symptoms of poisoning</li> <li>● First aid &amp; Management</li> <li>● Antidotes</li> <li>● Common drugs poisoning</li> <li>● Carbon monoxide poisoning</li> </ul> <b>Legal Responsibility:</b> <ul style="list-style-type: none"> <li>● Act of commission</li> <li>● Act of omission</li> <li>● Act of rashness, negligence &amp; damage</li> <li>● Legal liabilities of medical profession</li> <li>● Advantage &amp; disadvantage of the act.</li> </ul>		7	Define, describe and explain the different types of poisons along with their sources and management including the classification of various legal liabilities of medical professions.				1,2,3	
II	<ul style="list-style-type: none"> <li>● Malpractice</li> <li>● Civil negligence</li> <li>● Clinical negligence</li> <li>● Corporate negligence</li> <li>● Preparation of patients</li> <li>● Preparation of equipment's</li> <li>● Collection of specimens of urine, stool, sputum, blood, CSF, Pericardial fluid, Peritoneal fluid, Pleural fluid,</li> </ul>		10	Describe, illustrate and explain various ethical and legal responsibilities of medical professionals along with the techniques of specimen collection.				1,2,3	

	etc			
<b>III</b>	<ul style="list-style-type: none"> <li>● Definition</li> <li>● Types of shock</li> <li>● General Features of shock</li> <li>● Instigations of shock</li> <li>● Initial management &amp; first aid of shock</li> <li>● Definition</li> <li>● Clinical features</li> <li>● Diabetes laboratory tests for diabetes</li> <li>● Different types of glycosuria</li> <li>● Ketone bodies</li> <li>● Glucose tolerance test.</li> <li>● Definition</li> <li>● Etiologic &amp; Clinical Features</li> <li>● Investigations for hypoglycaemia</li> </ul>	<b>10</b>	Describe, classify and explain shock along with their clinical manifestations, management including the diagnostic tests for diabetes.	2,3, 4,5
<b>IV</b>	<ul style="list-style-type: none"> <li>● Definition</li> <li>● Names &amp; classification of drugs</li> <li>● Different preparations of drugs</li> <li>● Effects of drugs</li> <li>● Adverse effects of drugs</li> <li>● Tolerance, Abuse, addiction of drug</li> <li>● Different routes of drug administration</li> <li>● Storing of medicine</li> <li>● Units of standard measurement</li> </ul>	<b>8</b>	Describe, classify and explain the different types of emergency drugs along with their mechanism, routes of administration, indications and adverse effects.	3,4, 5
<b>V</b>	<p><b>Function of medical Professional</b></p> <ul style="list-style-type: none"> <li>● Qualities of good professional</li> <li>● Ethics of Medical Profession</li> <li>● Laboratory designing</li> <li>● Laboratory management</li> <li>● Different laboratory</li> <li>● Functions of receptionist, Head of section, laboratory specialist, business manager, quality officer, safety officer</li> <li>● Disposal of wastes</li> <li>● Reporting of tests of laboratory</li> <li>● Quality control and accreditation</li> <li>● Control of fire, infection, corrosive chemicals, toxic fumes, broken glasses, carcinogen.</li> <li>● Legal and ethical regulation.</li> </ul>	<b>10</b>	Describe, illustrate and explain medical ethics along with the guidelines and management of different laboratories in the hospital.	2,3, 4,5

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe signs and symptoms of common poisonings and its immediate management.	<b>1,2,3,6</b>
<b>2</b>	Explain the medical ethics and its importance on the healthcare system.	<b>6,8</b>
<b>3</b>	Identify the different types of shock along with the management.	<b>1,2,3,4</b>
<b>4</b>	Classify the different types of emergency drugs along with the dosage and effects.	<b>1,2,3,4</b>
<b>5</b>	Proficient in performing quality laboratory investigation process and laboratory management.	<b>1,3,4,6</b>

**MAPPING TABLE**

Course code	Course Name	PO 1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
<b>22BEDM124R</b>	HDPC II		3	2	2		3	2	2

SEMESTER – II									
Course Title	TECHNO PROFESSIONAL SKILLS								
Course code	22BEDM125R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	1. To learn on how to assess vital signs, conduct thorough history taking, and perform effective physical examinations. 2. To Identify and classify types of shock, apply appropriate assessment and management methods 3. To understand the importance of positioning in patient care, differentiate between various positions, and apply appropriate techniques while considering indications and contraindications.								
CO1	A complete knowledge and skill of vital sign and its assessment techniques.								
CO2	Skilled with process of history taking.								
CO3	Apply knowledge on patient's physical examination.								
CO4	Skilled with identification and pre-hospital management of shock.								
CO5	Apply knowledge on assessment and management of poisoning.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Vitals sign</b> <ul style="list-style-type: none"> <li>Blood pressure</li> <li>Pulse rate</li> <li>Heart rate</li> <li>Oxygen saturation</li> <li>Respiratory rate</li> </ul>		7	Describe, illustrate and explain cell organization and functions, microscopy and structural differences.				1,2,3	
II	<b>History Taking</b> <ul style="list-style-type: none"> <li>Purpose of history taking</li> <li>Components of history taking</li> <li>Chief complaint</li> </ul>		10	Describe, illustrate and explain membrane structure, function; cell organization and the proteins involved in transportation.				3,4,5	
III	<b>Physical Examination</b> <ul style="list-style-type: none"> <li>Techniques of examination</li> <li>General observation</li> <li>Head to toe examination</li> </ul>		10	Describe, illustrate and explain chromosomal structure and types.				3,4,5	
IV	<b>Examination of Shock</b> <ul style="list-style-type: none"> <li>Types of shock</li> <li>Identification of shock</li> <li>Assessment and management</li> </ul>		8	Describe, illustrate and explain the mechanism of cell to cell communication				2,3,4,5	
V	<b>Positioning</b> <ul style="list-style-type: none"> <li>Types of positions</li> <li>Importance of positioning</li> <li>Indication/contra-indication for different positions</li> </ul>		10	Describe, illustrate and explain the cell cycle and division in general and in some specific cell types				2,3,4,5	

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	A complete knowledge and skill of vital sign and its assessment techniques.	<b>1,2,3,4,</b>
<b>2</b>	Skilled with process of history taking.	<b>2,6,7</b>
<b>3</b>	Apply knowledge on patient's physical examination.	<b>1,2,3,4,</b>
<b>4</b>	Skilled with identification and pre-hospital management of shock.	<b>1,2,3,4</b>
<b>5</b>	Apply knowledge on assessment and management of poisoning.	<b>2,3</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO 1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>22BEDM125R</b>	Techno professional Skill	3	3	3	2		2		2

SEMESTER – II									
Course Title	Co-Curricular								
Course code	22UBCC121	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>		60	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2,3,4	
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students members of the club are trained represent AdtU in various inter University student and national level competitions.</li> </ul>								
	<ul style="list-style-type: none"> <li>Renewed personalities are invited to</li> </ul>								



	conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.			
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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	<b>5,6,7,8</b>
<b>2</b>	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	<b>5,6,7,8</b>
<b>3</b>	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	<b>5,6,7,8</b>
<b>4</b>	Explore new platform to learn from invited experts in their respective fields.	<b>5,6,7,8</b>
<b>5</b>	Evaluate overall growth alongside academic development.	<b>5,6,7,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1*</b>	<b>PO2</b>	<b>PO3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>22UBCC121</b>	Co-curricular					2	2	2	

SEMESTER – II									
Course Title	Extra-Curricular								
Course code	22UBEC121	Total credits: 2 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit- No.	Content			Contact Hour	Learning Outcome				KL
I	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>			60					1,2,3,4
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								
	<ul style="list-style-type: none"> <li>The student members of the club are trained to represent AdtU in various inter University student and national level competitions</li> </ul>								

	<ul style="list-style-type: none"> <li>Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in their respective fields.</li> </ul>			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	5,6,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	5,6,7,8
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	5,6,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,6,7,8
5	Evaluate overall growth alongside academic development.	5,6,7,8

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8
22UBEC121	Extra-Curricular					2	2	2	2

SEMESTER – II									
Course Title	IMPLICIT ENGLISH(COMMUNICATIVE ENGLISH& SOFT SKILLS)								
Course code	22UBPD123R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	1. To improve sentence structure, tense usage, and vocabulary understanding. 2. To learn effective reading strategies and critical thinking methods like SQ3R. 3. To acquire strategies for resolving conflicts positively and managing time efficiently.								
CO1	Apply principles of sentence structure, grammar rules to construct clear and effective written communication.								
CO2	Evaluate and select appropriate synonyms and antonyms to enhance written and verbal expression.								
CO3	Analyze texts using the SQ3R method to extract key information and main ideas.								
CO4	Apply conflict resolution strategies to manage interpersonal disputes constructively.								
CO5	Develop time management principles to prioritize tasks and meet deadlines efficiently.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	<b>Module 1-Grammar</b> <ul style="list-style-type: none"> <li>Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences</li> <li>Types of Tenses</li> <li>Common Errors</li> </ul>	7	Differentiate between interrogative, assertive, and exclamatory sentence types to enhance communication clarity.	2,3, 4,					
II	<b>Module 2-Vocabulary</b> <ul style="list-style-type: none"> <li>Synonyms</li> <li>Antonyms</li> <li>Homonyms</li> </ul>	10	Identify and classify homonyms in context to demonstrate understanding of word meanings.	2,3, 4,5,					
III	<b>Module 3-Reading Skills</b> <ul style="list-style-type: none"> <li>Techniques of Effective Reading</li> <li>Gathering ideas and information from a text</li> <li>The SQ3R Technique</li> <li>Interpret the text</li> </ul>	10	Explain the importance of effective reading techniques in improving comprehension and information retention.	2,3, 4					
IV	<b>Module 4-Conflict Management</b> <ul style="list-style-type: none"> <li>Definition</li> <li>Type of Conflict Management</li> <li>Effects of Conflict Management</li> <li>Methods to deal with Conflicts (Negative)</li> </ul>	8	Discuss the effects of different conflict management styles on relationships and team dynamics.	1,2, 3,					

<b>V</b>	<b>Module 5-Time-ManagementSkills</b> <ul style="list-style-type: none"> <li>• Introduction To Time Management,</li> <li>• Purpose And Importance of Time Management,</li> <li>• Basic Tips to Maintain Time.</li> </ul>	<b>10</b>	Demonstrate effective planning and scheduling techniques to optimize personal and professional productivity.	2,3,4,5
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply principles of sentence structure, grammar rules to construct clear and effective written communication.	6,7,8
2	Evaluate and select appropriate synonyms and antonyms to enhance written and verbal expression.	6,7,8
3	Analyze texts using the SQ3R method to extract key information and main ideas.	6,7,8
4	Apply conflict resolution strategies to manage interpersonal disputes constructively.	6,7,8
5	Develop time management principles to prioritize tasks and meet deadlines efficiently.	6,7,8

### MAPPING TABLE

Course code	Course Name	PO 1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
22UBPD123R	Implicit English						2	3	

SEMESTER – II									
Course Title	Digital Proficiency								
Course code	22UCDL103R	Total credits: 2 Total hours: 60P	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	1. Understanding on identifying and analyse computer hardware, software and their uses. 2. Improved ability to use MS-Office suite for various purposes. 3. Equipped with the skills to use the Internet efficiently for required information as well as for digital financial transactions.								
CO1	Develop fundamental knowledge of different computer systems and their functions.								
CO2	Knowledge on efficient use of MS- Office tools.								
CO3	Understanding on internet uses, types and cyber world.								
CO4	Knowledge on different uses of social media and its benefits & loses.								
CO5	Apply skills of digital payment systems.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Fundamentals of Computer Systems		7	Explain the fundamental of computer systems.				1,2	
	<ul style="list-style-type: none"> <li>Components of a Computer and their functions.</li> <li>Different Types of Computers and their Applications.</li> </ul>								
II	Introduction to MS-Office		10	Describe the functions on different tools of Microsoft Office like MS-Excel, MS-Word, etc.				1,2	
	<ul style="list-style-type: none"> <li>Components of the MS-Office suite.</li> <li>Creating documents with MS-Word.</li> <li>Creating Presentations with MS-Power Point.</li> <li>Creating Spreadsheets with MS-Excel.</li> </ul>								
III	Introduction to Internet & Cyber World		10	Explain the importance and use of internet along with its adverse side.				1,2	
	<ul style="list-style-type: none"> <li>Introduction to Computer Networks and Internet.</li> <li>World Wide Web, Websites and Web portals, Web browsing.</li> <li>Web Searching, Search engines, Introduction to Google Search Engine; How to search using Keywords, topics of Interest, etc.</li> <li>Creation and use of Email Accounts.</li> <li>Cyber Crimes.</li> </ul>								

<b>IV</b>	<b>Introduction to Social Media</b> <ul style="list-style-type: none"> <li>The Power of Social Media, Relevance of Social Media in present scenario.</li> <li>Creating accounts and using some popular Social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, and LinkedIn.</li> <li>Social Media Etiquettes.</li> </ul>	<b>8</b>	Explain the power of social media their relevance and adverse effects to over using it.	1,2
<b>V</b>	<b>Digital Payments</b> <ul style="list-style-type: none"> <li>Introduction to Digital Payment Systems.</li> <li>Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, and UPI.</li> </ul>	<b>10</b>	Illustrate the types of digital payment and their risks.	1,2

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge of different computer systems and their functions.	4, 7
2	Knowledge on efficient use of MS- Office tools.	4,7
3	Understanding on internet uses, types and cyber world.	4,7
4	Knowledge on different uses of social media and its benefits & loses.	4,7
5	Apply skills of digital payment systems.	4,7

#### MAPPING TABLE

Course code	Course Name	PO 1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
<b>22UCDL102 R</b>	Digital Proficiency				3			2	

SEMESTER – II									
Course Title	UHV+ Professional Ethics								
Course code	22UUHV104R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings</li> <li>To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.</li> <li>To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature</li> </ol>								
CO1	Demonstrate the ability to verify truths based on personal acceptance and experiential validation								
CO2	Develop skills and habits that help them cultivate a greater sense of harmony within themselves and with others, leading to personal growth and development								
CO3	Identify and evaluate the role of harmony in family, society and universal order.								
CO4	Understand and associate the holistic perception of harmony at all levels of existence.								
CO5	Develop appropriate technologies and management patterns to create harmony in professional and personal live								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Course Introduction - Need, Basic Guidelines, Content and Process for Value Education	7	Explain the importance of value education and apply guidelines for integrating values into daily life.	1,2, 3,4, 5					
II	Understanding Harmony in the Human Being - Harmony in Myself!	10	Discuss the personal values which require achieving internal harmony and emotional balance.	1,2, 3,4, 5					
III	Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship	10	Discuss the interpersonal dynamics to enhance harmonious relationships within families and communities.	1,2, 3,4, 5					
IV	Understanding Harmony in the Nature and Existence - Whole existence as Co-existence	8	Explain the interconnectedness of humans with nature and identify sustainable practices for coexistence.	1,2, 3,4, 5					
V	Implications of the above Holistic Understanding of Harmony on	10	Discuss how a holistic understanding of harmony	1,2, 3,4,					



	Professional Ethics		influences ethical decision-making in professional contexts and propose strategies for promoting ethical behaviour.	5
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate the ability to verify truths based on personal acceptance and experiential validation	6,7,8
2	Develop skills and habits that help them cultivate a greater sense of harmony within themselves and with others, leading to personal growth and development	6,7,8
3	Identify and evaluate the role of harmony in family, society and universal order.	6,7,8
4	Understand and associate the holistic perception of harmony at all levels of existence.	6,7,8
5	Develop appropriate technologies and management patterns to create harmony in professional and personal live	6,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UUHV104R	UHV+ Professional Ethics						3	1	2

SEMESTER – II									
Course Title	MOOCS								
Course code	2BEDMMO01	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	0
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objective (Minimum 3)	1. To equip with a thorough understanding of the course material through engaging online content. 2. To provide hands-on experience through interactive exercises and real-world projects. 3. To promote effective communication and teamwork through online discussions and group activities.								
CO1	Demonstrate a strong grasp of key principles and theories covered in the course.								
CO2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO5	Demonstrating strong collaboration and teamwork skills.								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7,8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7,8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7,8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	7,8

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDMMO01	MOOCS							2	3

SEMESTER – III									
Course Title	Patient Assessment, Venous Access & Drug Administration								
Course code	22BEDM211R	Total credits: 6 Total hours:	L	T	P	S	R	O/F	C
			4	0	4	0	0	0	6
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	III semester of first year of the programme								
Course Objectives (Minimum 3)	1. To conduct thorough patient assessments using vital signs, history taking, and physical examination techniques to gather comprehensive patient information. 2. To perform safe and effective venous access procedures for fluid and medication administration in diverse patient populations. 3. To administer medications accurately and safely, adhering to protocols and considering patient-specific factors to ensure optimal therapeutic outcomes.								
CO1	Explain and apply the techniques of assessment for medical and trauma patients.								
CO2	Discuss the technique of history taking and demonstrate the process to perform head-to-toe examination.								
CO3	Apply principles for critical thinking and implement skills on techniques of documentation and communication.								
CO4	Identify the different composition of fluid in the body, different types of IV Fluids, gain IV sites and access.								
CO5	Describe the routes of drug administration and utilize skills to perform correct techniques.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Patient assessment		7	Identify and differentiate between medical and trauma patient along with their assessment.				1,2,3,4	
	<ul style="list-style-type: none"> <li>-Medical patient assessment</li> <li>-Trauma patient assessment</li> </ul>								
II	History taking		10	Describe, demonstrate and explain the different techniques of history taking including full body examination.				3,4,5	
	<ul style="list-style-type: none"> <li>Techniques of history taking</li> <li>Special assessment challenges</li> <li>Vital signs</li> <li>Head to toe physical examination</li> <li>Limits of physical exam</li> </ul>								
III	Interpretation & Special Situations		10	Describe, illustrate and explain skills on documentation and communication techniques.				1,2,3	
	<ul style="list-style-type: none"> <li>Concept formation</li> <li>Data interpretation</li> <li>Application of principle</li> <li>Reflection in and on action.</li> <li>Various communication matters.</li> <li>Documentation techniques</li> <li>Verbal and nonverbal skills</li> <li>Special interview situations.</li> </ul>								
IV	Venous access		8	Describe and explain the fluid				3,4,	

	<ul style="list-style-type: none"> <li>Fluid composition &amp; distribution in the body</li> <li>I.V. fluid composition</li> <li>Techniques of I. V access.</li> </ul>		composition in the body along with the different types of IV fluids and IV access.	5
<b>V</b>	<b>Medication administration</b> <ul style="list-style-type: none"> <li>Routes of medication administration</li> <li>Calculating fluid infusion rates.</li> </ul>	<b>10</b>	Describe, illustrate and explain the various routes of medication administration including the calculation of drug doses.	2,3,4
<b>Practical</b>	<ol style="list-style-type: none"> <li>IV Cannulation Procedure</li> <li>Performing full body exam</li> <li>Drawing Medication</li> <li>Blood withdrawal</li> <li>Medication administration Via IM,IV,SC,IM,</li> <li>Administering Medication via nebulizer</li> </ol>	<b>30</b>	Demonstrate the techniques of IV cannulation, physical examination and medication administration via different routes	3,4,5

**TEXTBOOK:**

T1: Emergency Care in Streets by Nancy Carolin

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain and apply the techniques of assessment for medical and trauma patients.	1,2,3,4
2	Discuss the technique of history taking and demonstrate the process to perform head-to-toe examination.	2,3,4,6,7
3	Apply principles for critical thinking and implement skills on techniques of documentation and communication.	6,7,8
4	Identify the different composition of fluid in the body, different types of IV Fluids, gain IV sites and access.	2,3,4,6
5	Describe the routes of drug administration and utilize skills to perform correct techniques.	3,4,6,8

**MAPPING TABLE**

Course code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
<b>22BEDM211R</b>	Patient Assessment, Venous Access & Drug Administration		3	3	2	1	2		2

SEMESTER – III									
Course Title	Airway Management & Respiratory Emergencies								
Course code	22BEDM212R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours:	4	0	4	0	0	0	6
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	III semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. This course seeks to instruct students on the anatomy, opening, and maintenance of the airways. Focuses on providing high-quality hands-on training in accordance with global standards. On intubation trainers, all participants will be able to practise various techniques and equipment.</li> <li>2. To introduce the students on how to assess the patient's airway obstruction and manage them in the hospital as well as out of hospital settings.</li> <li>3. Recognition of airway compromise, including recognition and management of upper airway obstruction including foreign bodies and infections.</li> </ol>								
CO1	Describe anatomy and physiology of the airway and understand the basic airway adjuncts and functions.								
CO2	Explain advanced airway management techniques and develop the skills necessary for their effective application.								
CO3	Classify surgical & non-surgical airways.								
CO4	Identify the symptoms of airway and breathing conditions.								
CO5	Demonstrate the assessment and management of various respiratory disorders.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Airway Management</b> <b>Review of Anatomy and Physiology</b> <ul style="list-style-type: none"> <li>• -Basic Airway Management</li> <li>• Manual airway maneuvers</li> <li>• Airway Adjuncts</li> <li>• Continuous Positive Airway Pressure (CPAP)</li> <li>• Supplemental O<sub>2</sub> therapy and delivery devices</li> <li>• Suctioning</li> <li>• Assisted and artificial ventilation</li> </ul>	7	Describe and explain the anatomy and physiology of the respiratory system including the basic airway adjuncts.					1,2	
II	<b>Advanced airway management</b> <ul style="list-style-type: none"> <li>• Endo tracheal intubations</li> <li>• Kings LT Airway</li> <li>• Digital intubations</li> <li>• Laryngeal mask airways and Combitube intubations</li> <li>• Rapid sequence intubations</li> </ul>	10	Describe, explain and demonstrate advance airway manoeuvres along with basic airway adjuncts and procedure of suctioning.					3,4,5	
III	<b>Surgical Airway</b> <ul style="list-style-type: none"> <li>• Surgical and non-surgical airways</li> <li>• Special patient consideration</li> </ul>	10	Classify and explain different airways along with their indications, contraindications and					3,4,5	

			procedure.	
<b>IV</b>	<b>Respiratory emergencies – I</b> <ul style="list-style-type: none"> <li>Airway problems versus breathing problems.</li> </ul>	<b>8</b>	Classify and differentiate between airway and breathing problems.	3,4,5
<b>V</b>	<b>Respiratory emergencies - II</b> <ul style="list-style-type: none"> <li>Obstructive airway diseases.</li> <li>Assessment and management of various respiratory problems.</li> </ul>	<b>10</b>	Describe, identify and manage various respiratory disorders.	3,4,5
<b>Practical</b>	<ol style="list-style-type: none"> <li>Airway Maneuver- <ul style="list-style-type: none"> <li>Head-tilt-chin-lift</li> <li>Jaw thrust</li> </ul> </li> <li>Suctioning, inserting a oral airway</li> <li>ET tube intubation</li> <li>Non-invasive mask</li> <li>Tracheotomy</li> <li>Removal of ET tube</li> </ol>	<b>30</b>	Explain the indications, contraindications and demonstrate the techniques of inserting all the advance airway management equipments	3,4,5

**TEXTBOOK:**

T1: Emergency Care in Streets by Nancy Carolin

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe anatomy and physiology of the airway and understand the basic airway adjuncts and functions.	1,3,4
2	Explain advanced airway management techniques and develop the skills necessary for their effective application.	3,4
3	Classify surgical & non-surgical airways.	3,4
4	Identify the symptoms of airway and breathing conditions.	1,3,4
5	Demonstrate the assessment and management of various respiratory disorders.	1,2,3,4

**MAPPING TABLE**

Course code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8
22BEDM212R	Airway Management & Respiratory Emergencies		3	3	3				2

SEMESTER – III									
Course Title	Medical Emergencies I								
Course code	22BEDM213R	Total credits: 5 Total hours: 45T +60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	III semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. Identify anatomical structures of the female reproductive system.</li> <li>2. Describe physiological changes during normal and abnormal gynecological conditions.</li> <li>3. Explain the pathophysiology of common gynecological emergencies.</li> </ol>								
CO1	Demonstrate assessment on signs and symptoms, management, and safe handling of patients with psychiatric emergencies.								
CO2	Understand the female reproductive organs								
CO3	Understand various diseases related to gynaecological emergencies, their assessment and management.								
CO4	Develop knowledge on reproductive organs along with conception and gestational physiologic changes								
CO5	Demonstrate assessment of the complications during pregnancy along with the management of the complications.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Behavioural Emergencies		7	Describe common psychiatric signs and symptoms and identify appropriate interventions for acute psychiatric crises.				1,2,3,4	
<ul style="list-style-type: none"> <li>• Psychiatric signs and symptoms</li> <li>• Assessment and management of behavioural emergencies</li> <li>• Management and handling of hostile and violent patients</li> </ul>									
II	Gynaecological emergencies - I		10	Explain the anatomy and physiology of female reproductive system.				1,2	
<ul style="list-style-type: none"> <li>• Review of anatomy and physiology</li> </ul>									
III	Gynaecological emergencies - I		10	Discuss and explain the assessment and management of specific gynaecology emergencies, including pelvic inflammatory disease				3,4,5	
<ul style="list-style-type: none"> <li>• Pathophysiology of various diseases</li> <li>• Assessment and management</li> </ul>									
IV	Obstetrics:		8	Evaluate the various physiological changes during pregnancy				3,4,5	
<ul style="list-style-type: none"> <li>• Review of anatomy of female</li> </ul>									

	reproductive system <ul style="list-style-type: none"> <li>• Conception and gestation</li> <li>• Physiology of maternal changes during pregnancy.</li> <li>• Medical conditions that can be detrimentally affected by Pregnancy</li> </ul>			
<b>V</b>	<b>Labor&amp; Its Complications</b> <ul style="list-style-type: none"> <li>• Complications of pregnancy and labor.</li> <li>• Trauma during pregnancy.</li> <li>• Normal Delivery and abnormal deliveries.</li> </ul>	<b>10</b>	Illustrate the management of complications of labor, including cephalic presentation, breech presentation, shoulders dystocia, nuchal cord, and prolapsed cord..	3,4,5
<b>Practical</b>	Theory Based	<b>30</b>		

### TEXTBOOK:

T1: Emergency Care in Streets by Nancy Carolin

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate assessment on signs and symptoms, management, and safe handling of patients with psychiatric emergencies.	1,2,3,4
2	Understand the female reproductive organs	1
3	Understand various diseases related to gynaecological emergencies, their assessment and management.	2,3,4,6
4	Develop knowledge on reproductive organs along with conception and gestational physiologic changes	1,2,3,4,
5	Demonstrate assessment of the complications during pregnancy along with the management of the complications.	2,3,4,6

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDM213R	Medical Emergencies I	3	2	3	3		2		



SEMESTER – III									
Course Title	Pharmacology I								
Course code	22BEDM214R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	III semester of second year of the programme								
Course Objectives (Minimum 3)	1. To explain the fundamentals of pharmacology and comprehend the range of numerous disciplines, definitions, and drug nomenclature at the conclusion of each study unit. 2. To understand the drug's mechanism of action, potential side effects, dosage recommendations, and therapeutic applications. 3.								
CO1	Explain the concept of Pharmacology including Emergency Medicines and the routes of administration.								
CO2	Recognize different drugs that affect the Autonomic Nervous System.								
CO3	Classify sedative and antiepileptic drugs along with their mechanism of action.								
CO4	Discuss different drugs used to treat cardiovascular and respiratory conditions.								
CO5	Identify different types of IV fluids and their preparations as well as anti-diabetic drugs.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>General Pharmacology</b> <ul style="list-style-type: none"> <li>Introduction, definition and classification of drugs</li> <li>Routes of drug administration</li> <li>Pharmacokinetics</li> <li>Pharmacodynamics</li> <li>Factors modifying drug response</li> <li>Adverse effects</li> </ul>		7	Understand the basic concept of classification of drugs along with routes of administration, and their mechanism of actions.				1,2	
II	<b>Autonomic Nervous System:</b> <ul style="list-style-type: none"> <li>General Considerations</li> <li>Cholinergic and Anti – Cholinergic drugs</li> <li>Adrenergic and Adrenergic blocking drugs</li> <li>Skeletal muscle relaxants</li> </ul>		10	Explain the mechanism of action and function of different drugs related to autonomic nervous system.				1,2	
III	<b>Neuropharmacology:</b> <ul style="list-style-type: none"> <li>Sedative – Hypnotic Drugs: Barbiturates, Benzodiazepines</li> <li>Antiepileptic drugs, narcotic analgesics.</li> </ul>		10	Describe the action of sedative, antiepileptic and narcotic drugs.				1,2	
IV	<b>Cardiovascular and Respiratory</b>		8	Illustrate the concept of				1,2	

	<b>Pharmacology:</b> <ul style="list-style-type: none"> <li>• Drugs used in heart failure – Digitalis, Diuretics, vasodilators.</li> <li>• Antihypertensive Drugs – ACE inhibitors.</li> <li>• Drugs for ischemic Heart Disease – Nitrates, Beta blockers, Calcium channel blockers.</li> <li>• Vasopressors, Inotropic agents</li> <li>• Anticoagulants and Thrombolytics</li> <li>• Bronchodilators and Mucokinetic agents.</li> </ul>		cardiovascular and respiratory drugs function in human body for diseases like heart failure, hypertension, etc.	
<b>V</b>	<b>Others:</b> <ul style="list-style-type: none"> <li>• IV Fluids with different preparation.</li> <li>• Anti-Diabetic drugs – Insulin, Steroids</li> </ul>	<b>10</b>	Illustrate different procedure of drug preparation for administration.	1,2

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain the concept of Pharmacology including Emergency Medicines and the routes of administration.	1, 2,4,8
2	Recognize different drugs that affect the Autonomic Nervous System.	1
3	Classify sedative and antiepileptic drugs along with their mechanism of action.	1,2
4	Discuss different drugs used to treat cardiovascular and respiratory conditions	1,2,3,4
5	Identify different types of IV fluids and their preparations as well as anti-diabetic drugs.	1,2,4

#### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDM214R	Pharmacology I	2	2						2

SEMESTER – III									
Course Title	SYSTEMIC EXAMINATION OF THE PATIENT(TPS)								
Course code	22BEDM215R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	III semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>Equip students with the ability to systematically conduct thorough physical examinations for each body system, identifying normal and abnormal findings.</li> <li>Improve students' capabilities in correlating clinical examination findings with potential diagnoses, contributing to effective patient management and treatment planning.</li> <li>Understanding of the importance of effective communication, empathy, and professionalism during patient examinations to ensure accurate assessments and patient comfort.</li> </ol>								
CO1	Understanding the basic knowledge of systemic examination for a patient.								
CO2	A comprehensive knowledge on cardiovascular system and taking its assessment.								
CO3	Identify different respiratory disorders and manage the condition.								
CO4	Skilled with assessment of musculoskeletal system injuries.								
CO5	Knowledge on assessment of neurological system.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to systemic examination		7	Describe the basics of systemic examination.				1,2	
II	<b>Cardiovascular system</b> <ul style="list-style-type: none"> <li>Auscultating heart sound</li> <li>ECG</li> <li>Medical history</li> </ul>		10	Explain different type cardiovascular diseases and its assessment.				1,2	
III	<b>Respiratory system</b> <ul style="list-style-type: none"> <li>Inspection of the chest</li> <li>Palpation of the chest</li> <li>Percussion of the chest</li> <li>Auscultating lungs sound</li> </ul>		10	Describe the assessment techniques of chest inspection using different methods for respiratory system.				1,2	
IV	<b>Musculoskeletal system</b> <ul style="list-style-type: none"> <li>DCAPBTLs</li> <li>Assessment of range of motion</li> <li>Assessment of muscle strength</li> </ul>		8	Illustrate the procedure of musculoskeletal system assessment.				1,2	
V	<b>Neurological system</b> <ul style="list-style-type: none"> <li>Glasgow coma scale</li> <li>Cranial nerves</li> <li>Motor and sensory examination</li> </ul>		10	Explain the procedures of neurological system assessment.				1,2	

**TEXTBOOK:**

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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding the basic knowledge of systemic examination for a patient.	<b>1,2</b>
<b>2</b>	A comprehensive knowledge on cardiovascular system and taking its assessment.	<b>1,2</b>
<b>3</b>	Identify different respiratory disorders and manage the condition.	<b>2,3</b>
<b>4</b>	Skilled with assessment of musculoskeletal system injuries.	<b>2,3</b>
<b>5</b>	Knowledge on assessment of neurological system.	<b>2,3,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1 *</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>22BEDM215R</b>	Systemic Examination Of The Patient (TPS)	2	3	3					2

SEMESTER – III									
Course Title	GENERIC ELECTIVE (INTRO TO AR/VR/MR/XR: TECHNOLOGIES, APPLICATIONS & ISSUES)								
Course code	22BEDMGE21	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours:	1	0	0	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objective (Minimum 3)	1. To equip with a thorough understanding of the course material through engaging online content. 2. To provide hands-on experience through interactive exercises and real-world projects. 3. To promote effective communication and teamwork through online discussions and group activities.								
CO1	Demonstrate a strong grasp of key principles and theories covered in the course.								
CO2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO5	Demonstrating strong collaboration and teamwork skills..								

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7,8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7,8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7,8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDMGE	Generic Electives							2	3

SEMESTER – III									
<b>Course Title</b>	<b>MOOCS (PREHOSPITAL CARE OF ACUTE STROKE AND PATIENT SELECTION FOR ENDOVASCULAR TREATMENT USING THE RACE SCALE)</b>								
<b>Course code</b>	<b>22BEDMMO01</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			1	0	0	0	0	0	1
<b>Pre-requisite</b>	<b>NIL</b>	<b>Co-requisite</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Trauma, Emergency and Disaster Management</b>								
<b>Semester</b>	<b>III semester of second year of the programme</b>								
<b>Course Objective (Minimum 3)</b>	4. To equip with a thorough understanding of the course material through engaging online content. 5. To provide hands-on experience through interactive exercises and real-world projects. 6. To promote effective communication and teamwork through online discussions and group activities.								
<b>CO1</b>	Demonstrate a strong grasp of key principles and theories covered in the course.								
<b>CO2</b>	Apply learned concepts to solve real-world problems through practical projects and exercises.								
<b>CO3</b>	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
<b>CO4</b>	Develop their ideas clearly and effectively in both written and verbal forms.								
<b>CO5</b>	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	5, 7
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	5, 7
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	5, 7

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BEDMMO</b>	MOOCS							2	3

SEMESTER – III									
Course Title	Co-Curricular								
Course code	22UBCC221	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>	60	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2,3,4		
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students members of the club are trained represent AdtU in various inter University student and national level competitions.</li> </ul>								
	<ul style="list-style-type: none"> <li>Renewed personalities are invited to</li> </ul>								

	conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.			
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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	<b>5,6,7</b>
<b>2</b>	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	<b>5,6,7</b>
<b>3</b>	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	<b>5,6,7</b>
<b>4</b>	Explore new platform to learn from invited experts in their respective fields.	<b>5,6,7</b>
<b>5</b>	Evaluate overall growth alongside academic development.	<b>5,6,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
<b>22UBCC221</b>	Co curricular					2	2	2	



SEMESTER – III									
Course Title	Extra-Curricular								
Course code	22UBEC221	Total credits: 2 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	III semester of second year of the programme								
Course Objectives (Minimum 3)	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit- No.	Content			Contact Hour	Learning Outcome				KL
I	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>			60	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2, 3,4
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								
	<ul style="list-style-type: none"> <li>The student members of the club are trained represent AdtU in various inter University student and national level competitions</li> </ul>								

	<ul style="list-style-type: none"> <li>Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in their respective fields.</li> </ul>			
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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	5,6,7
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	5,6,7
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	5,6,7
4	Explore new platform to learn from invited experts in their respective fields.	5,6,7
5	Evaluate overall growth alongside academic development.	5,6,7

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UBEC221	Extra-Curricular					2	2	2	

SEMESTER – III									
Course Title	Basic Acclimatizing skills								
Course code	22UULS211R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	III semester of second year of the programme								
Course Objectives (Minimum 3)	1. To impart knowledge of the fundamentals of Hospitality industry and its applications. 2. Students will be able to familiarize with the cooking equipments & Utensils. 3. Students will be able to handle different modes of reservations								
CO1	Fundamental knowledge of cooking methods.								
CO2	Skilled with knowledge of organizing & Cleaning of Rooms.								
CO3	Knowledge on the travel management concept.								
CO4	Understanding the basic of household's amenities for day to-day use.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Introduction to Accommodation Management</b> <ul style="list-style-type: none"> <li>Telephone handling technique</li> <li>Organizing of Rooms.</li> <li>Cleaning agents.</li> <li>Cleaning equipments and uses.</li> <li>Bed making Process</li> </ul>		7	Describe the accommodation management using different techniques.				1,2	
II	<b>Fundamentals of Cooking</b> <ul style="list-style-type: none"> <li>Definition of cookery – Aim &amp; Objectives of cooking.</li> <li>Use of basic Cooking equipments</li> <li>Personal Hygiene and Safety</li> <li>Use of Fire &amp; Fuels</li> </ul>		10	Explain the fundamentals of cooking, including hygiene, safety, equipments use, etc.				1,2	
III	<b>Methods of Cooking</b> <ul style="list-style-type: none"> <li>Different Cuts.</li> <li>Use of Herbs and Spices.</li> <li>Basic Food and Beverage Preparation.</li> <li>Regional food Habits.</li> </ul>		10	Illustrate different methods of cooking.				1,2	
IV	<b>Forms &amp; Format's</b> <ul style="list-style-type: none"> <li>C – form</li> <li>Reservation form</li> <li>Registration form</li> </ul>		8	Illustrate different formats of form writing like- CV, Passport Application form, Registration form, etc.				1,2	

	<ul style="list-style-type: none"> <li>• Passport Application form</li> <li>• Legal Rent Agreement</li> </ul>			
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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Fundamental knowledge of cooking methods.	4,8
<b>2</b>	Skilled with knowledge of organizing & Cleaning of Rooms.	4,6
<b>3</b>	Knowledge on the travel management concept.	6,7
<b>4</b>	Understanding the basic of household's amenities for day to-day use.	6,7

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>22UULS211 R</b>	Basic Acclimatizing skills					2	2	3	

SEMESTER – III									
Course Title	Executive English								
Course code	22UBPD211R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 60P	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	III semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To enable students to learn and comprehend about the proficiency of the English language.</li> <li>To improve the writing skill of the learners and enable them to prepare CV and cover letter for professional development.</li> <li>To evaluate certain attributes in a candidate that can be otherwise difficult or time consuming to ascertain.</li> </ol>								
CO1	Understanding the use of grammar in prepositions.								
CO2	Knowledge on use of active & passive voice and direct & indirect speech.								
CO3	Skilled with writing different documents like resume, paragraph writing, etc.								
CO4	Apply knowledge on self-management.								
CO5	Apply skills on non-verbal communications using body language.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Grammar		7	Describe the use of grammar like prepositions, tag questions.				1,2	
	<ul style="list-style-type: none"> <li>Use of Prepositions</li> <li>Tag questions</li> </ul>								
II	Grammar		10	Describe the use of grammar in active & passive voice and direct-indirect speech.				1,2	
	<ul style="list-style-type: none"> <li>Active and Passive Voice</li> <li>Direct and Indirect Speech</li> </ul>								
III	Writing Skills		10	Explain the writing techniques of paragraph, CV, cover letter by avoiding vagueness.				1,2	
	<ul style="list-style-type: none"> <li>The Basics of Writing; avoid ambiguity and vagueness</li> <li>Paragraph Writing</li> <li>Resume, CV and Cover Letter</li> </ul>								
IV	Self-Management Skills		8	Illustrate self-management skills.				1,2	
	<ul style="list-style-type: none"> <li>SWOT Analysis</li> <li>Goal Setting</li> <li>Personal Hygiene</li> </ul>								
V	Non- Verbal Communication-Sciences of Body Language		10	Illustrate techniques of non-verbal communication using body language.				1,2	
	<ul style="list-style-type: none"> <li>What is Non-Verbal Communication &amp; Body Language,</li> <li>Types of Body Language,</li> <li>Importance and Impact of Body</li> </ul>								

	<p>Language,</p> <ul style="list-style-type: none"> <li>• Types of Communication through Body Language,</li> <li>• Body Language Do's and Don'ts, Doubt Clearing Session</li> </ul> <p><b>Group Discussion (Theory)</b></p> <ul style="list-style-type: none"> <li>• Importance,</li> <li>• Planning, Elements, and Skills assessed;</li> <li>• Effectively disagreeing,</li> <li>• Summarizing and Attaining the Objective.</li> </ul>			
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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding the use of grammar in prepositions.	7
2	Knowledge on use of active & passive voice and direct & indirect speech.	7
3	Skilled with writing different documents like resume, paragraph writing, etc.	7
4	Apply knowledge on self-management.	7
5	Apply skills on non-verbal communications using body language.	7

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
22UBPD211 R	Executive English							3	

SEMESTER – IV									
Course Title	Cardiovascular and Neurological Emergency Management								
Course code	22BEDM211R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	3+2
Pre-requisite	Anatomy and physiology of Heart and Nervous system	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To develop the ability to recognize and assess common cardiovascular emergencies, such as myocardial infarction, arrhythmias, and heart failure.</li> <li>To acquire skills in the assessment and management of neurological emergencies including stroke, seizures, and head trauma.</li> <li>To apply appropriate immediate interventions for cardiovascular emergencies to stabilize patients and minimize complication</li> </ol>								
CO1	Develop fundamental knowledge of the human heart and the circulatory system								
CO2	Demonstrate skills and techniques to assess and manage any cardiac emergencies								
CO3	Apply acquired skills to perform ECG and identify abnormalities								
CO4	Develop comprehensive knowledge on the nervous system								
CO5	Evaluate and treat a variety of neurologic emergencies, including seizures, strokes, and other condition								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Cardiovascular System</b> - Review of anatomy and physiology		5	Discuss, explain the anatomical structures and physiological functions of the cardiovascular system, including the heart, blood vessels, and cardiac circulation.				1,2,	
II	<b>Cardiovascular System</b> - Assessment and management of <ul style="list-style-type: none"> <li>Coronary artery disease and angina</li> <li>Acute myocardial infarct</li> <li>Congestive heart failure</li> <li>Cardiac tamponade</li> <li>Cardiogenic shock</li> <li>Aortic aneurysm</li> <li>Hypertensive emergencies</li> </ul>		10	Discuss the management of cardiovascular emergencies including coronary artery disease, acute myocardial infarction, congestive heart failure, cardiac tamponade, Cardiogenic shock, aortic aneurysm, and hypertensive emergencies, applying appropriate clinical interventions and treatment protocols.				1,2, 3,4	

<b>III</b>	<b>ECG</b> <ul style="list-style-type: none"> <li>- ECG and arrhythmias</li> <li>- 12 lead ECGs</li> <li>- Basic and advanced cardiac life support</li> <li>- Cardio pulmonary resuscitation (CPR)</li> <li>- Defibrillation</li> <li>- Cardio version</li> <li>- Transcutaneous cardiac pacing</li> <li>- Review of pharmacology</li> </ul>	<b>15</b>	Classify various types of cardiac arrhythmias on an ECG tracing and differentiate between benign and life-threatening arrhythmias to initiate appropriate initial management strategies.	1,2,3,4
<b>IV</b>	<b>Nervous system</b> <ul style="list-style-type: none"> <li>- Review of anatomy and physiology</li> </ul>	<b>5</b>	Explain the anatomical structures and physiological functions of the nervous system, including the central and peripheral components, and their roles in sensory, motor, and autonomic functions.	1,2,
<b>V</b>	<b>Neurological emergencies</b> <ul style="list-style-type: none"> <li>- Assessment and management of <ul style="list-style-type: none"> <li>• <i>Stroke</i></li> <li>• <i>TIA</i></li> <li>• <i>Altered Mental Status</i></li> <li>• <i>Coma, etc</i></li> </ul> </li> </ul>	<b>10</b>	Demonstrate proficiency in assessing and managing neurological emergencies, including stroke, transient ischemic attack (TIA), altered mental status, coma, and other critical conditions, applying timely interventions to optimize patient outcomes	1,2,3,4
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Cardiac monitoring procedure</li> <li>2. 12-Lead ECG Placement</li> <li>3. ECG Interpretation</li> <li>4. CPR Skills Training</li> <li>5. AED Operation Simulation</li> <li>6. Cardiac Arrest Scenario Simulation</li> <li>7. Basic Arrhythmia Recognition</li> <li>8. Hands-On Defibrillator Practice</li> <li>9. Team-Based BLS Scenario Drill</li> <li>10. Team-Based ACLS Scenario Drills</li> <li>11. Transcutaneous Pacing Simulation</li> <li>12. Cardioversion Techniques</li> <li>13. FAST (Face, Arms, Speech, Time) Assessment Drill</li> <li>14. Glasgow Coma Scale (GCS) Application Practice</li> <li>15. Emergency Response to Seizure Scenario</li> <li>16. Brain Injury Assessment</li> </ol>	<b>60</b>	Demonstrate proficiency in applying theoretical knowledge to effectively manage both cardiac and neurological emergencies, including ECG interpretation, CPR skills, AED operation, arrhythmia recognition, ACLS protocols, neurological assessments, and emergency responses to seizures and brain injuries	3,4,5



**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop fundamental knowledge of the human heart and the circulatory	<b>1,6,8</b>
<b>2</b>	Demonstrate skills and techniques to assess and manage any	<b>2,3,4,5,7</b>
<b>3</b>	Apply acquired skills to perform ECG and identify abnormalities	<b>2,3,4,</b>
<b>4</b>	Develop comprehensive knowledge on the nervous system	<b>1,6,8</b>
<b>5</b>	Illustrate the ability to evaluate and treat a variety of neurologic emergencies, including seizures, strokes, and other condition	<b>2,3,4,5,7</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BEDM221R</b>	Cardiovascular and Neurological Emergency Management	3	3	3	2				2

SEMESTER – IV									
Course Title	Special Consideration I								
Course code	22BEDM222R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	3+2
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. To understand neonatal physiological changes and manage emergencies like prematurity, seizures, and hypoglycaemia. 2. To assess and manage paediatric respiratory and cardiovascular emergencies, toxicological crises, and SIDS. 3. To recognize and respond to child abuse, and advocate for children with special healthcare needs.								
CO1	Understand and explain the physiological changes that occur in neonates post-birth.								
CO2	Demonstrate proficiency in managing neonatal emergencies through effective application of specific intervention and resuscitation steps								
CO3	Identify and treat common birth injuries in neonates.								
CO4	Demonstrate proficiency in assessing and managing any emergencies in paediatric patients								
CO5	Identify the signs of child abuse and provide appropriate care for children with special health care needs.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	Neonatology - Physiological changes in neonate		5	Describe the key physiological adaptations in neonates, including respiratory, cardiovascular, and metabolic changes.					1,2,
II	Neonatology Emergencies - Specific intervention and resuscitation steps - Management of premature, seizures, thermoregulation, Hypoglycemia		10	Apply specific intervention and resuscitation techniques to manage conditions such as prematurity, seizures, thermoregulation issues, and hypoglycaemia.					3,4, 5
III	Emergencies: - Common birth injuries.		15	Analyze the common birth injuries in neonates, and apply appropriate treatment strategies, and recommend preventive measures to reduce the occurrence of birth injuries.					3,4, 5

<b>IV</b>	<b>Pediatrics:</b> - Approach to pediatric patients. - Assessment and management of respiratory, cardiovascular, toxicological and sudden infant death syndrome.	<b>5</b>	Assess and manage paediatric respiratory and cardiovascular emergencies, toxicological crises, and implement strategies for preventing and responding to sudden infant death syndrome (SIDS).	2,3,4
<b>V</b>	<b>Child Abuse:</b> - Child abuse and neglect - Children with special healthcare needs.	<b>10</b>	Evaluate signs of child abuse and neglect and develop comprehensive care plans for children with special healthcare needs.	3,4,5
<b>Practical</b>	THEORY BASED	<b>30</b>		3,4,5

### TEXT BOOKS:

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

### REFERENCE BOOKS:

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Understand and explain the physiological changes that occur in neonates post-birth.	<b>1,2,6</b>
<b>2</b>	Demonstrate proficiency in managing neonatal emergencies through effective application of specific intervention and resuscitation steps	<b>1,2,3,4</b>
<b>3</b>	Identify and treat common birth injuries in neonates.	<b>1,2,3,4</b>
<b>4</b>	Demonstrate proficiency in assessing and managing any emergencies in paediatric patients	<b>1,2,3,4</b>
<b>5</b>	Identify the signs of child abuse and provide appropriate care for children with special health care needs.	<b>1,2,3,4,6</b>

### MAPPING TABLE

Course code	Course Name	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BEDM222R</b>	Special Consideration		3	3	2			2	

SEMESTER – IV									
Course Title	Pharmacology II								
Course code	22BEDM223R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	2
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. To describe how sedative-hypnotic drugs (barbiturates, benzodiazepines) and antianxiety drugs (benzodiazepines) work and differentiate their clinical uses based on how they are processed in the body. 2. To develop a treatment plan for heart failure using digitalis, diuretics, vasodilators, and ACE inhibitors, considering their mechanisms and possible interactions. 3. To assess the effectiveness and safety of antihypertensive and justify their selection based on patient-specific factors and conditions.								
CO1	Differentiate between the mechanisms of action of barbiturates and benzodiazepines.								
CO2	Evaluate the appropriate use of antiepileptic drugs in managing anxiety disorders.								
CO3	Apply pharmacological principles in the use of drugs for heart failure (digitalis, diuretics, vasodilators) and ACE inhibitors.								
CO4	Evaluate the efficacy and safety of antihypertensive drugs such as calcium channel blockers, central acting alpha agonists, peripheral alpha antagonists, and direct acting vasodilators.								
CO5	Integrate pharmacological treatments for vascular disease and ischemic heart disease.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Neuro pharmacology:</b> - Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines - Antianxiety Drugs: Benzodiazepines,		5	Explain the differences in the mechanism of action between barbiturates and benzodiazepines.				1,2,3	
II	<b>Other Anxiolytics</b> - Antiepileptic drugs, Narcotic analgesics		5	Assess the effectiveness of antiepileptic drugs in treating anxiety disorders compared to benzodiazepines.				2,3,4,5	
III	<b>Cardiovascular pharmacology:</b> - Drugs used in the treatment of Heart Failure(Digitalis, Diuretics, Vasodilators) - ACE inhibitors		5	Develop a treatment plan for heart failure using digitalis, diuretics, vasodilators, and ACE inhibitors, considering their mechanisms and potential interactions.				2,3,4,5	
IV	<b>Antihypertensive drugs</b> - Calcium channel Blockers - Central acting Alpha agonists - Peripheral Alpha Antagonists - Direct acting vasodilators		6	Critically assess the advantages and disadvantages of different antihypertensive drug classes, and justify drug selection based on patient characteristics and comorbidities and central acting alpha agonists.				2,3,4,5	

V	<b>Drugs used in the treatment of vascular disease and tissue Ischemia</b> <ul style="list-style-type: none"> <li>- Vascular Disease</li> <li>- Lipid lowering agents</li> <li>- Antithrombotic</li> <li>- Anticoagulants and Thrombolytics</li> <li>- Ischemic Heart Disease</li> <li>- Nitrates, Beta Blockers, Calcium channel Blockers</li> </ul>	9	Design a comprehensive treatment plan for vascular disease and ischemic heart disease using lipid lowering agents, antithrombotic agents, anticoagulants, thrombolytics, nitrates, beta blockers, and calcium channel blockers, tailored to patient-specific factors and guidelines.	3,4, 5,6
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**TEXT BOOKS:**

T1: Dr. K. D. Tripathi: *Essentials of Medical Pharmacology* 8th edition, New Delhi, India; (2019)

**REFERENCE BOOKS:**

R1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: *Emergency Care in the Streets* 8th edition, Burlington, Massachusetts, USA; 2018.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Differentiate between the mechanisms of action of barbiturates and benzodiazepines.	1,2,6,8
2	Evaluate the appropriate use of antiepileptic drugs in managing anxiety disorders.	1,2,6,8
3	Apply pharmacological principles in the use of drugs for heart failure (digitalis, diuretics, vasodilators) and ACE inhibitors.	1,2,6,8
4	Evaluate the efficacy and safety of antihypertensive drugs such as calcium channel blockers, central acting alpha agonists, peripheral alpha antagonists, and direct acting vasodilators.	1,2,6,8
5	Integrate pharmacological treatments for vascular disease and ischemic heart disease.	1,2,6,8

**MAPPING TABLE**

Course code	Course Name	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDM223R	Pharmacology II	3	3	2			2		2

SEMESTER – IV									
Course Title	Trauma Emergencies								
Course code	22BEDM224R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. To analyze the patient's condition using the ABCDE approach during the initial assessment. 2. To understand the principles of triage and their application in mass casualty incidents and multiple casualty situations. 3. To apply critical thinking and problem-solving skills to provide immediate and appropriate emergency care								
CO1	Apply the knowledge to stabilize and manage fractures using appropriate techniques and materials.								
CO2	Apply the general rules for applying dressings and bandages to provide effective emergency care for fractures and wounds.								
CO3	Classify types of haemorrhage and special forms of bleeding.and implement appropriate control measures to manage bleeding effectively								
CO4	Assess and provide immediate care for various injuries (head, chest, abdominal, blast, crush, burns, scalds, electrical injuries)								
CO5	Demonstrate the appropriate use of dressings and bandages for wound management.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Fracture:</b> - Cause of Fracture - Types of fracture - Classification of fractures - Skull fractures - Jaw and Facial fractures - Upper Trunk and Limbs - Lower Trunk and Limbs	10	Analyze the causes, types, and classifications of fractures, including skull, jaw, facial, upper trunk and limbs, and lower trunk and limbs fractures.					2,3, 4,5	
II	<b>Dressings &amp; Bandages</b> Types of dressing - General rules for applying dressings - General Rules for applying Bandages - Types of bandages - Slings	7	Understand and apply the general rules for applying dressings and bandages, including the types of dressings and bandages and the use of slings.					2,3, 4,5	
III	<b>Hemorrhage or Bleeding:</b> - Types of hemorrhage - Special forms of Bleeding	5	Identify and classify types of haemorrhage and special forms of bleeding.					2,3, 4,5	

<b>IV</b>	<b>Injuries:</b> - Head injuries - Chest injuries - Abdominal wounds - Blast injuries - Crush injuries - Burns and Scalds - Electrical Injuries Wounds and - Soft Tissue Injuries	<b>10</b>	Evaluate and manage head, chest, abdominal, blast, crush, burns, scalds, and electrical injuries.	2,3, 4,5
<b>V</b>	<b>Wounds:</b> - Definition - Emergency care for open wounds - Wound with foreign body - Special wounds	<b>8</b>	Discuss various types of wounds and provide emergency care for open wounds, wounds with foreign bodies, and special wounds.	2,3, 4,5

### TEXT BOOKS:

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran:Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

### REFERENCE BOOKS:

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply the knowledge to stabilize and manage fractures using appropriate techniques and materials.	1,2,3,4,6
2	Apply the general rules for applying dressings and bandages to provide effective emergency care for fractures and wounds.	2,3,4,8
3	Classify types of haemorrhage and special forms of bleeding.and implement appropriate control measures to manage bleeding effectively	1,2,3,4,6
4	Assess and provide immediate care for various injuries (head, chest, abdominal, blast, crush, burns, scalds, electrical injuries)	1,2,3,4
5	Demonstrate the appropriate use of dressings and bandages for wound management.	2,3,4

### MAPPING TABLE

Course code	Course Name	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDM224R	Trauma Emergencies	2	3	3	3	2	2		

SEMESTER – IV									
Course Title	BASIC LIFE SAVING SKILLS								
Course code	22UULS222R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. To learn and demonstrate essential Basic Life Support (BLS) techniques for assisting in medical emergencies before professional help arrives. 2. To enhance communication, teamwork, and conflict resolution skills to improve personal and professional interactions. 3. To Understand the Triage system, recognize different levels of triage, and classify common medical emergencies to prioritize patient care effectively.								
CO1	Demonstrate knowledge and skill to perform CPR use an AED, and respond to choking in adults and children.								
CO2	Understand the significance of communication and teamwork in various situations								
CO3	Apply knowledge and skill about pre-hospital care and management of trauma emergencies								
CO4	Understand the principles and purpose of the Triage system in healthcare settings.								
CO5	Identify and manage common medical emergency conditions								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Basic Life Support ( BLS)</b> - Introduction of BLS - Chain of survival - ABCs Assessment - CPR and Ventilation Technique - AED - Choking for adult and children		5	Apply the principles of Basic Life Support (BLS) to perform CPR, ventilation, and use an AED correctly in emergency scenarios.				1,2,	
II	<b>Soft skills</b> - Introduction - Communications Skills - Situational Skills - Team Work - Other Soft Skills		5	Demonstrate the effective communication and teamwork skills in emergency situations, ensuring clear and concise information exchange and coordinated efforts.				1,2, 3,4	



<b>III</b>	<b>Trauma emergencies</b> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Priorities of Initial approach in pre-hospital care <ul style="list-style-type: none"> <li>a) Scene safety</li> <li>b) Primary assessment</li> <li>c) Bleeding control</li> <li>d) Helmet removal</li> <li>e) Care of amputated body part</li> <li>f) Extrication of victims and safe transfer</li> <li>g) Cervical spine stabilization</li> <li>h) Cervical collar application</li> </ul> </li> <li>- Splinting of broken Limbs</li> </ul>	<b>10</b>	Analyze the priorities of initial trauma care to conduct scene safety, primary assessment, bleeding control, and proper handling of injured patients in pre-hospital settings.	1,2, 3,4
<b>IV</b>	<b>Triage system</b> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Flow chart approach of Triage</li> <li>- Triage of Multiple Casualties in Pre-Hospital setting</li> <li>- Triage of Single casualty</li> </ul>	<b>5</b>	Evaluate different triage methods to prioritize care for single and multiple casualties efficiently in a pre-hospital setting.	1,2, 3,4, 5
<b>V</b>	<b>Medical emergencies</b> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Victim centred approach in medical emergency</li> <li>- Management of :- <ul style="list-style-type: none"> <li>a)seizures</li> <li>b)heart attack</li> <li>c)asthma</li> <li>d)diabetic emergencies</li> <li>e)emergency childbirth</li> <li>f)stroke recovery position</li> </ul> </li> </ul>	<b>5</b>	Develop a comprehensive care plan for managing specific conditions such as seizures, heart attacks, and asthma, ensuring a victim-centered approach in simulated scenarios.	2,3, 4,5

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate knowledge and skill to perform CPR use an AED, and respond to choking in adults and children.	<b>1,2,3,4,6</b>
<b>2</b>	Understand the significance of communication and teamwork in various situations	<b>2,3,4,8</b>
<b>3</b>	Apply knowledge and skill about pre-hospital care and management of trauma emergencies	<b>1,2,3,4,6</b>
<b>4</b>	Understand the principles and purpose of the Triage system in healthcare settings.	<b>1,2,3,4</b>
<b>5</b>	Identify and manage common medical emergency conditions	<b>2,3,4</b>

### MAPPING TABLE

Course code	Course Name	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UULS222R</b>	Basic Life Saving Skills		3	3	2	2			2

SEMESTER – IV									
Course Title	EVS								
Course code	22UBES201R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. To understand and address complex environmental issues from a problem-oriented, inter-disciplinary perspective 2. To develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, Skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and prevention of new ones. 3. To explore strategies for sustainable development and living, including conservation, renewable energy, waste reduction, and responsible consumption								
CO 1	Discuss the importance of Environment Studies and the need for public awareness.								
CO 2	Identify natural resource, its importance, and its impacts on the environment								
CO 3	Explore in-depth knowledge on concept of ecosystem								
CO 4	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.								
CO 5	Explain various environmental pollution and its impact on human and ecosystem								
Unit- No.	Content			Contact Hour	Learning Outcome				KL
I	<b>Multidisciplinary nature of environmental studies:</b> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Scope and importance</li> <li>• Need for public awareness</li> </ul>			5	Explain the definition, scope, and importance of environmental studies and discuss the need for public awareness.				1,2,
II	<b>Natural Resources:</b> <b>Renewable and non-renewable resources:</b> <ul style="list-style-type: none"> <li>• Forest resources</li> <li>• Water resources</li> <li>• Mineral resources</li> <li>• Food resources</li> <li>• Energy resources</li> <li>• Land resources</li> </ul>			10	Describe different types of natural resources (renewable and non-renewable) and explain their uses and environmental impacts.				1,2, 3,4

<b>III</b>	<b>Ecosystems</b> <b>Concept of an ecosystem:</b> <ul style="list-style-type: none"> <li>• Structure and function- Producers, consumers, and decomposers.</li> <li>• Energy flow</li> <li>• Ecological succession</li> <li>• Food chains, food webs and ecological pyramids</li> <li>• Introduction- types, characteristic features, structure, and function of the following ecosystem: - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems</li> </ul>	<b>15</b>	Describe the components of an ecosystem, explain energy flow and ecological succession, and compare different types of ecosystems.	1,2,3,4
<b>IV</b>	<b>Biodiversity and its conservation</b> <ul style="list-style-type: none"> <li>• Introduction–</li> <li>• Definition</li> <li>• Value of biodiversity</li> <li>• Threats to biodiversity</li> <li>• Conservation of biodiversity</li> </ul>	<b>5</b>	<b>Discuss</b> , explain biodiversity's value and threats, and describe methods for its conservation.	1,2,
<b>V</b>	<b>Environmental Pollution</b> <ul style="list-style-type: none"> <li>• Definition Cause, effects, and control measures of:- Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards</li> <li>• solid waste management</li> <li>• Disaster management</li> </ul>	<b>10</b>		1,2,3,4

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss the importance of Environment Studies and the need for public awareness.	<b>8</b>
<b>2</b>	Identify natural resource, its importance, and its impacts on the environment	<b>8</b>
<b>3</b>	Explore in-depth knowledge on concept of ecosystem	<b>8</b>
<b>4</b>	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.	<b>8</b>
<b>5</b>	Explain various environmental pollution and its impact on human and ecosystem	<b>8</b>

### MAPPING TABLE

Course code	Course Name	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBEES201R</b>	EVS								<b>3</b>

SEMESTER – IV									
Course Title	ENHANCED PROFESSIONAL SKILLS								
Course code	22UBPD221R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	22UBPD121R	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objective (Minimum 3)	1. To enhance the writing skills in different areas including Paragraph writing and letter writing. 2. To understand and enhance the Self-management skills. 3. To familiarize students with the use of Contextual vocabulary and Use of phrasal verbs and idioms in a conversation 4. To understand the dress code ethics and interview skills 5. To enhance the analytical skill and problem-solving skill of the students.								
CO1	Develop proficiency in paragraph writing and letter writing								
CO2	Develop student's self-management skill to plan their goals.								
CO3	Develop writing skills in different areas including Paragraph writing and letter writing.								
CO4	Enhance their capacity in understanding dress code ethics and develop interview skills								
CO5	Enhance comprehend sentences accurately and quickly and controlling the emphasis in writing								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Writing Skills</b> - Paragraph Writing & Narratives - Letter Writing - Technical Writing <b>Pipe and cistern</b> - Introduction of pipes and cistern - Solving different types of questions		7	Write a technical document that introduces the principles of pipes and cisterns, while explaining the concept clearly and illustrating its application through solving different types of questions.				1,2,	
II	<b>Self- Management Skills</b> - SWOT Analysis - Goal Setting and Personal Hygiene <b>Mixture allegation and Clock</b> - Introduction of basics - Solving questions on mixture		7	Explain the importance of conducting a SWOT analysis for personal development and setting SMART goals, as well as the significance of personal hygiene in professional and personal settings.				1,2, 3,4	

<b>III</b>	<b>Vocabulary Development</b> <ul style="list-style-type: none"> <li>- Understanding different aspects of a word (such as the use of say, tell, speak)</li> <li>- Learning strategies to develop vocabulary</li> <li>- Contextual vocabulary learning</li> <li>- Use of phrasal verbs and idioms in a conversation</li> <li>- Effectively using dictionary, thesaurus</li> </ul> <b>Statement and Course of action</b> <ul style="list-style-type: none"> <li>- Revision of syllogism</li> <li>- Statement and conclusion</li> <li>- Course of action based on statement</li> </ul>	7	Explain various strategies for developing vocabulary, including contextual learning and the use of phrasal verbs and idioms in conversation.	1,2, 3,4
<b>IV</b>	<b>Interview Skills &amp; Dress Code Ethics</b> <ul style="list-style-type: none"> <li>- Types of interview- telephonic, virtual &amp; face to face online interview, personal interview, Panel interview, Group interview</li> <li>- Common interview questions and answering strategies</li> <li>- Dress Code Ethics during Interviews</li> <li>- Mock Interview Session</li> </ul> <b>Sitting arrangement (puzzle)</b> <ul style="list-style-type: none"> <li>- Linear arrangement puzzle</li> <li>- Circular arrangement puzzle</li> <li>- Matrix</li> </ul>	11	Explain common interview questions and effective answering strategies, as well as the importance of dress code ethics during interviews.	1,2,
<b>V</b>	<b>Grammar (Flipped Classroom)</b> <ul style="list-style-type: none"> <li>- Word-stress, Syllables Practice Session: Common Errors (testing the students 'grammar already learnt')</li> </ul> <b>Profit loss and discount</b> <ul style="list-style-type: none"> <li>- Introduction to basics</li> <li>- Introduction to discount</li> <li>- Problems related on the topic</li> </ul>	4	Identify common grammar errors related to word stress and syllable division.	1,2, 3,4

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop proficiency in paragraph writing and letter writing	<b>6,7,8</b>
<b>2</b>	Develop student's self-management skills to plan their goals.	<b>6,7,8</b>
<b>3</b>	Develop writing skills in different areas including Paragraph writing and letter writing.	<b>6,7,8</b>
<b>4</b>	Enhance their capacity in understanding dress code ethics and develop interview skills	<b>6,7,8</b>
<b>5</b>	Enhance comprehend sentences accurately and quickly and controlling the emphasis in writing	<b>6,7,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO 1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22UBPD221R</b>	Enhance Professional Skills						2	3	2



SEMESTER – IV									
Course Title	PERSONAL FINANCIAL PLANNING								
Course code	22UUFL223R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. To understand the relevant concept of money, borrowing, lending, taxes and their application to financial planning. 2. To assess the personal financial planning process, the life cycle of financial plans and methods of goal achievement 3. To formulate a budget, record keeping system and tax planning strategy based on current financial goals.								
CO1	Understand the relevant concept of money, borrowing, lending, taxes and their application to financial planning.								
CO2	Assess the personal financial planning process, the life cycle of financial plans and methods of goal achievement.								
CO3	Formulate a budget, record-keeping system and tax planning strategy based on current financial goal								
CO4	Gain insights into tax planning for different financial scenarios, such as individual taxpayers, businesses, and investments								
CO5	Learn strategies to manage and reduce debt efficiently								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	<b>Fundamentals of Financial Planning:</b> i. Functions of Money, ii. Inflation- Meaning, causes, how it can be controlled, iii. Process of financial planning, iv. Time value of money- simple and compound interest v. net present value and Future Value vi. Power of Compounding, vii. Doubling period and Rule of 72	<b>5</b>	Describe the fundamentals of financial planning including its different tools.					<b>1</b>	
<b>II</b>	<b>Income Tax Planning:</b> i. Meaning of Income, ii. Direct and Indirect taxes, Taxable Income, Various heads of Income for Tax Calculation, iii. Non-taxable income, iv. Tax evasion and tax avoidance, v. GST and tax planning strategies	<b>10</b>	Discuss the techniques of income tax planning.					<b>1,2,</b>	

<b>III</b>	<b>Entrepreneurial Planning:</b> i. Meaning of Entrepreneurship, prerequisite of becoming an entrepreneur, ii. Entrepreneurship support system in India, iii. Institutional support systems for entrepreneurship, iv. financial support system for entrepreneurship, v. venture capital, business Angels, vi. Assistant of Government, vii. Commercial bank Loans and Overdraft.	<b>15</b>	Illustrate the knowledge and techniques of entrepreneurial planning and supporting the government in any way.	3,4
<b>IV</b>	<b>Planning for investing in securities market:</b> i. Investment avenues offered by Securities Markets, Primary market and secondary market ii. Stock market- Meaning, features, functions of NSE, BSE, DEMAT trading account iii. Security Repository, stock brokers, Operational aspect of securities markets: placement of orders, contract note, pay-in and pay-out, trading and settlement cycle iv. Various Risk Involved in investing in securities markets; Role of Financial Intermediaries; stock indices. v. Mutual Funds- Meaning, concept, definition, types, importance and drawback of Mutual Funds, Mutual Funds in India, Investing in Mutual Funds vi. Systematic Investment Plan (SIP) and its advantages	<b>5</b>	Explain the terms and conditions of investment including strategies of investing in different trading platforms.	4,5,6
<b>V</b>	<b>Planning for debts and Retirement:</b> i. Consumer credit- Introduction to consumer credit, choosing a source of credit, the cost of credit alternatives. ii. Consumer Legal Protection; iii. Housing decision: factors and finance; Vehicle decision iv. Retirement Planning- Meaning of Cost of living, Retirement need analysis; development of retirement plan, various retirement schemes iv. Estate Planning; Pension and Medicare Planning; wills	<b>10</b>	Explain proper planning for debts and retirement.	5,6

**TEXT BOOKS:**

T1: Personal Finance and Planning by Dr. Rajni. Date of Publication 1st January,2020, Publisher : JSR PUBLISHING HOUSE LLP (1 January 2020)

T2: Personal Finance 8<sup>th</sup> Edition by Arthur J. Keown, Pearson Education, Publisher:PearsonEducation;Eighthedition(30July2019)

**REFERENCE BOOKS:**

R1: The Dumb Things Smart People Do with their Money: Thirteen Ways to Right your Financial Wrongs Kindle Edition by Jill Schlesinger, Publisher: Ballantine Books (5 February (2019)

R2 :Peaceful Personal Finance: A short read on the Basics of Personal Finance and Planning Kindle Edition by Hemasingh

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the relevant concept of money, borrowing, lending, taxes and their application to financial planning.	8
2	Assess the personal financial planning process, the life cycle of financial plans and methods of goal achievement.	8
3	Formulate a budget, record-keeping system and tax planning strategy based on current financial goal	8
4	Gain insights into tax planning for different financial scenarios, such as individual taxpayers, businesses, and investments	8
5	Learn strategies to manage and reduce debt efficiently	8

**MAPPING TABLE**

Course code	Course Name	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UUFL223R	Personal Financial Planning								2

SEMESTER – IV									
Course Title	MOOCS								
Course code	22BEDMMO21	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	0
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objective (Minimum 3)	1. To equip with a thorough understanding of the course material through engaging online content. 2. To provide hands-on experience through interactive exercises and real-world projects. 3. To promote effective communication and teamwork through online discussions and group activities.								
CO1	Demonstrate a strong grasp of key principles and theories covered in the course.								
CO2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7,8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7,8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7,8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	7,8

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDMMO21	MOOCS							2	3

SEMESTER – IV									
Course Title	GENERIC ELECTIVES (COURSERA)								
Course code	22BEDMGE21	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objective (Minimum 3)	4. To equip with a thorough understanding of the course material through engaging online content. 5. To provide hands-on experience through interactive exercises and real-world projects. 6. To promote effective communication and teamwork through online discussions and group activities.								
CO1	Demonstrate a strong grasp of key principles and theories covered in the course.								
CO2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7,8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7,8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7,8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	7,8

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDMGE21	Generic Electives							2	3

SEMESTER – IV									
Course Title	Co-Curricular								
Course code	22UBCC221	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of second year of the programme								
Course Objectives (Minimum 3)	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>		60	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2,3,4	
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students members of the club are trained represent AdtU in various inter University student and national level competitions.</li> </ul>								
	<ul style="list-style-type: none"> <li>Renewed personalities are invited to</li> </ul>								

	conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	7,8
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	7,8
4	Explore new platform to learn from invited experts in their respective fields.	7,8
5	Evaluate overall growth alongside academic development.	7,8

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
22UBCC221	Co curricular							2	3

SEMESTER – IV									
Course Title	Extra-Curricular								
Course code	22UBEC221	Total credits: 2 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit- No.	Content			Contact Hour	Learning Outcome				KL
I	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>			60	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2,3,4
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								
	<ul style="list-style-type: none"> <li>The student members of the club are trained to represent AdtU in various inter University student and national level competitions</li> </ul>								
	<ul style="list-style-type: none"> <li>Renewed personalities are invited to conduct workshops that benefit the</li> </ul>								



	members and students by giving them the platform to learn from experts in their respective fields.			
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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	<b>7,8</b>
<b>2</b>	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	<b>7,8</b>
<b>3</b>	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	<b>7,8</b>
<b>4</b>	Explore new platform to learn from invited experts in their respective fields.	<b>7,8</b>
<b>5</b>	Evaluate overall growth alongside academic development.	<b>7,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1*</b>	<b>PO2</b>	<b>PO3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>22UBEC221</b>	Extra-Curricular							2	3

SEMESTER – V									
Course Title	Trauma Care								
Course code	22BEDM311R	Total credits: 6 Total hours: 60T+60P	L	T	P	S	R	O/F	C
			4	0	4	0	0	0	4+2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	V semester of third year of the programme								
Course Objectives (Minimum 3)	1. To understand trauma care systems, injury mechanisms, and injury epidemiology. 2. To develop skills in assessing and managing bleeding, shock, and soft tissue injuries to stabilize patients and prevent complications. 3. To gain knowledge and skills in managing burns, abdominal, thoracic, musculoskeletal, head, face, spinal injuries, and environmental emergencies.								
CO1	Explain the structure and function of trauma care systems and identify common mechanisms of injury.								
CO2	Apply appropriate techniques to assess and manage bleeding and shock effectively in trauma scenarios.								
CO3	Evaluate the effectiveness of treatment strategies for burns, abdominal injuries, and thoracic trauma based on patient outcomes.								
CO4	Analyze the diagnostic findings and prioritize interventions for musculoskeletal, head, and spinal injuries.								
CO5	Apply appropriate protocols to effectively manage environmental emergencies, ensuring patient safety and stabilization.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Trauma systems and mechanism of injury</b> - Energy - Biomechanics and Kinematics - Trauma centres - Types of traumas		10	Describe, Explain, Discuss, the different types of trauma systems and explain the mechanisms of trauma				1,2,	
II	<b>Soft tissue injury and Bleeding and Shock</b> - Review of Cardio Vascular system - Anatomy and physiology of skin - Pathophysiology of Haemorrhage - Assessment and management of bleeding patient - Pathophysiology of shock - Assessment and management of shock - Wound healing - Closed versus open wounds - Crush injuries - Blast injuries - Assessment and management of soft tissue injury - Management of crush syndrome		15	Identify, explain, describe the Pathophysiology and assessment of soft tissue injuries and apply an appropriate methods to manage different injuries effectively				1,2, 3,4	

<b>III</b>	<b>Burns, Abdominal Injuries &amp; Thoracic Injuries</b> <ul style="list-style-type: none"> <li>- Pathophysiology of Burns</li> <li>- Assessment &amp; Management of Burns</li> <li>- Review of anatomy and physiology of abdomen</li> <li>- Pathophysiology, assessment and management of abdominal injuries</li> <li>- Pathophysiology Assessment &amp; Management of Thoracic Injuries</li> </ul>	<b>12</b>	Identify, explain, describe the Pathophysiology and assessment of burn , abdominal and thoracic injuries and apply an appropriate methods of management effectively	1,2, 3,4
<b>IV</b>	<b>Musculoskeletal injuries, Head and face an Spinal Injuries</b> <ul style="list-style-type: none"> <li>- Review of anatomy Assessment and management of head and facial injuries</li> <li>- Assessment and management of spinal injuries</li> <li>- Spinal immobilization techniques.</li> </ul>	<b>13</b>	Identify, explain, describe the Pathophysiology and assessment of musculoskeletal , head and face injuries and apply an appropriate methods to manage the injuries effectively	1,2, 3,4
<b>V</b>	<b>Environmental Emergencies</b> <ul style="list-style-type: none"> <li>- Heat Illness</li> <li>- Cold Injuries</li> <li>- Drowning</li> <li>- Diving Injuries</li> <li>- Altitude Illness</li> <li>- Lightning Strike</li> <li>- Bites &amp; Stings</li> </ul>	<b>10</b>	Identify, explain, describe various environmental emergencies and analyze the preventive measures to prevent and manage any emergencies	1,2, 3,4

<b>Practical</b>	<ol style="list-style-type: none"> <li>1. <b>Simulated Trauma Scenarios:</b>Analyze different trauma scenarios to understand the mechanisms of injury (e.g., falls, motor vehicle accidents, and penetrating trauma).</li> <li>2. <b>Haemorrhage Control Techniques:</b> techniques such as direct pressure application, tourniquet use, and wound packing, suture technique</li> <li>3. <b>Burn Management:</b> cleaning and debriding burns, applying appropriate dressings (e.g., non-adherent dressings, silver sulfadiazine cream), and managing pain with analgesics.</li> <li>4. <b>Immobilization and Stabilization Procedures:</b> Application of splints, cervical collars, and backboards, Scoop stretcher and perform focused neurological assessments.</li> <li>5. <b>Cooling Methods and Rewarming techniques</b></li> <li>6. <b>Care for Sting bites</b></li> <li>7. <b>Techniques for safe extraction from water</b></li> </ol>	<b>60</b>	Identify the appropriate techniques, describe the steps, explain the rationale, apply skills, analyze scenarios, evaluate effectiveness, and develop care plans for managing trauma scenarios including haemorrhage control, burn management, immobilization, cooling and rewarming, sting bite care, and water extractions.	1,2, 3,4, 5
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**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran:Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain the structure and function of trauma care systems and identify common mechanisms of injury.	<b>1,3,4,7</b>
<b>2</b>	Apply appropriate techniques to assess and manage bleeding and shock effectively in trauma scenarios.	<b>1,2,3,4,5</b>
<b>3</b>	Evaluate the effectiveness of treatment strategies for burns, abdominal injuries, and thoracic trauma based on patient outcomes.	<b>1,2,3,4,5</b>
<b>4</b>	Analyze the diagnostic findings and prioritize interventions for musculoskeletal, head, and spinal injuries.	<b>1,2,3,4,5</b>
<b>5</b>	Apply appropriate protocols to effectively manage environmental emergencies,ensuring patient safety and stabilization.	<b>1,2,3,4,5</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDM311R	Trauma Care	2	3	3	3	2	2		

<b>SEMESTER – V</b>										
<b>Course Title</b>	<b>Medical Emergencies II And Special Considerations II</b>									
<b>Course code</b>	<b>22BEDM312R</b>	<b>Total credits: 6</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>	
		<b>Total hours: 60T+60P</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4+2</b>	
<b>Pre-requisite</b>	<b>NIL</b>	<b>Co-requisite</b>	<b>NIL</b>							
<b>Programme</b>	<b>Bachelor Of Trauma, Emergency and Disaster Management</b>									
<b>Semester</b>	<b>V semester of third year of the programme</b>									
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>To identify, assess, and manage endocrine, allergic, gastrointestinal, renal, urological, toxicological, haematological, infectious, and communicable emergencies through evidence-based practices</li> <li>To provide effective acute interventions for chronic care patients and manage substance abuse and poisoning emergencies.</li> <li>To address the needs of geriatrics, special needs patients, and victims of abuse, neglect, or assault with ethical and compassionate care.</li> </ol>									
<b>CO1</b>	Describe the signs, symptoms, and management of endocrine and allergic emergencies									
<b>CO2</b>	Explain the assessment and management of gastrointestinal, renal and urological emergencies									
<b>CO3</b>	Apply appropriate decontamination and antidote therapies to cases of substance abuse and poisoning									
<b>CO4</b>	Evaluate appropriate emergency care strategies for managing infectious and communicable diseases in geriatric patients, ensuring effective treatment and prevention measures.									
<b>CO5</b>	Assess the signs of abuse, neglect, and assault in patients with special needs									
<b>Unit-No.</b>	<b>Content</b>				<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>
<b>I</b>	<b>Endocrine emergencies, Allergic emergencies</b> - Review of Anatomy and physiology - Pathophysiology - Assessment and management - Review of Anatomy and physiology - Pathophysiology - Assessment and management				<b>15</b>	Identify the signs and symptoms of endocrine emergencies, such as diabetic ketoacidosis and thyroid storm, and apply appropriate treatment protocols for allergic emergencies, including anaphylaxis, in emergency scenarios.				1,2,

<b>II</b>	<b>Gastro intestinal, Renal and urological emergencies</b> - Review of Anatomy and physiology - Pathophysiology - Assessment and management	<b>10</b>	Describe the assessment and management of gastrointestinal, renal, and urological emergencies, such as acute abdominal pain, renal failure, and urological obstructions, in emergency situations.	1,2,3,4
<b>III</b>	<b>Toxicology: Substance abuse and poisoning, Haematological emergencies</b> - Types of toxicological emergencies. - Routes of absorption - Bites, stings, and injected poisons. - Review of Anatomy and physiology - Pathophysiology - Assessment and management	<b>15</b>	Discuss the assessment and management of toxicological emergencies related to substance abuse and poisoning, including decontamination and administration of antidotes, in emergency settings. Identify and analyze haematological emergencies, such as severe anaemia, thrombotic disorders, and bleeding disorders, to determine appropriate emergency interventions and management strategies.	1,2,3,4
<b>IV</b>	<b>Infectious and communicable diseases, Geriatrics</b> - Transmission of communicable diseases - Precautions for health care providers - Ambulance cleaning and disinfection - Review of anatomy and physiology - Pathophysiology - Assessment and management of geriatrics	<b>10</b>	Discuss methods to control the spread of infectious and communicable diseases and evaluate isolation and treatment measures	1,2,3,4
<b>V</b>	<b>Abuse, Neglect and assault, Patients with special needs, Acute interventions for chronic care patient</b> - Child abuse and neglect - Elder abuse and neglect - Domestic abuse - Sexual assault - Physical challenges - Mental challenges - Pathologic challenges - Terminal ill patients - Patients with communicable diseases - Culturally diverse patients - Financial challenges - Injury prevention - Assessment and management	<b>10</b>	Identify signs of abuse, neglect, and assault and justify appropriate intervention and reporting procedures	1,2,3,4

<b>Practical</b>	<b>Theory Based</b>	<b>60</b>		1,2,3,4,5
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**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran:Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe the signs, symptoms, and management of endocrine and allergic emergencies	<b>1,2,3,4</b>
<b>2</b>	Explain the assessment and management of gastrointestinal, renal and urological emergencies	<b>1,2,3,4,</b>
<b>3</b>	Apply appropriate decontamination and antidote therapies to cases of substance abuse and poisoning	<b>1,2,3,4,</b>
<b>4</b>	Evaluate appropriate emergency care strategies for managing infectious and communicable diseases in geriatric patients, ensuring effective treatment and prevention measures.	<b>1,2,3,6,7</b>
<b>5</b>	Assess the signs of abuse, neglect, and assault in patients with special needs	<b>2,6,7,8</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BEDM312R</b>	Medical Emergencies II and Special Consideration II	3	3	3	1	1	2	2	1

SEMESTER – V									
Course Title	Medical Equipment Usage And Management								
Course code	22BEDM313R	Total credits: 5 Total hours: 60T+60P	L	T	P	S	R	O/F	C
			4	0	4	0	0	0	4+2
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	V semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To describe the functions, proper usage, and maintenance requirements of various medical equipment commonly used in healthcare settings.</li> <li>To demonstrate the correct operation and troubleshooting techniques for essential medical devices to ensure patient safety and effective clinical outcomes</li> <li>To apply principles of safety and regulatory compliance in the management and usage of medical equipment, ensuring adherence to industry standards and best practices.</li> </ol>								
CO1	Apply the principles of using personal protective equipment (PPE) and airway management equipment to ensure safety and effectiveness in clinical practice.								
CO2	Apply advanced life support techniques using cardiac and trauma life support equipment to enhance patient survival rates and minimize complications in emergency situations.								
CO3	Demonstrate proficiency in utilizing delivery kits to ensure safe and effective childbirth in various clinical settings.								
CO4	Identify different types of entrapment situations and apply appropriate extrication techniques.								
CO5	Identify various types of communication devices used in healthcare, such as radios, telephones, and telecommunication systems.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Personal protective equipment's, Airway management equipment</b> - Gloves, Mask, Goggle, Apron etc - OPA, NPA, Suction Machine, BVM - ET Tube, LMA, Combitube, Kings PtLA etc.		12	Demonstrate the correct procedures for donning and doffing PPE and for using and maintaining airway management equipment, including intubation and ventilation techniques.				1,2,	
II	<b>Cardiac life support equipment, Trauma life support equipment</b> - ECG Machine, Cardiac Monitor, Pulse-Oximeter, - Sphygmomanometer, Stethoscope, Defibrillator, AED etc. - Splint, Bandage, Cervical Collar, Spine Board, Scoop Stretcher, KED etc.		15	Illustrate correct procedures for operating and maintaining cardiac life support equipment (e.g., defibrillators, cardiac monitors) and trauma life support equipment (e.g., splints, cervical collars) during emergency interventions.				1,2, 3,4	



<b>III</b>	<b>Delivery kit</b> - Surgical gloves, Mask, Gown, Cord Clamps, Sanitary Pads, Feeding Tube, Bulb Syringe etc - Neonatal resuscitation kit Infant BVM, Infant ET Tube, Infant Laryngoscope etc.	<b>13</b>	Apply knowledge of delivery kit contents and procedures to assist in uncomplicated deliveries, ensuring maternal and neonatal safety.	1,2, 3,4
<b>IV</b>	<b>Extrication Equipment's</b> - Fire extinguisher, Axe, Crib, Crow Bar, Cutter, Rubber Gloves, Hammer etc.	<b>12</b>	Evaluate the safety considerations and protocols associated with the use of extrication equipment during emergency responses	1,2, 3,4
<b>V</b>	<b>Communication devices</b> - Mobile Phone, Radio, Public Addressing System etc	<b>8</b>	Demonstrate proficiency in operating different types of communication devices, such as radios, telephones, and mobile communication apps, to relay critical information during emergencies.	1,2, 3,4
<b>Practical</b>	<ol style="list-style-type: none"> <li><b>1. Personal Protective Equipment (PPE):</b> PPE Donning and Doffing Drill</li> <li><b>2. Airway Management Equipment:</b> Insertion of Oropharyngeal (OPA) and Nasopharyngeal (NPA) airways, use of suction machines, and Bag-Valve-Mask (BVM) ventilation, Endotracheal (ET) tubes, Laryngeal Mask Airways (LMA), Combitubes, and Kings LT-D airways.</li> <li><b>3. Cardiac Life Support Equipment:</b> Procedures of ECG machines, cardiac monitors, Defibrillator and pulse-Oximeter application</li> <li><b>4. Trauma Life Support Equipment:</b> Immobilization techniques using splints, cervical collars, spine boards, scoop stretchers, and Kendrick Extrication Devices (KED).</li> <li><b>5. Neonatal resuscitation kit:</b> Resuscitation techniques using infant Bag-Valve-Mask (BVM), Endotracheal (ET) tubes, and laryngoscopes.</li> <li><b>6. Extrication Equipment:</b> practical exercises using fire extinguishers, axes, cribs, crowbars, cutters, rubber gloves, and hammers to simulate vehicle extrication scenarios.</li> </ol>	<b>60</b>	Demonstrate proficiency in utilizing emergency equipment to ensure effective response and patient care in clinical emergencies, including personal protective equipment, airway management devices, cardiac and trauma life support equipment, delivery kits, extrication tools, and communication devices.	1,2, 3,4, 5

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Apply the principles of using personal protective equipment (PPE) and airway management equipment to ensure safety and effectiveness in clinical practice.	<b>2,3,4,8</b>
<b>2</b>	Apply advanced life support techniques using cardiac and trauma life support equipment to enhance patient survival rates and minimize complications in emergency situations.	<b>1,2,3,4,8</b>
<b>3</b>	Demonstrate proficiency in utilizing delivery kits to ensure safe and effective childbirth in various clinical settings.	<b>,2,3,4,</b>
<b>4</b>	Identify different types of entrapment situations and apply appropriate extrication techniques.	<b>2,3,5,6,7</b>
<b>5</b>	Identify various types of communication devices used in healthcare, such as radios, telephones, and telecommunication systems.	<b>2,3,4,5,7</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BEDM313R</b>	Medical Equipment usage and management		3	3	3	2	2	2	

SEMESTER – V									
Course Title	Techno-professional skill (Basic Care Of Patient)								
Course code	22BEDM314R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	0	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	V semester of third year of the programme								
Course Objectives (Minimum 3)	1. To provide knowledge and skills on monitoring the patients in ICU. 2. To give an insight knowledge and skills on different positioning and mobilization of patients. 3. To provide knowledge and skills on the control of infection in ICU								
CO1	Develop fundamental knowledge on the techniques of monitoring ICU patients.								
CO2	Understand various body positioning and mobility techniques including preventive measures of pressure injury.								
CO3	Apply skills and technique to maintain the airway along with the pharmacological management.								
CO4	Explain the different routes of medication administration and calculation of drug doses.								
CO5	Understand the importance of hygiene and personal protective equipment in infection control.								
Unit-No.	Content		Contact Hour	Learning Outcome					KL
I	<b>Monitoring of patients in ICU</b> <ul style="list-style-type: none"> <li>• Vital signs monitoring</li> <li>• ECG monitoring</li> <li>• Pain and sedation monitoring</li> </ul>		10	Explain and illustrate knowledge on techniques of monitoring patients in the ICU.					3,4,5
II	<b>Positioning and Mobilization</b> <ul style="list-style-type: none"> <li>• Positioning techniques</li> <li>• Mobility techniques</li> <li>• Pressure injuries and prevention in ICU patients</li> </ul>		15	Describe, illustrate and explain various techniques of patient positioning and mobility including preventive measures of pressure injuries.					3,4,5
III	<b>Airway maintenance</b> <ul style="list-style-type: none"> <li>• Positioning</li> <li>• Airway maneuvers</li> <li>• Airway adjuncts</li> <li>• Advanced airway equipments</li> <li>• Pharmacological interventions               <ul style="list-style-type: none"> <li>➤ Bronchodilators</li> <li>➤ Anti inflammatory</li> <li>➤ Mucolytic agents</li> </ul> </li> </ul>		12	Explain, illustrate and demonstrate various airway management techniques along with the different drugs used in the procedure.					3,4,5

<b>IV</b>	<b>Medication administration</b> <ul style="list-style-type: none"> <li>• Routes of administration</li> <li>• Dose calculation</li> </ul>	<b>13</b>	Explain and illustrate the various routes of drug administration and dosage calculation.	3,4,5
<b>V</b>	<b>Infection Control</b> <ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Personal protective equipments</li> <li>• Isolation precautions</li> </ul>	<b>10</b>	Describe, illustrate and explain the important measures such as hand hygiene and PPE for infection control in the ICU.	3,4,5

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge on the techniques of monitoring ICU patients.	2,3,4,6,8
2	Understand various body positioning and mobility techniques including preventive measures of pressure injury.	1,2,3,4,6,8
3	Apply skills and technique to maintain the airway along with the pharmacological management.	1,2,3,4,8
4	Explain the different routes of medication administration and calculation of drug doses.	2,3,6,7,
5	Understand the importance of hygiene and personal protective equipment in infection control.	2,3,4,7

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDM314R	Techno-professional skill (Basic Care Of Patient)		3	3	3	2	2	2	

SEMESTER – V									
Course Title	MOOCS								
Course code	22BEDMMO31	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	0
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	V semester of third year of the programme								
Course Objective (Minimum 3)	7. To equip with a thorough understanding of the course material through engaging online content. 8. To provide hands-on experience through interactive exercises and real-world projects. 9. To promote effective communication and teamwork through online discussions and group activities.								
CO1	Demonstrate a strong grasp of key principles and theories covered in the course.								
CO2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7,8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7,8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7,8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	7,8

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDMMO31	MOOCS	1	1	1	1	1	1	2	3

SEMESTER – V									
Course Title	Co-Curricular								
Course code	22UBCC311	Total credits: 1 Total hours: 60S	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	II semester of first year of the programme								
Course Objectives (Minimum 3)	1. To develop skills and interests through participation in diverse extracurricular and co-curricular activities. 2. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 3. To provide opportunities for personal growth and practical learning beyond the academic curriculum.								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> </ul>		60	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2,3,4	
	<ul style="list-style-type: none"> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> </ul>								
	<ul style="list-style-type: none"> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> </ul>								
	<ul style="list-style-type: none"> <li>The students members of the club are trained represent AdtU in various inter University student and national level competitions.</li> </ul>								
	<ul style="list-style-type: none"> <li>Renewed personalities are invited to</li> </ul>								

	conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.			
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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	<b>7,8</b>
<b>2</b>	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	<b>7,8</b>
<b>3</b>	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	<b>7,8</b>
<b>4</b>	Explore new platform to learn from invited experts in their respective fields.	<b>7,8</b>
<b>5</b>	Evaluate overall growth alongside academic development.	<b>7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8
<b>22UBCC311</b>	Co curricular							2	3

SEMESTER – VI									
Course Title	EMS System & Introduction To Air Ambulance								
Course code	22BEDM321R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 60T	4	0	0	0	0	0	4
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	VI semester of third year of the programme								
Course Objectives (Minimum 3)	1. To identify the organizational structure and key components of EMS systems. 2. To discuss ethical considerations in patient transport decision-making. 3. To compare different types of air ambulance vehicles and their suitability for patient transport.								
CO1	Understand the Comprehensive Role of EMS Systems								
CO2	Develop strategies to enhance paramedic well-being, manage stress, cope with death and dying								
CO3	Learn principles of injury prevention, design prevention programs, and recognize teachable moments to mitigate risks and promote community safety.								
CO4	Understand legal accountability and scope of practice for paramedics, and apply ethical principles in patient care decisions.								
CO5	Evaluate the logistical challenges and benefits of air medical transport.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>EMS systems, Roles and Responsibilities</b> - EMS system development - EMT education - Licensure, certification and registration - Professionalism - Roles and responsibilities - Medical direction - EMS research.		15	Describe the development and evolution of EMS systems, including their organizational structure and integration with healthcare systems.				1,2,3	
II	<b>Well-being of the paramedic</b> - Components of well-being - Stress - Coping with death and dying - Emergency vehicle operations - Personal protective equipments		10	Identify stress management techniques and coping strategies for paramedics dealing with high-stress environments and situations.				3,4,5	
III	<b>Illness and injury prevention</b> - Principles of injury prevention - Prevention programs - Teachable moment		10	Explain principles of injury prevention and design prevention programs tailored to community needs and healthcare settings.				3,4,5	



<b>IV</b>	<b>Medical and legal issues &amp; Ethical issues</b> <ul style="list-style-type: none"> <li>- <b>Legal system in India</b></li> <li>- Legal accountability of the paramedic</li> <li>- Scope of practice</li> <li>- Negligence</li> <li>- Crime scene and emergency scene responsibilities</li> <li>- Documentation</li> <li>- Reportable cases</li> <li>- Medical ethics</li> <li>- Patient's rights</li> <li>- Autonomy</li> <li>- With holding or with drawing resuscitation.</li> </ul>	<b>15</b>	Discuss the legal framework governing paramedic practice, emphasizing scope of practice, documentation standards, and ethical considerations.	1,2, 3,4, 5
<b>V</b>	<b>Introduction to Air Ambulance</b> <ul style="list-style-type: none"> <li>- Understanding your Air Ambulance</li> <li>- Understanding Air Physics</li> <li>- Critical care transport considerations</li> </ul>	<b>10</b>	Explain the unique considerations in air ambulance operations, including air physics, patient care during transport, and critical care capabilities.	1,2, 3,4, 5

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the Comprehensive Role of EMS Systems	<b>2,3,4,8</b>
<b>2</b>	Develop strategies to enhance paramedic well-being, manage stress, cope with death and dying	<b>5,7,8</b>
<b>3</b>	Learn principles of injury prevention, design prevention programs, and recognize teachable moments to mitigate risks and promote community safety.	<b>1,2,3,4,6</b>
<b>4</b>	Understand legal accountability and scope of practice for paramedics, and apply ethical principles in patient care decisions.	<b>2,6,8</b>
<b>5</b>	Evaluate the logistical challenges and benefits of air medical transport.	<b>1,2,3,4,6</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDM321R	EMS System and Introduction to Air Ambulance	1	3	3	2	2	3	2	

<b>SEMESTER – VI</b>										
<b>Course Title</b>	<b>Disaster Management &amp; Ambulance Operations</b>									
<b>Course code</b>	<b>22BEDM322R</b>	<b>Total credits: 4</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>	
		<b>Total hours: 60T</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	
<b>Pre-requisite</b>	<b>NIL</b>	<b>Co-requisite</b>	<b>NIL</b>							
<b>Programme</b>	<b>Bachelor Of Trauma, Emergency and Disaster Management</b>									
<b>Semester</b>	<b>VI semester of third year of the programme</b>									
<b>Course Objectives (Minimum 3)</b>	1. To develop proficiency in disaster preparedness and planning for effective ambulance operations. 2. To acquire skills in triage, patient prioritization, and resource allocation in mass casualty incidents. 3. To enhance teamwork and communication skills for effective collaboration among emergency response agencies.									
<b>CO1</b>	Demonstrate Proficiency in Ambulance Operations and Medical Incident Command									
<b>CO2</b>	Develop knowledge and skills to respond to terrorism incidents involving chemical, biological, radiological, and nuclear threats, including effective rescue and patient care procedures.									
<b>CO3</b>	Identify hazardous materials, manage hazardous scenes, and conduct decontamination procedures while considering toxicology and patient treatment.									
<b>CO4</b>	Apply techniques such as contact and cover procedures, self-defense tactics, and evidence preservation protocols in simulated crime scene scenarios.									
<b>CO5</b>	Understand the causes and effects of disasters									
<b>Unit- No.</b>	<b>Content</b>				<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>
<b>I</b>	<b>Ambulance operations, medical incident command</b> - Understanding your ambulance - Ambulance staffing and development - Emergency vehicle operation - Air medical transport - The incident commands - Standard operating procedures - Medical incident command - Triage				<b>10</b>	Demonstrate the ability to implement medical incident command protocols during simulated scenarios, including triage management and resource allocation.				1,2,3,4

<b>II</b>	<b>Terrorism and weapons of mass destruction, Rescue awareness and operations</b> <ul style="list-style-type: none"> <li>- Terrorism</li> <li>- Weapons of mass destruction</li> <li>- Paramedic Response to terrorism</li> <li>- Chemical agents</li> <li>- Biological agents</li> <li>- Radiological/nuclear devices</li> <li>- Guide lines for operations</li> <li>- Steps of special rescue</li> <li>- General rescue scene procedure</li> <li>- Assisting rescue crews</li> <li>- Patient care</li> </ul>	<b>18</b>	Analyze response guidelines and protocols for handling chemical, biological, radiological, and nuclear incidents, identifying key steps for special rescue operations.	1,2, 3,4
<b>III</b>	<b>Hazardous material incidents</b> <ul style="list-style-type: none"> <li>- Identification of hazardous materials</li> <li>- Hazardous scene management</li> <li>- Contamination and toxicology</li> <li>- Decontamination and treatment</li> </ul>	<b>10</b>	Identify various types of hazardous materials commonly encountered in emergency situations, explaining their potential risks and appropriate handling procedures.	1,2, 3,4
<b>IV</b>	<b>Crime scene awareness</b> <ul style="list-style-type: none"> <li>- Awareness</li> <li>- Highway incidents</li> <li>- Residential incidents</li> <li>- Violence on the streets</li> <li>- Hostage situations</li> <li>- Contact and cover</li> <li>- Self-defines</li> <li>- Preserving crime scene evidence</li> </ul>	<b>12</b>	Assess the techniques such as contact and cover procedures, self-defense strategies, and evidence preservation methods to maintain crime scene integrity and ensure responder safety.	3,4, 5
<b>V</b>	<b>Disaster management</b> <ul style="list-style-type: none"> <li>- Understanding natural and manmade disasters</li> <li>- Understanding effects of disasters</li> <li>- Prevention, preparation, response</li> <li>- Medical response to disasters</li> <li>- Mock drills</li> </ul>	<b>10</b>	Evaluate response effectiveness, and refine strategies for preventing, preparing for, and responding to disasters.	3,4, 5

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran:Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate Proficiency in Ambulance Operations and Medical Incident Command	<b>1,2,3,4,5,7</b>
<b>2</b>	Develop knowledge and skills to respond to terrorism incidents involving chemical, biological, radiological, and nuclear threats, including effective rescue and patient care procedures.	<b>1,2,3,4,5,7</b>
<b>3</b>	Identify hazardous materials, manage hazardous scenes, and conduct decontamination procedures while considering toxicology and patient treatment.	<b>1,2,3,4,5,7</b>
<b>4</b>	Apply techniques such as contact and cover procedures, self-defense tactics, and evidence preservation protocols in simulated crime scene scenarios.	<b>1,2, 3,4,5,7</b>
<b>5</b>	Understand the causes and effects of disasters	<b>1,2, 3,4,5,7</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BEDM322R</b>	Disaster Management & Ambulance Operations	2	2	3	3	3	2	2	

SEMESTER – VI									
Course Title	MOOCS								
Course code	22BEDMMO32	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Trauma, Emergency and Disaster Management								
Semester	VI semester of third year of the programme								
Course Objective (Minimum 3)	1. To equip with a thorough understanding of the course material through engaging online content. 2. To provide hands-on experience through interactive exercises and real-world projects. 3. To promote effective communication and teamwork through online discussions and group activities.								
CO1	Demonstrate a strong grasp of key principles and theories covered in the course.								
CO2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7,8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7,8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7,8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	7,8

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BEDMMO23	MOOCS							2	3



# Assam down town University

## Curriculum and Syllabus

### Bachelor of Medical Laboratory Technology



OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**


July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022

  
*Chairperson*  
*Board of Studies*

  
*Member Secretary*  
*Academic Council*



## ***Vision***

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## ***Missions***

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community.



# Programme Details

## Programme Overview

B.Sc. Medical Laboratory Technology Programme offers to candidates in depth knowledge about the laboratory equipment and their usage in diagnostic procedures. A degree in Bachelor of Medical Laboratory Technology can open up job opportunities in areas such as healthcare clinics, government and private hospitals, medical laboratories, research laboratories etc. Duration of B.Sc Medical Laboratory Technology program is 3(three) year degree course composed with 6(six) semester and 6(six) months internship program.

### I. Specific Features of the Curriculum

Well equipped with physical facilities such as spacious and well-furnished classrooms, laboratories, skill centers, library and hostels for enriching knowledge and to serve rural community and slums dwellers through this knowledge. Qualified and trained faculty who can foster research in different discipline and well versed to scientifically formulae, implement and monitor community-oriented programs and projects especially where level of involvement in adoption of innovative and appropriate technology involved.

### II. Eligibility Criteria:

He/ she has passed the Higher Secondary (10+2) with Science (PCB) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks in Physics, Chemistry, and Biology or 50% of marks in mathematics separately. Minimum percentage of marks: 45% aggregate.

### III. Program Educational Objectives (PEO):

**PEO1:** Adtu Medical Laboratory graduates will be prepared for successful career paths as medical lab technologist, laboratory system analyst, health outreach coordinator, health and safety officers, and spanning private and government healthcare settings.

**PEO2:** Graduates of Medical Laboratory technology will be academically prepared to excel as specialized professionals in medical laboratory environments, ready to make impactful contributions to healthcare advancement and human welfare.

**PEO3:** MLT graduates will be engaged in professional activities to enhance their competency and professional stature; and will be successful in higher education in areas of Medical Laboratory technology if pursued.

### IV. Program Specific Outcomes (PSO):

**PSO1: Practice-In-Industry:** Demonstrate clinical practice proficiency and laboratory testing efficiency in clinical posting and healthcare industry.

**PSO2: Professional Proficiency:** Apply a comprehensive understanding of pathological, biochemical and microbiological concepts, medical laboratory technology processes and standard operating procedures encompassing multidisciplinary approaches to conduct precise investigations improving diagnostic accuracy and healthcare service quality.

**PSO3: Global Competency:** Avail international and industry-focused certification courses to enhance professional skills and excel globally in the field.

## V. Program Outcome (PO):

**PO1: Healthcare Knowledge:** Apply knowledge of human anatomy, physiology, biochemistry and pathological cum microbiological testing processes in the diagnosis of diseases.

**PO2: Problem-Solving:** Identify pre-analytical, analytical and post-analytical problems and select adequate processes and instruments for reaching substantiated solutions in investigating diseases.

**PO3: Modern Analytical Competency:** Apply a comprehensive understanding of techno-analytical processes and adherence to standard procedures in operating modern analytical instruments to deliver high-quality laboratory investigations.

**PO4: Sample Collection and Carriage:** Demonstrate competency in clinical sample collection, transportation and preservation related to Hematology/hemostasis, clinical biochemistry, blood banking, microbiology, and serology/immunology.

**PO5: Ethical Practices:** Apply ethical principles, commit to professional ethics, and maintain good hospital practices.

**PO6: Communication:** Execute effective communications with patients, attendants and healthcare professionals.

**PO7: Teamwork:** Demonstrate functional proficiency to work independently and collaboratively within a multidisciplinary healthcare team. 3

**PO8: Environment and Sustainability:** Apply eco-friendly practices in laboratory procedures and biomedical waste disposal practices minimizing environmental impact.

**PO9: Lifelong Learning:** Ability to engage in independent and lifelong learning in

the broadest context of technological advancements in the profession.

**VI. Total Credits to be Earned:149**

**VII. Career Prospects:**

Medical Laboratory Technicians can earn employment in pathology labs, hematology, Biochemistry, microbiology, cytotechnologist, research labs, immunology, pharmaceuticals, and Clinics or hospitals. They can also pursue career in the education line as a lecturer or clinical instructor. Some of the job roles offered to B.Sc. Medical Laboratory Technology graduates include: Laboratory Technician, Blood Bank Technician, Medical Record Technician and Laboratory Manager

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weight age of 40% or as prescribed by the Programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (Sessional) examination and evaluating the performance of the students pursuing that course. The Components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Sem Exam – I (ISE-I) (Written Examination) *	30
2.	In-Sem Exam – II (ISE-II) (Written Examination) *	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*are compulsory*

**Note:** Total Internal assessment should be out of 40

## INSTRUCTION

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.
2. The report of evaluation of an activity towards the in-semester (Sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.
3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

### **A. SEMESTER END EXAMINATION:**

Time table for end semester examination is published at least 25 days prior to the start of Examination.

#### **I. Pre-Examination:**

#### **Eligibility Criteria for a student to appear in University Examinations:**

The student shall only be allowed to appear in a University Examination, if:

- i) He/ She is a registered student of the University;
- ii) He/ She is of good conduct and character;
- iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance

As laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

#### **I. Admit Card:**

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online. The University shall have the right to cancel admission for examination of any candidate on valid grounds.

#### **II. Pattern of Question Papers:**

The question paper shall follow the principles of Bloom's Taxonomy.

Table

S.NO	Level	Questions /verbs for test
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.

2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify
4	Analyse	Classify, outline, categorize, analyse, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.
6	Create	Design, Formulate, Modify, Develop, integrate, etc.

**Note:** No course is to be evaluated on basis of all 6 knowledge levels.

The format of the question paper across the entire program follows a unique pattern and the total marks are 60.

**Table 1: Question paper pattern for End semester examination**

Sl. no	Question pattern	Total marks
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

#### **V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

#### **VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Office-in-Charge of the center may take appropriate decisions as per the rules and procedure of the Examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

## **VII. Instruction to the Students:**

- i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.
- iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.
- viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

## **VIII. Provision for an Amanuensis (writer):**

- (i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.
- (ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.
- (iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process.

## **A. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times CR$

**i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weight age given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

**ii. Grade Point:**

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

**iii. Letter Grade:**

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

<b>Letter Grade</b>	<b>Grade Points</b>	<b>Description</b>
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass



F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

**iv. Grade Point Average:**

**a. SGPA (Semester Grade Point Average)**

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades 'O' to 'F' as given in Table 1.

$$SGPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  registered Course and  $C_i$  is the Credit (weight) of that Course.

**b. CGPA (Cumulative Grade Point Average)**

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrollment in the Programme. In other words, taking into account all the Courses graded with 'O' to 'P' as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrollment.
- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  completed Course and  $C_i$  is the Credit (weight) of that Course.

$$CGPA = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i}$$

(iii) The CGPA shall be convertible into equivalent percentage of marks using Equation  
Conversion of CGPA to percentage marks: = CGPA \* 10

## **A. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### **ii. Grievance Readdress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

(i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.

(ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite Performa available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.

(iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a university appointed examiner.

(iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.

(v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.

(vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.

(vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.

(viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.

(ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# INSTRUCTION TO TEACHERS AND STUDENTS

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favor because this strategy for teaching is seen to favor passive students.

## 1. **Student- centric / Constructivist Approach:**

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behavior problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer and discuss in the successive class. This will help in the preparation for various competitive examinations and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped

classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student-centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

#### **The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures	20%
Student-centric Approach, Students present and deliver lectures in the presence of Teacher and supervised by teacher	60%
Students visit fields or perform experiments or teachers perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

#### **Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned Approaches and prepare a lesson plan for execution and maintain a file.

#### **Curriculum Framework: Breakdown of Credits(for 2022-23 Syllabus)**

<b>Sl. No</b>	<b>Category</b>	<b>Total number of Credits</b>
1	University Core(UC)	16
2	University Elective (UE)	12
3	Program Core(PC)	116
4	Program Elective (PE)	1
5	Faculty Elective (FE)	4
<b>Total number of credits</b>		<b>149</b>

#### **Breakdown by categories of courses**

Sl no	Category	Credits	%
1	Paramedical Sciences	138	92.6 %
2	Engineering	2	1.34%
3	Commerce & Management	1	0.67%
4	Humanities and Social Science	8	5.36%
<b>Total</b>		149	100%

**PCI, INC, AICTE regulated programs shall have to follow the regulating body  
SEMESTERWISE COURSE DISTRIBUTION**

	S.N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			Total
					L	T	P	S	R	O	C	IA*	SEE*	PE*		
<b>Semester I</b>	1.	22BMLT111R	Anatomy I	FC	3	0	4	0	0	0	5	40	60	100	200	
	2	22BMLT112R	Physiology I	FC	3	0	4	0	0	0	5	40	60	100	200	
	3	22BMLT113R	Biochemistry I	FC	3	0	2	0	0	0	4	40	60	100	200	
	4	22BMLT114R	Hospital Duty and Patient Care I	FC	2	0	0	0	0	0	2	40	60	0	100	
	5	22UBPD111R	Basic English	UE	0	0	4	0	0	0	2	40	60	0	100	
	6	22UBEC111	Extra-Curricular	UC	0	0	0	4	0	0	1	0	0	0	100	
	<b>Total</b>					11	0	14	4	0	0	19				900
<b>Semester II</b>	S. No.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			Total
					L	T	P	S	R	O	C	IA*	SEE*	PE*		
	1.	22BMLT121R	Anatomy-II	FC	3	0	4	0	0	0	5	40	60	100	200	
	2	22BMLT122R	Physiology-II	FC	3	0	4	0	0	0	5	40	60	100	200	
	3	22BMLT123R	Biochemistry-II	FC	3	0	2	0	0	0	4	40	60	100	200	
	4	22BMLT124R	Hospital Duty and Patient care-II	FC	2	0	0	0	0	0	2	40	60	0	100	
	5	22BMLT125R	Pathology-I & microbiology-I	PC	2	0	0	0	0	0	2	40	60	0	100	
	6	22BMLT126R	Techno professional skill-I	PC	0	0	2	0	0	0	1	0	0	100	100	
	7	22UUHB101R1/27R	Universal human value professional ethics	UC	1	0	2	0	0	0	2	40	60	100	200	
	8	22UBPD121R	Effective English	UE	0	0	4	0	0	0	2	0	0	100	100	
	9	22UUDL101R	Basic digital Literacy	UC	0	0	2	0	0	0	1	0	0	100	100	
	10	22UBEC121	Extra-curricular	UC	0	0	0	4	0	0	1	0	0	100	100	
11	22UBCC121	Co-curricular	UC	0	0	0	0	4	0	0	1	0	0	100		
12	22MOCEU201/2/3/4/5	MOOC	SE		0	0	0	0	0	0	1	0	0	100		

<b>Total</b>				4	0	20	8	0	0	27				1600
<b>S. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>							<b>Maximum Marks for</b>			<b>Total</b>
				<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	
1.	22BMLT211R	Microbiology-II	PC	3	0	6	0	0	0	6	40	60	100	200
2	22BMLT212R	Pathology-II	PC	3	0	6	0	0	0	6	40	60	100	200
3	22BMLT213R	Biochemistry-III	PC	3	0	6	0	0	0	6	40	60	100	200
4	22BMLT214R	Techno professional skill-II	PC	0	0	2	0	0	0	1	0	0	100	100
5	22BMLT215R	EVS	UC	2	0	0	0	0	0	2	40	60	0	100
6	22UBPD211R	English language proficiency	UE	0	0	4	0	0	0	2	0	0	100	100
7	22UULS201R	Basic acclimatizing skills(BAS)	UC	0	0	2	0	0	0	1	0	0	100	100
8	22UBEC211	Extra-curricular	UC	0	0	0	4	0	0	1	0	0	100	100
9	22UBCC211	Co-curricular	UC	0	0	0	4	0	0	1	0	0	100	100
10		Generic Elective	UE	2	0	0	0	0	0	2	40	60	0	100
11	22MOCEU301/2/3/4/5	MOOC	SE	0	0	0	0	0	0	1	0	0	100	100
<b>Total</b>				13	0	26	8	0	0	29				1400

<b>S. N.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>							<b>Maximum Marks for</b>			<b>Total</b>
				<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	
1.	22BMLT221R	Microbiology-III	PC	3	0	6	0	0	0	6	40	60	0	100
2	22BMLT222R	Pathology-III	PC	3	0	6	0	0	0	6	40	60	0	100
3	22BMLT223R	Biochemistry-IV	PC	3	0	6	0	0	0	6	40	60	0	100
4	22BMLT224R	Basic computer science	PC	1	0	2	0	0	0	2	40	60	100	200
5	22BMLT225R	Techno Professional skill-III	PC	0	0	2	0	0	0	1	0	0	100	100
6		Generic Elective	UE	2	0	0	0	0	0	2	40	60	0	100
7	22UBPD221R	Personality Development skill for employability	UE	0	0	4	0	0	0	2	0	0	100	100
8	22UUFLL201R	Introduction to financial budgeting and planning	UC	0	0	2	0	0	0	1	0	0	100	100
9	22UULS202R	Basic life saving skills (BLSS)	UC	0	0	2	0	0	0	1	0	0	100	100
10	22UBEC221	Extra-curricular	UC	0	0	0	4	0	0	1	0	0	100	100
11	22UBCC221	Co-curricular	UC	0	0	0	4	0	0	1	0	0	100	100

	12	22MOCEU401/2/ 3/4/5	MOOC	SE	0	0	0	0	0	0	1	0	0	100	100
	<b>Total</b>				20	0	30	8	0	0	30				1300
<b>Semester V</b>	<b>S. N.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>							<b>Maximum Marks for</b>			
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	<b>Total</b>
	1.	22BMLT311R	Microbiology-Iv	PC	3	0	6	0	0	0	6	40	60	100	200
	2	22BMLT312R	Pathology IV	PC	3	0	6	0	0	0	6	40	60	100	200
	3	22BMLT313R	Biochemistry-V	PC	3	0	6	0	0	0	6	40	60	100	200
	4	22BMLT315R	Techno skill-IV	PC	0	0	2	0	0	0	1	0	0	100	100
	5	22BMLT316R	Laboratory management/instrumentation	DE	1	0	0	0	0	0	1	40	60	0	100
	6	22UBCC311	Co-curricular	UC	0	0	0	4	0	0	1	0	0	100	100
	7	22MOCEU501/2/ /3/4/5	MOOC	SE	0	0	0	0	0	0	1	0	0	0	100
	<b>Total</b>				10	0	20	4	0	0	22				1000
<b>Semester VI</b>	<b>S. N.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>							<b>Maximum Marks for</b>			
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	<b>Total</b>
	1.	22BMLT321R	Microbiology-V	PC	3	0	6	0	0	0	6	40	60	100	200
	2	22BMLT322R	Pathology-V	PC	3	0	6	0	0	0	6	40	60	100	200
	3	22BMLT323R	Biochemistry-VI	PC	3	0	6	0	0	0	6	40	60	100	200
	4	22BMLT324R	First aid	PC	0	0	0	4	0	0	1	0	0	100	100
5	22BMLT325R	Research Project	PC	0	0	0	0	1	8	0	3		0	100	100
	<b>Total</b>				9	0	18	4	18	0	22				800

**\*IA: Internal Assessment, SEE: Semester End Examination,  
PE: Practical Examination**





SEMESTER – I									
<b>Course Title</b>	<b>Anatomy I</b>								
<b>Course code</b>	<b>22BMLT111R</b>	<b>Total credits: 5</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 48T+64P</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Science in Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ I semester of first year of the Programme</b>								
<b>Course Objectives</b>	1. To learn about the anatomical position, gross and microscopic structure of the organs and skeleton in the human body. 2. To provide a strong anatomical foundation about the human body. 3. To assist students in developing a better grasp of the anatomical structure and relationships in various body regions.								
<b>CO1</b>	To understand the normal position, functional and cross-sectional anatomy of various structures of the body.								
<b>CO2</b>	Students will be able to differentiate between different type of tissue, bones, muscle and their structural differences.								
<b>CO3</b>	To have a comprehensive knowledge on the different component and the gross anatomical structure of the respiratory system.								
<b>CO4</b>	To have a fundamental knowledge about the gross structure of the circulatory system.								
<b>CO5</b>	To have an insight knowledge on the gross structure of the different organs in the digestive system.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>INTRODUCTION TO ANATOMICAL TERMS:</b> Organization of human body, Anatomical positions, axis and plans, common anatomical terminology.	<b>4</b>	An introduction to the fundamental components that make up the human body.				1,2		
<b>II</b>	<b>MUSCULAR SKELETAL SYSTEM:</b> Bones: Classification & types according to morphology & development structure and functions, description of bones of human body, blood supply of bones. Cartilage: Description. Joints: Definition, Classification, Structure and Movements. Muscles: Types and Structure of Muscles of the body with some important muscle's attachments.	<b>18</b>	Understanding the skeletal system's bones in connection to the axial and appendicle skeleton to from a broad perspective.				1,2		
<b>IV</b>	<b>DIGESTIVE SYSTEM:</b> Structure of Gastro Intestinal tract and accessory organs of Digestion.	<b>15</b>	Structure of Gastro Intestinal tract, and accessory organs of digestion.				1,2		
<b>V</b>	<b>TISSUE:</b> Classification and description of the basic tissues of the body. Histology: Epithelium, Compact bone muscles, Connective tissue, Nervous tissue, Artery, Vein	<b>5</b>	Classification and description of the basic tissues of the body.				3,4		

	and Lymphatic tissue			
<b>Practical</b>	1. Study of Anatomical planes and positions. 2. Study of Skeleton and Bones of human body (Skull, Vertebrae, Ribs and Bone of upper limb)	<b>64</b>	1. An introduction to the fundamental components that make up the human body. 2. Understanding the skeletal system's bones in connection to the axial and appendicular skeleton to from a broad perspective	1,2,3,4

#### TEXT BOOKS:

**T1:** B.D.Chaurasia: Volume Upper limb & Thorax, Volume II Lower limb, Abdomen & Pelvis, Volume III- Head, Neck, Face, Volume IV-Brain-Neuro anatomy.

**T2:** Vishram Singh: Text book of Anatomy Upper limb & Thorax Textbook of Anatomy Abdomen & Lower Limb: Textbook of Head neck and Brain.

**T3:** Peter L Williams and Roger Warwick: Gray's Anatomy.

#### REFERENCE BOOKS:

R1: T.S. Ranganathan: Textbook of Human Anatomy.

R2: Under bring, GPPal: Human Embryology.

R3: Text Book of Histology A practical guide: J.P Gunasegar.

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	To understand the normal position, functional and cross-sectional anatomy of various structures of the body.	1,2,4,6,9
2	Students will be able to differentiate between different type of tissue, bones, muscle and their structural differences.	1,2,3,4,6,9
3	To have a comprehensive knowledge on the different component and the gross anatomical structure of the respiratory system.	1,2,4,6,9
4	To have a fundamental knowledge about the gross structure of the circulatory system.	1,2,4,6,9
5	To have an insight knowledge on the gross structure of the different organs in the digestive system.	1,2,4,6,9

SEMESTER – I									
<b>Course Title</b>	<b>PHYSIOLOGYI</b>								
<b>Course code</b>	<b>22BMLT112R</b>	<b>Total credits: 5</b> <b>Total hours:</b> <b>48T+64P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3+2=5</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ I semester of first year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. To comprehend how tissues, organelles, cells, and the organ system are put together and function.</li> <li>2. To provide a thorough understanding of all physiological systems in the human body.</li> <li>3. To understand the anatomy and physiology of the cardiovascular system, and the composition and distribution of fluids in the body</li> </ol>								
<b>CO1</b>	Developed comprehensive knowledge of cells, tissue, organs, and organ systems and their function.								
<b>CO2</b>	Explain insight knowledge about the different blood cells different types of blood groups and blood coagulating factors.								
<b>CO3</b>	Describes descriptive knowledge of the digestive system's organs and their function in digestion in various parts of the alimentary canal.								
<b>CO4</b>	Analyse descriptive knowledge on the classification nervous system and the function of special senses.								
<b>CO5</b>	Understanding of how the various organs of the respiratory and cardiovascular systems operate.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Contact Hour</b>				<b>KL</b>		
<b>I</b>	<b>GENERAL PHYSIOLOGY:</b> Organization of human body, cell structure and organelle, Tissues and functions.	4	Describe about the organization and function of different organ systems.				1,2		
<b>II</b>	<b>BLOOD:</b> Blood volume and body fluids. Composition and functions of blood. Structure formation and function of RBC, WBC, and platelets. Haemoglobin. Plasma, blood coagulation Blood groups	8	Understand the importance of body fluids, structure of different blood cells presents in the blood.				1,2		
<b>III</b>	<b>DIGESTIVESYSTEM:</b> General introduction, organizational plan of digestive system. Movement of G.I Tract and functions of various components. Composition, functions and regulation of salivary, gastric, pancreatic, intestinal and biliary secretion. Functions of liver, gall bladder and pancreas. Digestion and absorption of carbohydrate, protein and fat.	16	Illustrate about the process of digestion in various parts of the digestive system.				1,3		

<b>IV</b>	<b>RESPIRATORY SYSTEM:</b> General organization. Mechanics of respiration. Regulation of respiration. Gaseous exchange in lung and tissues. Pulmonary ventilation, volumes and capacities. Effect of Exercise On respiration, hypoxia.	10	Developed knowledge about the mechanics associated with the regulation of respiration.	1,4
<b>V</b>	<b>CARDIOVASCULAR SYSTEM:</b> General organization, structure and properties of cardiac muscles. Cardiac output, cardiac cycle, conducting system of heart. Heart sounds, regulation of H.R, pulse, blood pressure and its regulation. Systemic circulation, pulmonary circulation and coronary circulation. ECG, cardio respiratory changes during exercise.	10	Explain the properties of different cardiac muscles, and will understand the cardiac cycle and cardiac output.	3,4,5
<b>Practical</b>	1. Study of compound Microscope. 2. Arterial pulse 3. Measurement of blood pressure 4. Haemoglobin 5. Blood group	64	Demonstrate the measurement of blood pressure, arterial pulse and explain blood grouping methods	1,2,3,4

#### **TEXTBOOKS:**

1. Anatomy Physiology- Ross and Wilson
2. Anatomy and Physiology: Understanding the Human Body by Clark
3. Anatomy and Physiology for nurses Evelyn Pearce
4. Anatomy and Physiology for nurses by Sears
5. Anatomy and Physiology for nurses by Pearson
6. Anatomy and Physiology by N Murgesh

#### **REFERENCE BOOKS:**

- R1: Textbook of Anatomy & Physiology – Indu Khurana, Arushi Khurana
- R2: Anatomy & Physiology – Agarwal/Arya
- R3: Anatomy & Physiology – Krishna Garg, Medha Joshi, Sudipta Kundu

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Developed comprehensive knowledge of cells, tissue, organs, and organ systems and their function.	<b>1,2,3&amp;8</b>
<b>2</b>	Explain insight knowledge about the different blood cells different types of blood groups and blood coagulating factors.	<b>3&amp;8</b>
<b>3</b>	Describes descriptive knowledge of the digestive system's organs and their function in digestion in various parts of the alimentary canal.	<b>8</b>
<b>4</b>	Analyze descriptive knowledge on the classification nervous system and the function of special senses.	<b>5&amp;8</b>
<b>5</b>	Understanding of how the various organs of the respiratory and cardiovascular systems operate.	<b>2,4,5,6,7&amp;8</b>

**SEMESTER – I**

<b>Course Title</b>	<b>Biochemistry I</b>								
<b>Course code</b>	<b>22BMLT113R</b>	<b>Total credits: 5</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/ F</b>	<b>C</b>
		<b>Total hours:</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3+2=5</b>
<b>Pre-requisite</b>	Nil	<b>Co-requisite</b>	Nil						
<b>Programme</b>	<b>Bachelor of Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ I semester of first year of the programme</b>								
<b>Course Objective (Minimum 3)</b>	<ol style="list-style-type: none"> <li>To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites</li> <li>To understand the energy flow in the form of ATP in the human body and cells.</li> <li>To give a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids.</li> </ol>								
<b>CO1</b>	Explain the sources, functions and metabolism process of Carbohydrates								
<b>CO2</b>	Identify various classifications of amino-acids and recognize the significance of Protein.								
<b>CO3</b>	Describe the significance, classification and functions of lipids.								
<b>CO4</b>	Comprehend the structure and functions of Nucleic Acids.								
<b>CO5</b>	Explain the fundamentals and importance of acid, base and buffers								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Contact Hour</b>				<b>KL</b>		
<b>1</b>	<b>Carbohydrates:</b> Definition and classification of carbohydrates, Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) and their sources, biological significance of Carbohydrate	<b>12</b>	Students will know about the various classes and types of carbohydrates and their functions e.g.: Aldose and ketose sugars, monosaccharides and polysaccharides, etc.				1,2,3		
<b>2</b>	<b>Proteins:</b> Definition of Proteins along with the biological significance, Amino acids and its classification, Essential and Non-essential amino acids	<b>12</b>	Students will know what is proteins and their importance in living system, how they are used up, how proteins are linked to defence system and fights for the infections				1,2,3		
<b>3</b>	<b>Lipids:</b> Definition and classification of lipids. Classification of Fatty Acids. Examples and functions of some common lipids (Phospholipids, Glycol-lipids, Steroids).	<b>12</b>	Students will know what are lipids, their different forms and types and their properties				1,2,3		
<b>4</b>	<b>Nucleic acids:</b> Basic idea of the structure of DNA and RNA, Function of DNA and RNA.	<b>6</b>	Students will know the different forms and structures of DNA and RNA such as A-DNA, B-DNA and Z-DNA, Chargaff's rule etc.				1,2,3, 4		
<b>5</b>	<b>Acid-base buffers:</b> Basic idea of acids, bases, Ph., buffer, Acid base balance.	<b>6</b>	Students will understand the different properties, definition and functions of acid, base, buffer, pH, pOH, pKa, etc.				5,6		
<b>Practical</b>	1. Identification of glassware's 2. Identification of instruments 3. Qualitative test for carbohydrates	<b>32</b>	Students will know about various biochemical apparatus and instruments				1,2,3, 4		

**Text Books:**

1. Textbook of Biochemistry by Dr D.M Vasudevan, SreekumariS, Jaypee Publishers, NewDelhi.
2. Biochemistry by U. Satyanarayana, Books and Allied Pvt. LtdCalcutta
3. Textbook of Medical Biochemistry by Chatterjee and Shinde
4. Text of Medical Laboratory Technology by Prafula Godkar

**Reference Books:**

1. Robyt, John F. Essentials of carbohydrate chemistry. Springer Science & Business Media, 1998.
2. BeMiller, James N. Carbohydrate chemistry for food scientists. Elsevier, 2018.
3. Liwo, Adam, Di Cecco, and Liwo. Computational Methods to Study the Structure
4. Dynamics of Biomolecules and Biomolecular Processes. Springer International Publishing, 2019.

**Other Learning Resources:**

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6943057>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain the sources, functions and metabolism process of Carbohydrates	<b>1, 2, 4</b>
<b>2</b>	Identify various classification of amino-acids and recognize the significance of Protein.	<b>1,4</b>
<b>3</b>	Describe the significance, classification and functions of lipids.	<b>1, 2</b>
<b>4</b>	Comprehend the structure and functions of Nucleic Acids.	<b>1, 2, 4</b>
<b>5</b>	Explain the fundamentals and importance of acid, base and buffers	<b>1, 2, 4, 8</b>



SEMESTER-I									
Course Title	Hospital duty and patient care-I								
Course code	22BMLT114R	Total credits: 2 Total hours: 45	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ I semester of first year of the Programme								
Course Objectives (Minimum 3)	1. The study of HDPC is aimed at imparting knowledge in providing patient care, meeting the highest standard of professional level of quality and efficiency prevailing in the society. 2. The students will be taught about the India's health care system, personal hygiene, laboratory safety, and code of conduct to be followed by a General Duty Assistant, functions of the hospital management and hospital services. 3. The students will be taught about the vital signs of the patient and effectively manage the abnormalities.								
<b>CO1</b>	Discuss different functions, process of record keeping, reporting and essential components of hospital management.								
<b>CO2</b>	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.								
<b>CO3</b>	Apply fundamental knowledge of patient safety and care to ensure basic care needs of patients.								
<b>CO4</b>	Assessment of common laboratory accidents and its effective management.								
<b>CO5</b>	Describe vital signs and effectively manage the abnormalities.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	<b>HOSPITAL AND RECORDS &amp; REPORTS:</b> Definition and Functions of Hospitals Classification, Organization and Departments of Hospitals Management of Hospitals Definition of Records and Reports Different types of Records and Reports Values, Objectives and Maintenance of records Principle of good record writing Difference of records & reports.	<b>7</b>	Discuss different functions, process of record keeping, reporting and essential components of hospital management.					1,2	
<b>II</b>	<b>FIRST AID:</b> Introduction Aims & objectives of first aid Priorities of first aid Golden rules of first aid Qualities & responsibilities of first aider Simple first aid measures in selected conditions like– Food poisoning Snake bite Burns Hemorrhage	<b>10</b>	Illustrate the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.					2,3	
<b>III</b>	<b>HYGIENE AND BASIC CARE NEEDS OF PATIENTS:</b> Personal Hygiene and Maintenance of Hygiene Maintaining therapeutic environment  Safety factors for patients such as safety from mechanical injury, thermal & chemical injury,	<b>10</b>	Execute the knowledge on personal hygiene and basic care needs of patients.					1, 2	

	Radiation & bacteriological injury, safety from allergens. Different positions of the body: Supine position, Prone Position, Cardiac position, Lateral Position, Fowlers Position			
<b>IV</b>	<b>SAFETY IN THE LABORATORY:</b> Common laboratory accidents from Physical injuries Electrical shock Chemical injury Bleeding Burn Eye accidents Biological hazards.	<b>8</b>	Illustrate the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	1,2
<b>V</b>	<b>VITALSIGNSOFPATIENTS:</b> Body temperature Maintenance of body temperature Factors influencing body temperature Different types of fever Stages of rigor Management of pyrexia Pulse Common pulse sites Factors influencing pulse rate Characteristics of Pulse Abnormal pulses Reading of pulse Blood Pressure Definition, Factors influencing B.P. Abnormalities of B.P.Recording of B.P. Respiration Regulation of respiration Factors causing variations in respiration Abnormal respirations Reading of respiratory rate. Different methods of Artificial Respiration	<b>10</b>	Examine the importance of vital signs of patients- Body temperature, Pulse, Blood pressure and Respiration.	3, 4

#### TEXT BOOKS:

1. Fundamentals of Hospital Practice and Patients care by VyakarnamNageshwer

#### REFERENCE BOOKS:

1. Fundamentals of Hospital Practice and Patients care by VyakarnamNageshwer

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Discuss different functions, process of record keeping, reporting and essential components of hospital management.	<b>1, 5 &amp; 6</b>
<b>2</b>	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	<b>1, 2, 5, 6, 7 &amp; 9</b>
<b>3</b>	Apply fundamental knowledge of patient safety and care to	<b>1, 2, 5, 6, 7</b>

	ensure basic care needs of patients.	
<b>4</b>	Assessment of common laboratory accidents and its effective management.	<b>1, 2, 3, 6, 7, 8 &amp; 9</b>
<b>5</b>	Describe vital signs and effectively manage the abnormalities.	<b>1, 2, 3, 5, 6, 7 &amp; 9</b>

SEMESTER-I									
<b>COURSE TITLE</b>	<b>BASIC ENGLISH</b> (Communicative English & Soft Skills)								
<b>COURSE CODE</b>	<b>22UBPD111R</b>	<b>TOTAL CREDITS:</b> 2	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>TOTAL HOURS:</b> 30h	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>	NIL						
<b>ANTI-REQUISITE</b>	NIL								
<b>PROGRAMMES</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>FIRST</b>								

<b>COURSE OBJECTIVE:</b>	<ol style="list-style-type: none"> <li>1. To introduce the students to the basics of English grammar and their application.</li> <li>2. To enhance communication skills through listening and speaking exercises.</li> <li>3. To learn and understand the importance of pronunciation of words.</li> </ol>
<b>COURSE OUTCOME:</b>	<ol style="list-style-type: none"> <li>1. The application of grammatical rules will enable the students to improve their speaking and writing skills.</li> <li>2. It enables the learners to use the language effectively.</li> <li>3. It will strengthen their listening and speaking skills.</li> <li>4. It will strengthen their vocabulary and use of words.</li> <li>5. It will give an introduction on the concept to communication, its importance and barriers.</li> </ol>

UNIT-NO	Content	Contact hrs	Learning outcome	Knowledge levels
1	<b>Grammar</b> Parts of Speech; Articles; Auxiliary Verbs; Affirmative and Negative Sentences	5	Students will demonstrate a fundamental understanding of Grammar rules.	1,2
2	<b>Grammar</b> Determiners; Sentence Construction; Types of Sentences (Assertive, Imperative etc.); Degree of Comparison; Comprehension Exercises	8	Students will construct grammatically correct and varied Sentence types.	1,2
3	<b>Listening Skills</b> What is listening?; The Process of Listening; Factors that adversely affect Listening; Difference between Listening and Hearing; Purpose and Importance of Effective Listening; How to Improve Listening	6	Students will confidently introduce themselves and engage in basic conversations with	1,2

	Process?		Correct pronunciation.	
4	<b>Speaking Skills</b> Introducing yourself; Self-discovery; Basics of Phonetics and pronunciation; Extempore speech; Video Recording for Self-Reflection	5	Students will effectively communicate in both formal and Informal settings.	1,2
5	<b>Communication Skills</b> Introduction to Communication; Importance of Communication Skills; Purpose of Communication;	6	Students will demonstrate a fundamental understanding of communication skills	1,2

**Textbooks:**

1. Wren & Martin. (2017). High School English Grammar and Composition. S.Chand Publishing.
2. Pal, Rajendra. Suri, Premlata (2022). English Grammar & Composition. Sultan Chand and Sons Publishing.
3. Debnath, Adhir(2018).A Textbook of English Grammar and Composition. Bina Library

**Reference Books:**

1. Mitra, Barun. (2016)Personality Development and Soft Skills 2/E, Oxford University Press.
2. Murphy, Raymond,(2012) English Grammar in Use Book with Answers: A Self-Study and Practice Book for Intermediate Learners of English, Cambridge University Press

**Other Learning Resources:**

<https://youtu.be/53SIKuCuHv0>

<b>COURSE TITLE</b>	<b>EXTRACURRICULAR</b>								
<b>COURSE CODE</b>	<b>22UBEC111</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	NIL	<b>CO-REQUISITE</b>							
<b>ANTI-REQUISITE</b>	NIL								
<b>PROGRAMMES</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>FIRST</b>								

<b>COURSE OBJECTIVES:</b>	<ol style="list-style-type: none"> <li>1. To ascertain physical and mental development of the students and select best performers for state, national and international level competition.</li> <li>2. To enhance and improve student's talents in the field of sports, yoga, music, dance, drama, etc through AdtU club activities and workshops.</li> </ol>
<b>COURSE OUTCOMES:</b>	<ol style="list-style-type: none"> <li>1. Students will learn to work well with others and communicate better.</li> <li>2. Students will learn to manage their time and stay organized.</li> <li>3. Students will enhance their creative abilities and think more critically.</li> <li>4. Students will improve their overall health and reduce stress.</li> <li>5. Students will become more aware of their role in society and contribute positively.</li> </ol>

<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<p>Co-curricular activities cover a wide range of experiences and pursuits that complement academic learning. They are typically organized and managed within educational institutions or communities and play a crucial role in holistic development. Some examples are</p> <ol style="list-style-type: none"> <li>1. Sports and Physical Activities</li> <li>2. Cultural Activities:</li> <li>3. Academic Clubs and Competitions</li> <li>4. Community Service and Volunteering</li> <li>5. Leadership and Personal Development</li> <li>6. Creative and Hobby-based Activities</li> </ol>	<b>60</b>	<ol style="list-style-type: none"> <li>1. Skill Development: Enhancing skills such as teamwork, leadership, communication, and critical thinking.</li> <li>2. Holistic Growth: Supporting emotional, social, and physical development alongside academic learning.</li> <li>3. Building Networks: Creating opportunities to interact with peers, mentors, and professionals.</li> <li>4. Personal Fulfilment: Providing</li> </ol>	1, 2

			avenues for creativity, self-expression, and exploring personal interests.	
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**MAPPING TABLE**

Course code	Course Name	PO1 *	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
22BML111R	Anatomy I	3						1	1	
22BMLT112R	Physiology I	3						1	1	
22BMLT113R	Biochemistry I	3	2		2				1	
22BMLT114R	Hospital duty patient care-I	2	2		3	3		1	2	

**SEMESTER – II**

<b>Course Title</b>	<b>Anatomy II</b>								
<b>Course code</b>	<b>22BMLT121R</b>	<b>Total credits: 5</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 48T+64P</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Science in Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ II semester of first year of the Programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. To study the basic anatomical structure of human body. 2. To provide a comprehensive concept to fall the anatomical systems of the human body. 3. To give an illustrative overview about the human bones and its anatomical significance.								
<b>CO1</b>	The student will understand the organs, organ system and their structure.								
<b>CO2</b>	The student will be able to correlating the study of the anatomy with their physiological functions leading to an approach which can help a student to understand the diseases properly for prevention.								
<b>CO3</b>	The student will understand the histology of the organs.								
<b>CO4</b>	The student will understand the pelvis and reproductive system of human body.								
<b>CO5</b>	The student will understand the lymphatic system with its anatomical significance.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>PELVIS AND REPRODUCTIVE SYSTEM:</b> General description of pelvic organs. Structure of male and female Reproductive organs. Structure of breast.	<b>4</b>	Student will get to know about the pelvis and reproductive system General description of pelvic organs.				1,2		
<b>II</b>	<b>URINARY SYSTEM:</b> Structure of kidney, ureter, urinary bladder, male and female urethra attachments.	<b>12</b>	Student will get to know about the structure of kidney, ureter, urinary				1,2		
<b>III</b>	<b>NERVOUS SYSTEM:</b> Classification of Nervous system. Central Nervous system – Brain and Spinal cord, blood supply of brain. Spinal nerves and Cranial nerves. Autonomic Nervous System.	<b>12</b>	Student will get to know about the Central Nervous system – Brain and Spinal cord, blood supply of brain.				1,2		
<b>IV</b>	<b>SENSORY ORGANS:</b> Skin, Eye, Ear, Nose, Tongue	<b>16</b>	Students will get to know about the sensory organ				1,2		
<b>V</b>	<b>LYMPHATIC SYSTEM:</b> Lymphatic vessels and lymph, lymph nodes, spleen.	<b>4</b>	Students will get to know about the Lymphatic vessels.				3,4		
<b>Practical</b>	Study of bones of human body. Study of organs: Brain, heart, lung, liver, kidney, spleen.	<b>64</b>	Students will get to learn about the structure of human bones and also learn about the organ in human body.				1,2,3,4		



**TEXT BOOKS:**

1. Anatomy & Physiology- Ross and Wilson.
2. Anatomy and Physiology: Understanding the Human Body by Clark.
3. Anatomy and Physiology for nurses by Evelyn Pearce.

**REFERENCE BOOKS:**

1. Anatomy and Physiology for nurses by Pearson.
2. Anatomy and Physiology by N Murgesh.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The student will understand the organs, organ system and their structure.	<b>1</b>
<b>2</b>	The student will be able to correlate the study of the anatomy with their physiological functions leading to an approach which can help a student to understand the diseases properly for prevention.	<b>2,3</b>
<b>3</b>	The student will understand the histology of the organs.	<b>1,3</b>
<b>4</b>	The student will understand the pelvis and reproductive system of the human body.	<b>1,4,6</b>
<b>5</b>	The student will understand the lymphatic system with its anatomical significance.	<b>1,6</b>

**SEMESTER – II**

SEMESTER – II									
Course Title	PHYSIOLOGY II								
Course code	22BMLT122R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 50T+64P	3	0	4	0	0	0	3+2=5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ II semester of first year of the Programme								
Course Objectives (Minimum 3)	1. To understand the underlined mechanisms that work to keep the human body a live and functioning. 2. To provide a comprehensive concept of all physiological systems of the human body.								
CO1	Learn a comprehensive knowledge of hormones secreted by the endocrine system and their function.								
CO2	Able to explain the fundamental knowledge on excretory system and their function.								
CO3	Understand and develop knowledge of the male and female reproductive system								
CO4	Apply descriptive knowledge on the classification of the nervous system and function of special senses.								
CO5	Demonstrate a comprehensive understanding of the different types of immune cells in the body and their function.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	<b>ENDOCRINESYSTEM:</b> Structure and hormones of endocrine glands, pituitary, thyroid, parathyroid, Pancreas, Adrenal, testes and ovary. Functions and regulation of secretion of hormones	<b>10</b>	Understand about the location, function of hormones secreted by the glands. Students will learn about the regulation of hormones secretion and its deficiency.					1,2	
<b>II</b>	<b>EXCRETORYSYSTEM:</b> Structure and functions of kidneys, nephron, ureter, urinary bladder and urethra. Urine formation. Renal function tests.	<b>10</b>	Elaborate about the organs involve in excretory system, its function unit and structure of kidney.					1,2,3	
<b>III</b>	<b>REPRODUCTIVES SYSTEM:</b> Male and female reproductive organs and changes during puberty. Menstrual cycle, ovulation. Physiological changes during pregnancy, Placenta and placental circulation.	<b>12</b>	Describes about the organs of male and female and its function. Knowledge on ovulation and how menstrual cycle take place.					1,2,5	
<b>IV</b>	<b>NERVOUS SYSTEM AND MUSCLE:</b> Organization of nervous system. Structure and function of muscle and nerve cells. Functions of brain, Spinal cord, cranial And spinal nerves Motor system. Sensory system. ANS Synapse, neuromusculartransmission reflexarc, Reflex action and reflexes Cerebrospinal fluid	<b>12</b>	Analyze about the organization of the nervous system, its classification and function. Knowledge on the structural and function unit of the nervous system					3,5	

<b>V</b>	<b>LYMPHATIC AND IMMUNOLOGICAL SYSTEM:</b> Lymph glands and circulation of lymph, Spleen structure and function Immunity–Formation of T-cells and B-cells, Antigen, Antibody and Immune response.	<b>6</b>	Develop a comprehensive concept of the lymphatic and immune systems.	4,5
<b>Practical</b>	Bleeding and clotting time ESR, DLC, RBC	<b>64</b>	Describe, illustrate and explain and apply bleeding, clotting time, ESR, DLC& RBC techniques.	1,2,3,4

### TEXT BOOKS:

1. Anatomy & Physiology-Ross and Wilson
2. Anatomy and Physiology: Understanding the Human Body by Clark
3. Anatomy and Physiology for nurses by Evelyn Pearce
4. Anatomy and Physiology for nurses by Sears
5. Anatomy and Physiology for nurses by Pearson
6. Anatomy and Physiology by N Murgesh

### REFERENCE BOOKS:

1. Human Physiology – CC Chatterjee
2. Medical Physiology – CN Chandra Shekhar
3. Principles of Physiology- Debasis Pranank
4. Textbook of Medical physiology- G K Pal

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to explain the fundamentals and advances of cytology including structure and functions of cell and cell organelles.	<b>1,2&amp;9</b>
<b>2</b>	Able to explain the cell cycle and cell division.	<b>1,2 &amp; 9</b>
<b>3</b>	Learn and develop skills for operating microscope, preparing slides by various staining techniques	<b>1,2 &amp; 9</b>
<b>4</b>	Apply knowledge of cellular processes to explain how cells operate and interact within living organisms.	<b>1,2 &amp; 9</b>
<b>5</b>	Demonstrate a comprehensive understanding of cell structure and function.	<b>1,2,4&amp;9</b>

**SEMESTER – II**

<b>Course Title</b>	<b>Biochemistry-II</b>								
<b>Course code</b>	<b>22BMLT123R</b>	<b>Total credits: 4</b> <b>Total hours:</b> <b>45T+30P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>3</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3+1=4</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>BACHELORMEDICALLABORATORYTECHNOLOGY</b>								
<b>Semester</b>	<b>Fall/ II semester of first year of the Programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites 2. To understand the energy flow in the form on ATP in the human body and cells. 3. To give a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids.								
<b>CO1</b>	Describe classification, mechanism of enzymes, and factors affecting enzyme actions.								
<b>CO2</b>	Define the mechanism of carbohydrate metabolism in the body.								
<b>CO3</b>	Explain the metabolism of protein and its significant effects on different organs of body.								
<b>CO4</b>	Describe the process of Lipids metabolism and associated clinical conditions.								
<b>CO5</b>	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>Enzymes:</b> Definition and classification of enzyme. Basic idea of co-enzyme, iso-enzyme. Mechanism of enzyme Action. Factors affecting enzyme action.	<b>6</b>	It will assess the students to know both biological and chemical properties that are present in enzymes. Also, they will know the various classes and sub classes of enzymes with their biological functions.				1,2		
<b>II</b>	<b>Carbohydrates metabolism:</b> Glycolysis, Kreb's Cycle, Gluconeogenesis, Glycogenesis, glycogenolysis	<b>10</b>	The metabolism of carbohydrates in the liver includes glycogenesis, glycogenolysis, and gluconeogenesis. Glycogenesis is the process of storing excess glucose for use by the body Later time.				1,2,5,6		
<b>III</b>	<b>Protein metabolism:</b> Transamination Deamination Urea Cycle and its Significance	<b>10</b>	Learn how amino acids and proteins are metabolized, emphasizing the role of few intermediates of their metabolism, monitoring the deficiency and abundance disorders of amino acid metabolisms and the role of enzymes in the regulation of the pathways				1,2,5,6		
<b>IV</b>	<b>Lipid metabolism:</b> Oxidation of Fatty Acids, Ketone bodies, Ketosis and ketoacidosis	<b>10</b>	Students will know about the various metabolic reactions related to lipid metabolisms; how the fat molecules, Triacylglycerols, cholesterol, etc used up for the production of				1,2,3,5,6		

			energy and ATP.	
<b>V</b>	<b>Vitamins and minerals:</b> Definition and classification of vitamins according to solubility. Sources and functions of individual vitamins. Deficiency. Individual minerals (calcium, phosphorus, iron, magnesium fluoride, copper, selenium, molybdenum etc) – Their sources, function and properties.	<b>12</b>	Understand the differences between the water soluble and fat-soluble vitamins and their key role in the metabolism as coenzymes.	1,2,3,5,6
<b>Practical</b>	<b>Qualitative for proteins</b> <ul style="list-style-type: none"> <li>• Heat and acetic acid test</li> <li>• Precipitation test</li> <li>• Heller's test</li> <li>• Solubility test for lipids</li> </ul>	<b>32</b>	Students will know about various biochemical tests	1,2,3,4

#### TEXT BOOKS:

1. Textbook of Biochemistry by Dr D.M Vasudevan, SreekumarS, Jaypee Publishers, New Delhi.
2. Biochemistry by V. Satyanarayan, Books and Allied Pvt. Ltd. Calcutta
3. Textbook of Medical Biochemistry by Chatterjee and Shinde
4. Text of Medical Laboratory Technology by Prafula Godkar

#### REFERENCE BOOKS:

1. Satyanarayana, U. Biochemistry. Elsevier Health Sciences, 2013.
2. Kumar, Vijay, and Kiran Dip Gill. Basic concepts in clinical biochemistry: a practical guide. Springer Singapore, 2018.
3. Bender, David A. Nutritional biochemistry of the vitamins. Cambridge University press, 2003.
4. Mossoro, E. J. "Lipids and lipid metabolism." Annual Review of Physiology 39, no. 1 (1977): 301-321.

#### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6943057/>

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	<b>CO1:</b> Describe classification, mechanism of enzymes, and factors affecting enzyme actions.	<b>1, 2, 4</b>
<b>2</b>	<b>CO2:</b> Define the mechanism of carbohydrate metabolism in the body.	<b>1, 2</b>
<b>3</b>	<b>CO3:</b> Explain the metabolism of protein and its significant effects on different organs of body.	<b>1, 2, 4</b>
<b>4</b>	<b>CO4:</b> Describe the process of Lipids metabolism and associated clinical conditions.	<b>1, 2, 4</b>
<b>5</b>	<b>CO5:</b> Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body	<b>1, 2, 4, 8</b>

SEMESTER – II									
<b>Course Title</b>	<b>Hospital duty and patient care-II</b>								
<b>Course code</b>	<b>22BMLT114R</b>	<b>Total credits: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Even/ II semester of first year of the Programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. To impart the knowledge inpatient in a holistic approach for the overall well-being of the patient. 2. To impart a comprehensive knowledge on medical ethics and the quality and functions of medical professionals 3. To provide a gross knowledge on the legal hazardous and laboratory investigation and laboratory setup of medical profession.								
<b>CO1</b>	Describe signs and symptoms of common poisonings and its immediate management								
<b>CO2</b>	Explain the medical ethics and its importance on the healthcare system								
<b>CO3</b>	Identify the different types of shock along with the management.								
<b>CO4</b>	Determine the signs and symptoms of hyperglycemia and hypoglycemia and its immediate management.								
<b>CO5</b>	Proficient in performing quality laboratory investigation process and laboratory management.								
<b>Unit-No.</b>	<b>Content</b>			<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>
<b>I</b>	<b>POISONING</b> Definition, causes of poisoning, Sources of Poisoning, Symptoms of poisoning, first aid & Management, Antidotes, Common drugs poisoning Carbon monoxide poisoning			<b>4</b>	Describe the basic introduction of poisoning and learn about the Symptoms of poisoning, First aid & Management, Antidotes.				1,2
<b>II</b>	<b>MEDICAL PROFESSIONAL AND LEGAL HAZARDS OF MEDICAL PROFESSION</b> Qualities and Function Of medical Professional, Ethics of Medical Profession Malpractice Civil negligence Clinical negligence, corporatenegligence Consumer protection Act for medical Professional a. Act of commission, omission, rashness, negligence & damage b. Advantage & disadvantage of the act.			<b>12</b>	Illustrate the knowledge on the Medical Professional and Legal Hazard.				2,3
<b>III</b>	<b>SHOCK</b> Definition, Types of shock General Features of shock Investigations of shock Initial management & first aid of shock.			<b>2</b>	Understanding about the SHOCK Types of shock, General Features of shock, Investigations of shock Initial management & first aid of shock.				3,4
<b>IV</b>	<b>HYPERGLYCEMIA AND HYPOGLYCEMIA</b> Definition, Clinical features, Diabetes			<b>4</b>	Explain about the Hyperglycemia and Hypoglycemia and their				2,4

	laboratory tests for diabetes, Different types of glycosuria, Ketone bodies, Glucose tolerance test. Definition, Etiology, Clinical Features, Investigation and Management for Hypoglycemia.		investigations.	
<b>V</b>	<b>LABORATORY INVESTIGATION AND LABORATORY SETUP</b> Preparation of patients and equipments, Collection of specimens of urine, stool, sputum, blood, CSF, Pericardial fluid, Peritoneal fluid, Pleural fluid, etc. Laboratory designing and management, Different laboratories, Disposal of wastes, Reporting of tests of laboratory Quality control and accreditation Control of fire, infection, corrosive chemicals, toxic fumes, broken glasses, carcinogen. Legal and ethical regulation.	<b>10</b>	Examine the importance of the various lab Investigation and Laboratory Setup process.	1,2,3

#### **TEXT BOOKS:**

1. Fundamentals of Hospital Practice and Patients care by VyakarnamNageshwer

#### **REFERENCE BOOKS:**

1. Fundamentals of Hospital Practice and Patients care by VyakarnamNageshwer

#### **RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe signs and symptoms of common poisonings and its immediate management	<b>1,2,6&amp;7</b>
<b>2</b>	Explain the medical ethics and its importance on the healthcare system	<b>5,6&amp;9</b>
<b>3</b>	Identify the different types of shock along with the management.	<b>1,2,6&amp;7</b>
<b>4</b>	Determine the signs and symptoms of hyperglycaemia and hypoglycaemia and its immediate management.	<b>1,2,6&amp;7</b>
<b>5</b>	Proficient in performing quality laboratory investigation process and laboratory management.	<b>1,2,3,4,5,7,8&amp;9</b>

SEMESTER – II									
<b>Course Title</b>	<b>Pathology-I &amp; Microbiology-I</b>								
<b>Course code</b>	<b>22BMLT125R</b>	<b>Total credits: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 32T+0P</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ II semester of first year of the Programme</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. The students will be taught about cell injuries, Inflammation and repair, hemo-dynamic disorders and introduction of Hematology.</li> <li>2. The students will be introduced with the General Microbiology, instruments, sterilization methods, sample collection methods which are used in Microbiology laboratories.</li> <li>3. The students will be introduced with the functions different parts and uses in a Microscope.</li> </ol>								
<b>CO1</b>	Able to understand general pathology, microbiology and its various parts.								
<b>CO2</b>	To have a comprehensive knowledge on inflammation and cell injury.								
<b>CO3</b>	Outline the normal constituents of urine and other body fluids.								
<b>CO4</b>	Understand the importance of sterilization and disinfection.								
<b>CO5</b>	Learn the functions and importance of different parts of a Microscope.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>PATHOLOGY:</b> Introduction and scope of Pathology, Subdivisions of Pathology, Techniques for studying Pathology. Cell Injuries: Important aspects of normal cell structure, Reversible cell injury, Irreversible cell injury, Pigments, Carbon monoxide poisoning Inflammation and repair: Inflammation: Definition and signs of inflammation, Types–Acute and chronic inflammation.	7	Student will learn about the types of cell injury.				1,2		
<b>II</b>	<b>PATHOLOGY:</b> Hemodynamic Disorder, Thromboembolic Disease Shock: Hyperemia/Ischemia and Hemorrhage, Edema, Thrombosis and Embolism Infraction, Shock.	6	Students will learn and understand about Thromboembolic Disease.				2,3		
<b>III</b>	<b>MICROBIOLOGY:</b> <b>Introduction to Medical Microbiology:</b> Code and conduct of medical laboratory Technology, Definition & Classification of Microbiology, History of microbiology Definition & Classification of microorganisms. <b>Introduction to bacteriology:</b> Size,	7	Students will learn about the identification, classification and characterization of bacterial species.				1,4		



	Shape, Basic structure of bacteria			
<b>IV</b>	<p><b>MICROBIOLOGY:</b> Instruments in Clinical Microbiology Laboratory Glassware used in Clinical Microbiology</p> <p><b>Laboratory:</b> Introduction Care and handling of glassware, Cleaning of glassware.</p> <p><b>Microscopy:</b> Introduction, parts, functions and uses of microscope in microbiology.</p> <p><b>Sterilization and disinfection:</b> Definition, Classification, Antisepsis, Autoclave</p>	6	Students will understand the uses and types of glass wares, microscope and importance's of sterilization.	1,4
<b>V</b>	<p><b>PATHOLOGY:</b> Neoplasia: Nomenclature, Carcinogenic Agents, Tumors - Tumors Grading and Staging.</p> <p><b>MICROBIOLOGY:</b> Method of collection of samples for diagnostic microbiology: Urine, Sputum, Stool, Blood</p>	6	Students will learn about Neoplasia and methods for different sample collection in microbiology lab.	1,4,5

#### **TEXT BOOKS:**

#### **PATHOLOGY:**

T1: Textbook of Pathology–Harsh Mohan

T2: Pathologic Basis of Disease-Robbina and Cotran

T3: Textbook of Medical Laboratory Technology–Praful B.Godkar, Darshan P Godkar.

#### **MICROBIOLOGY:**

T1: Textbook of Microbiology by Ananthanarayana

T2: Medical Microbiology by Paniker & Satish Gupta

T3: Textbook of Medical Laboratory Technology by P.Godkar

T4: Textbook of Microbiology by C.PBaveja.

#### **REFERENCE BOOKS:**

R1: Textbook of Medical Laboratory Technology–Praful B.Godkar, Darshan P Godkar.

R2: Text book of Microbiology by C.P. Baveja.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Able to understand general pathology, microbiology and its various parts.	1
2	To have a comprehensive knowledge on inflammation and cell injury.	1,2
3	Outline the normal constituents of urine and other body fluids.	1,3
4	Understand the importance of sterilization a disinfection.	4,8
5	Learn the functions and importance of different parts of a Microscope.	3,9

SEMESTER – II									
<b>Course Title</b>	<b>Laboratory Infrastructure and Design</b>								
<b>Course code</b>		<b>Total credits: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 32T+0P</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ II semester of first year of the Programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. To acquaint the students with the ideas pertaining to the infrastructure and design Laboratory 2. The goal of this course is to enable the students to comprehend the concept of laboratory layout after lectures and demonstrations.								
<b>CO1</b>	Understanding the rationale behind laboratory architecture and infrastructure.								
<b>CO2</b>	Describe a comprehensive knowledge on how a laboratory operates, generalize to the entire laboratory								
<b>CO3</b>	Briefly outline on Laboratory's general management and public support								
<b>CO4</b>	Evaluate the sample floor plan for different clinical laboratory and primary service category.								
<b>CO5</b>	Demonstrate the fundamental design, maintenance, and cleaning of a laboratory								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	Purpose of engineering controls: -to provide a safe, accessible environment for laboratory personal to conduct a work -patients/users, staff & environment safety	3	Understand the importance of engineering controls in ensuring a safe and accessible environment for laboratory personnel, patients, and staff.				2,3		
<b>II</b>	Layout of Laboratory areas: -sample collection area -laboratory working area -General laboratory area	3	Demonstrate proficiency in organizing workspaces, handling equipment safely, and adhering to standard operating procedures.				1,2		
<b>III</b>	Work flow: -Staff movement Patient movement Sample movement	3	Develop skills in facilitating smooth and comfortable patient and staff movement for feasible workflow.				1,3,4		
<b>IV</b>	Infrastructure requirement for laboratory: -Reception -Blood sample collection -Storage area	3	Identify and implement appropriate infrastructure for reception, sample collection and storage area.				2,3		
<b>V</b>	Laboratory renovation -Repairing, Cleaning	3	Demonstrate effective strategies for repairing and cleaning laboratory spaces.				2,3,4		

SEMESTER – II									
Course Title	Universal Human Values and Professional Ethics								
Course code	22UUVH101R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30P	1	0	2	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor in Medical laboratory Technology								
Semester	Winter/II Semester of First Year of the Programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To help students distinguish between values and skills, and understand the need, basic guidelines, content and process of value education.</li> <li>To help students initiate a process of dialog within themselves to know what they 'really want to be' in their life and profession</li> <li>To help students understand the meaning of happiness and prosperity for a human being.</li> <li>To facilitate the students to understand harmony at all the levels of human living, and live accordingly.</li> <li>To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life</li> </ol>								
<b>CO1</b>	Evaluate the importance and process of Value Education, aligning it with human aspirations.								
<b>CO2</b>	Analyze the concept of harmony within oneself, emphasizing the connection between 'I' and the body.								
<b>CO3</b>	Assess and apply foundational values in family and society for comprehensive human goals.								
<b>CO4</b>	Examine the interconnectedness and mutual fulfillment in nature, emphasizing co-existence principles.								
<b>CO5</b>	Demonstrate competence in professional ethics, incorporating a holistic understanding for eco-friendly production systems.								
Unit-No.	Content	Contact Hour	Learning Outcome				BL		
<b>I</b>	<b>Course Introduction - Need, Basic Guidelines, Content and Process for Value Education</b> Understanding the need, basic guidelines, content and process for Value Education, Self-Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels.	3	Understand the need for value education in fostering ethical, moral, and socially responsible behavior. The basic guidelines include promoting core values such as integrity, empathy, respect, and responsibility. The course content covers various dimensions of human values, ethical theories, and real-life applications in personal and professional contexts. The process involves interactive teaching methods, including discussions, case studies, reflective exercises, and community service activities, to engage students in deep thinking and practical application of values.				<b>1,2,3</b>		
<b>II</b>	<b>Understanding Harmony in the Human Being - Harmony in Myself</b> Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - Sukh and Savidha, Understanding the Body	3	Learn to identify and align their thoughts, emotions, and actions through self-awareness and self-regulation techniques. The course emphasizes the integration of the body, mind, and spirit, promoting				<b>3,4</b>		

	as an instrument of 'I' (I being the doer, seer and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya		practices such as mindfulness, meditation, and reflective journaling to achieve internal balance. Students are encouraged to recognize their intrinsic values and aspirations, fostering a sense of purpose and contentment.	
<b>III</b>	<b>Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship</b> Understanding harmony in the Family- the basic unit of human interaction , Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship, Understanding the meaning of Vishwas; Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals, Visualizing a universal harmonious order in society Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha )- from family to world family!.	3	Learn about the importance of empathy, effective communication, mutual respect, and cooperation in fostering strong and positive human connections. The course emphasizes the roles and responsibilities of individuals in contributing to the well-being of their families and communities, encouraging practices that promote trust, understanding, and support. Students are taught conflict resolution strategies and the value of compassion and ethical behavior in interpersonal interactions.	<b>3,4</b>
<b>IV</b>	<b>Understanding Harmony in the Nature and Existence - Whole existence as Co-existence</b> Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.	3	Learn to recognize the intrinsic balance and mutual dependence that sustain ecosystems and the broader environment. The course emphasizes the concept of co-existence, where harmony arises from understanding and respecting the natural world's interdependent relationships. Students are encouraged to adopt sustainable practices and an ethical attitude towards nature, recognizing their role in maintaining ecological balance.	<b>4</b>
<b>V</b>	<b>Implications of the above Holistic Understanding of Harmony on Professional Ethics</b> Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic	3	It fosters values such as integrity, empathy, and sustainability, guiding professionals to consider the broader impact of their decisions and actions.	<b>4</b>

	<p>Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, b) At the level of society: as mutually enriching institutions and organizations.</p>		<p>Professionals are encouraged to cultivate a balanced approach that respects diverse perspectives, promotes collaboration, and prioritizes ethical conduct in business practices. This holistic perspective also emphasizes accountability and responsibility towards stakeholders, communities, and the environment, encouraging ethical leadership and long-term sustainability in organizational strategies and operations.</p>	
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#### TEXT BOOKS:

1. Business Ethics: Ethical Decision Making & Cases by O.C. Ferrell and John Fraedrich.
2. Professional Ethics and Human Values by Jayakumar.

#### REFERENCE BOOKS:

1. The Oxford Companion to Philosophy edited by Ted Honderich.
2. The Cambridge Encyclopedia of Language edited by David Crystal.

#### OTHER LEARNING RESOURCES:

1. <https://youtu.be/rl85jxktfms>
2. <https://www.betterteam.com/dress-code-policy#:~:text=Everyone%20is%20expected%20to%20be,religion%20or%20ethnicity%20are%20exempt>

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Evaluate the importance and process of Value Education, aligning it with human aspirations.	1,2,3,4,6,7,10,12
2	Analyze the concept of harmony within oneself, emphasizing the connection between 'I' and the body.	1,2,3,4,6,7,10,12
3	Assess and apply foundational values in family and society for comprehensive human goals.	1,2,3,4,6,7,10,12
4	Examine the interconnectedness and mutual fulfilment in nature, emphasizing co-existence principles.	1,2,3,4,6,7,10,12
5	Demonstrate competence in professional ethics, incorporating a holistic understanding for eco-friendly production systems.	1,2,3,4,6,7,10,12

<b>COURSE TITLE</b>	<b>EFFECTIVE ENGLISH (Communicative English &amp; Soft Skills)</b>								
<b>COURSE CODE</b>	<b>22UBPD121R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PRE-REQUISITE</b>	<b>22UBPD111R Basic English</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>ANTI-REQUISITE</b>	<b>NIL</b>								
<b>PROGRAMMES</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>SECOND</b>								

<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>To enable students to learn and understand the different types of sentences.</li> <li>To strengthen the vocabulary of the students which will help in their writing and speaking</li> <li>To introduce them with the Time Management technique.</li> </ol>
<b>CO1</b>	Provide students with the ability to transform sentence types, utilize different tenses, and address common grammatical mistakes.
<b>CO2</b>	Empower students to proficiently apply one-word substitutions, differentiate between homonyms and homophones, avoid frequently confused words, and incorporate idioms and phrases in their vocabulary.
<b>CO3</b>	Assist students in comprehending the various aspects and types of listening, and in identifying and overcoming obstacles to effective listening.
<b>CO4</b>	Facilitate students in employing effective reading strategies, extracting relevant information from texts, and utilizing the SQ3R method.
<b>CO5</b>	Instruct students on the significance of time management and provide foundational strategies to manage their time efficiently.

<b>UNIT-NO</b>	<b>CONTENT</b>	<b>CONTACT HRS</b>	<b>LEARNING OUTCOME</b>	<b>KNOWLEDGE LEVELS</b>
<b>I</b>	<b>Grammar (flipped classroom)</b> i. Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences ii. Types of Tenses iii. Common Errors	<b>6</b>	Students will accurately construct and transform various sentence types and correct grammatical errors.	<b>1,2, 3</b>
<b>II</b>	<b>Vocabulary Development</b> i. One word substitution ii. Homonyms and Homophones iii. Words often confused Idioms and phrases	<b>6</b>	Students will enhance their vocabulary and use words accurately in context.	<b>1,2, 3</b>
<b>III</b>	<b>Listening Skills</b> i. What is listening? ii. Types of Listening iii. Understanding Listening	<b>5</b>	Students will demonstrate effective listening skills and identify listening barriers.	<b>1,2, 3</b>

	Barriers			
IV	<b>Reading Skills</b> i. Techniques of Effective Reading ii. Gathering ideas and information from a text iii. The SQ3R Technique	5	Students will read efficiently and extract relevant information using the SQ3R technique.	1,2, 3
V	<b>Time-Management Skills</b> i. Introduction to Time Management ii. Purpose and Importance of Time Management iii. Basic Tips to Maintain Time	4	Students will effectively manage their time using various strategies.	1,2, 3

**Textbooks:**

1. Wren, P. C and Martin H.1995.HighSchool English Grammar and Composition, S Chand Publishing.
2. Barrett, rant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.



SEMESTER – II									
Course Title	BASIC DIGITAL LITERACY								
Course code	2UUDL101R	Total credits: 2 Total hours: 15T	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	NIL						
Programme	BACHELOR OF MEDICAL LABORATORY TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
Course Objectives	<ol style="list-style-type: none"> <li>To introduce the students to identify and analyze computer hardware, software and their uses.</li> <li>To able to use MS-Office suite for various purposes.</li> <li>To use the Internet efficiently for required information as well as for digital financial transactions.</li> </ol>								
CO1	Students will understand Computer Hardware, Software and Computer handling.								
CO2	Students will be able to solve basic information management issues using MS-Office Products.								
CO3	Students will be able to efficiently search the Internet for required information.								
CO4	Students will be able to use computing technically ethically, safely, securely and legally for day-to-day use.								
CO5	Students will be able to use MS-Office for various purposes.								
UnitNo.	Content	Contact Hour	Learning Outcome				KL		
I	Fundamentals of Computer Systems Components of a Computer and their functions. Different Types of Computers and their Applications.	3	To learn about the basic fundamentals of computer and their applications.				1,2,3,		
II	Introduction to MS-Office Components of the MS-Office suite. Creating documents with MS-Word. Creating Presentations with MS- PowerPoint. Creating Spreadsheets with MS-Excel.	3	To learn about the uses of MS word				1,2,,4,		
III	Introduction to Internet & Cyber World Introduction to Computer Networks and Internet. World Wide Web, Websites and Web portals, Web browsing. Web Searching, Search engines, Introduction to Google Search Engine; How to search using Keywords, topics of Interest, etc. Creation and use of Email Accounts. Cyber Crimes.	3	To acquire knowledge about the internet and its uses				1,3,4,5		

<b>IV</b>	Introduction to Social Media The Power of social media, Relevance of	<b>3</b>	To learn about the social media/social platforms	2,3,4,5
	social media in present scenario. Creating accounts and using some popular social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, LinkedIn. Social Media Etiquettes.			
<b>V</b>	Digital Payments Introduction to Digital Payment Systems. Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, UPI.	<b>3</b>	To acquire knowledge on the digital payments	1,2,3,

**Reference Books:**

1. Swan, Michael(2014) Practical English Usage, Cambridge University Press
2. Taylor J. and Wright, J., IELTS Advantage Reading Skills: A step-by-step guide to a high IELTS reading score, Delta Publishing by Klett

**Other Learning Resources:**

1. <https://clockify.me/time-management-techniques>
2. <https://www.peoplehum.com/glossary/conflict-management>

<b>COURSE TITLE</b>	<b>EXTRA CURRICULAR</b>								
<b>COURSE CODE</b>	<b>22UBEC121</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>		<b>CO-REQUISITE</b>							
<b>PROGRAMMES</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>SECOND</b>								

<b>COURSE OBJECTIVES:</b>	1.To ascertain physical and mental development of the students and select best Performers for state, national and international level competition. 2.To enhance and improve student's talents in the field of sports, yoga, music, Dance, drama, etc through AdtU club activities and workshops.
<b>CO1</b>	The students will be engaged indifferent activities headed under different clubs namely dance, music, photography, drama, literacy, etc
<b>CO2</b>	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.
<b>CO3</b>	The students will be trained to represent ADTU in various inter university, state and national level competitions.
<b>CO4</b>	The students will be given a plat form to earn from invited experts in their respective fields.
<b>CO5</b>	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.

<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Based on the learner's interest they can participate in various sports, music, and co-curricular activities joining the clubs of the University (Football, Footstall; Cricket; Swimming; Basketball; Badminton; Table Tennis; athletics and other outdoor and indoor games; Dance; Music; Vocals; Photography; Drama; Literary activities); The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies; Renowned skilled professionals/ personalities are invited organising workshops to promote the talents of the students.	<b>60</b>	Participation in university clubs across sports, music, and extra-curricular activities cultivates diverse skills and personal growth. Students develop teamwork, leadership, and creativity through sports like football, cricket, and athletics. Musical pursuits and dance foster self-expression and coordination, while literary and drama activities enhance communication and critical thinking. Workshops led by skilled professionals provide industry insights and mentorship opportunities, preparing students for future challenges. By encouraging participation based on interests and hobbies, universities nurture well-rounded individuals who excel academically and socially, equipped with practical skills and a broadened perspective on cultural diversity and personal fulfilment.	1, 2

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc	5,7,9
<b>2</b>	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.	5,7,9
<b>3</b>	The students will be trained to represent ADTU in various inter university, state and national level competitions.	5,7,9
<b>4</b>	The students will be given a platform to earn from invited experts in their respective fields.	5,7,9
<b>5</b>	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.	5,7,9

<b>COURSE TITLE</b>	<b>CO -CURRICULAR</b>								
<b>COURSE CODE</b>	<b>22UBCC121</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>		<b>CO-REQUISITE</b>							
<b>PROGRAMMES</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>SECOND</b>								
<b>COURSE OBJECTIVES:</b>	Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.								
<b>CO1</b>	Students will develop effective leadership qualities through practical activities and projects, fostering teamwork and decision-making abilities.								
<b>CO2</b>	Students will develop critical thinking skills by analyzing complex issues, evaluating evidence, and proposing innovative solutions.								
<b>CO3</b>	Students will engage in community service projects or advocacy efforts, promoting social justice, environmental sustainability, and ethical leadership.								
<b>CO4</b>	Students will unleash their creative potential by exploring new ideas, experimenting with different mediums								
<b>CO5</b>	Through mock interviews and resume workshops, students will enhance their employability and prepare for future career opportunities								

<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<p>Co-curricular activities cover a wide range of experiences and pursuits that complement academic learning. They are typically organized and managed within educational institutions or communities and play a crucial role in holistic development. Some examples are</p> <p>Sports and Physical Activities  Cultural Activities:  Academic Clubs and Competitions  Community Service and Volunteering  Leadership and Personal Development  Creative and Hobby-based Activities</p>	<b>60</b>	<p>Skill Development: Enhancing skills such as teamwork, leadership, communication, and critical thinking.</p> <p>Holistic Growth: Supporting emotional, social, and physical development alongside academic learning.</p> <p>Building Networks: Creating opportunities to interact with peers, mentors, and professionals.</p> <p>Personal Fulfillment: Providing avenues for creativity, self-expression, and exploring personal interests.</p>	1,2

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Students will develop effective leadership qualities through practical activities and projects, fostering teamwork and decision-making abilities.	5,7,9
<b>2</b>	Students will develop critical thinking skills by analysing complex issues, evaluating evidence, and proposing innovative solutions.	5,7,9
<b>3</b>	Students will engage in community service projects or advocacy efforts, promoting social justice, environmental sustainability, and ethical leadership.	5,7,9
<b>4</b>	Students will unleash their creative potential by exploring new ideas, experimenting with different mediums	5,7,9
<b>5</b>	Through mock interviews and resume workshops, students will enhance their employability and prepare for future career opportunities.	5,7,9



### Relationship between Course Outcomes and Programme outcome

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
22BMLT121R	Anatomy II	3	3		2					
22BMLT112R	Physiology II	3	3		2					
22BMLT123R	Biochemistry II	3	3		2				1	
22BMLT114R	Hospital duty patient care-II	3	2			2			3	
22BMLT125R	Pathology-I &microbiology -I	3			3		2			
22BMLT126R	Laboratory infrastructure & design	0	1	1	2	1	0	0	2	2



		<b>SEMESTER - III</b>							
<b>Course Title</b>		<b>MICROBIOLOGY II</b>							
<b>Course code</b>	<b>22BMLT211R</b>	<b>Total credits: 6</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 48T+96P</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>Semester</b>	<b>THIRD SEMESTER</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. The candidates undergoing training in medical laboratory technology will learn the techniques of collection of samples, their processing and identification of various pathogens like bacteria using different techniques.</li> <li>2. The basic knowledge of different diseases caused by various micro-organisms is also imparted.</li> <li>3. The training is aimed at making the students competent to isolate and identify the causative micro-organisms</li> </ol>								
<b>CO1</b>	The students will be able to classify microbes and understand the microbial growth and nutrition								
<b>CO2</b>	Basic understanding on culture media and its classification								
<b>CO3</b>	Identification of various types of microscopes and their uses								
<b>CO4</b>	An overall knowledge on the morphology, pathogenesis and laboratory diagnosis of pathogens.								
<b>CO5</b>	Importance on Biomedical waste management, types and segregation methods applicable in health care services.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Microscopy:</b> Bright - field microscopy Dark - field microscopy Phase contrast microscopy Fluorescence microscopy Electron microscopy Transmission Electron microscopy Scanning Electron microscopy	<b>6</b>	Students will be able to understand and differentiate microscope based on its parts and uses.					1,2	
<b>II</b>	<b>Stains in Microbiology</b> Preparation of smears, simple staining Classifications of stains Gram's staining Acid fast staining Negative staining	<b>6</b>	Understanding different techniques of staining and its role in diagnostic field					1,2	
<b>III</b>	<b>Bacteriology:</b> Morphology, cultural characteristics, Pathogenesis and Laboratory diagnosis of: Staphylococcus Streptococcus Pneumococcus Escherichia coli, Klebsiella, Shigella, Salmonella. Vibrio cholerae Pseudomonas aeruginosa	<b>15</b>	Students will be able to correlate the characteristics/features of different bacteria that causes human infections.					1,2	
<b>IV</b>	<b>Microbial growth and nutrition</b> Nutritional requirement	<b>15</b>	Students will be able to understand how culture					1,2	

	Nutritional types of microorganisms, growth factors Bacterial growth curve Bacteriological Medias-Simple media, differential media, special media, enrichment media.		media promotes and supports the growth and differentiate microorganisms	
<b>V</b>	<b>Biomedical waste management</b> Introduction Categories of Biomedical waste Segregation of waste treatment and disposal	<b>6</b>	Understand different waste generated and it's treatment in health care sector.	1,2
<b>Practical</b>	Preparation of culture medias Staining:Gram's stain, AFB stain,Capsule stain,Spores stain. Culturecharacteristic studyofBacteria: Staphylococcus Species, Streptococcus Species, Escherichia coli, Klebsiella species, Pseudomonas Species. Hanging drop preparation.	<b>96</b>	Student will be made to learn and understand the importance of culture medias, staining techniques and check motility of the bacteria.	1,2,3,4

#### TEXT BOOKS:

1. Textbook of Microbiology by CP Baveja, 7<sup>th</sup> edition.

#### REFERENCE BOOKS:

1. Reference: Textbook of microbiology and immunology by S.C. Parija
2. Microbiology by Prescott,Harley,Kleis
3. Textbook of Microbiology by Anantha Narayan and Paniker.

#### OTHER LEARNING RESOURCES:

1. <https://www.ncbi.nlm.nih.gov/books/NBK7627/>
2. <https://www.ncbi.nlm.nih.gov/books/NBK546149/>

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	The students will be able to classify microbes and understand the microbial growth and nutrition	<b>1,2,4</b>
<b>2</b>	Basic understanding on culture media and its classification	<b>1,4</b>
<b>3</b>	Identification of various types of microscopes and their uses.	<b>1,2,3</b>
<b>4</b>	An overall knowledge on the morphology, pathogenesis and laboratory diagnosis of pathogens.	<b>1,2</b>
<b>5</b>	Importance on Biomedical waste management, types and segregation methods applicable in health care services.	<b>1,2,3,4,8</b>

SEMESTER – III									
Course Title	PATHOLOGYII								
Course code	22BMLT212R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 48(T)+96(P)	3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical laboratory technology								
Semester	Fall/ III semester of second year of the Programme								
Course Objectives (Minimum 3)	<p>1. The training in this subject is imparted to enable the students to carry out routine clinical laboratory investigation (blood, urine etc.).</p> <p>2. They should be able to provide technical help for selected sophisticated hematological techniques with adequate knowledge of various principles.</p> <p>3. They should be able to compare and contrast, the morphology and cytological content of Neutrophils, eosinophils, monocytes and basophils.</p>								
CO1	Describe the basics on hematology and understanding the formation, collection and preservation of blood samples.								
CO2	Describe about RBC and the relation between hemoglobin and Anemia.								
CO3	Execute the knowledge on WBCs, its morphological understanding on leukemia.								
CO4	Understand the hemostasis in details								
CO5	Examine on Bone marrow smear and staining techniques.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Introduction to Hematology</b> Blood–formation, composition Method of blood collections Preservation of blood for routine examination and others(anticoagulant) Preparation of thin and thick smears, staining of smears, Romano sky dyes, preparation and staining procedures of blood smears.	6	Describe, illustrate and explain the basic concepts of hematology, and learn to prepare blood smears and various hematological staining methods.				1,2		
II	<b>Red Blood Cells/ Erythrocytes</b> Formation, Morphology, Functions Count methods and its clinical importance Hemoglobin- structure, function and types, Reticulocyte, PCV, ESR, Red cell indices <b>Anemia</b> –definition, Morphology & Etiology, classification, Microcytic Hypochroanaemia a) Causes b) Types c) Lab investigation. d) Laboratory pictures e) Clinical importance Sickle cell anaemiaThalassemia	20	Describe, illustrate and explain Normal blood cells and various red cells disorders related with RBC.				1,2		
III	<b>White Blood Cells (WBC)</b> Formations Types Functions, life morphology Methods of counting, WBC and differential	6	Describe, illustrate and explain the morphology and functions of WBC and techniques to count the WBC.				1,2		

	co(preparation of smears) Leukaemia and its classification			
<b>IV</b>	<b>Platelets</b> Formation, morphology, Function Method of counting, normal abnormal counts with clinical importance <b>Hemostasis and coagulation</b> Normal hemostasis mechanism of blood coagulation and nor fibrinolytic system Investigation of hemostasis mechanism - BT, CT, blood coagulation time testPT, PTT <b>Haemophilia</b> –Definition	<b>10</b>	Describe, illustrate and explain the morphology and functions of platelets and techniques to count the morphology and functions of platelets	1,2
<b>V</b>	<b>Bone marrow</b> Method of preparation of bone marrow smears. Different types of staining of bone marrow smear	<b>6</b>	Describe, illustrate and explain different techniques of staining bone marrow.	1,2
<b>Practical</b>	<b>HAEMATOLOGY</b> 1. Study of instruments. 2. Study of Microscope 3. Collection of blood 4. Anticoagulants its uses and preparation 5. Preparation of blood thin film and staining and study of RBC morphology. 6. Preparation of blood thick film and staining and study of blood parasite 7. Total RBC counts 8. Total WBC counts 9. Differential WBC counts 10. Absolute counts of platelet, eosinophil 11. Haemoglobin estimation by various methods. 12. ESR estimation 13. PCV estimation 14. Reticulocyte count 15. Sick cell preparation 16. BT, CT, PT, PTT and APTT	<b>96</b>	Describe, illustrate and explain various haematological techniques and carry out microscopic examination.	1,2,3,4

#### TEXT BOOKS:

1. Clinical Haematology Principles, procedure, correlations by E. Anne Stiene Martin, Cheryl A. Lotspiech – steininger, John A. Koepke.

#### REFERENCE BOOKS:

1. Textbook of Medical Lab Technology – Praful B. Godkar, Darshan P. Godkar
2. Clinical Haematology in Medical Practice – de Gruchy
3. Medical Laboratory Technology Methods & interpretation – Ramnik Sood

#### OTHER LEARNING RESOURCES:

1. <https://vdoc.pub/documents/dacie-and-lewis-practical-haematology-44o9vf6jei70>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Students will learn and understand and comprehend the instrument used in haematology.	<b>1,3</b>
<b>2</b>	Students will learn and understand about the collection of blood and the used of different types of anticoagulants in haematology.	<b>1,4</b>
<b>3</b>	Students will be able to recognize normal from abnormal by interpreting and analysing laboratory findings from common blood test.	<b>5,6,7</b>
<b>4</b>	Student will learn about the preparation of blood thin and thick smear.	<b>4</b>
<b>5</b>	Students will acquire knowledge about all the basic routine test of hematology RBC, WBC, BT, CT, PT, APTT and hemoglobin etc.	<b>6,2,4</b>

SEMESTER – III									
Course Title	Metabolic Biochemistry								
Course code	23BMLT213R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 45T+30P	3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor Medical Laboratory Technology								
Semester	Fall/ III semester of Second year of the Programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. The candidates are imparted basic training of theoretical and practical in the field of Clinical biochemistry.</li> <li>2. They are taught the technique of collection of clinical samples and their processing.</li> <li>3. The students will also be given the basic knowledge of chemistry and metabolism of various metabolites which are routinely estimated in different diseases so that a clear understanding of the different tests is obtained, in addition to basic training in safety measures</li> </ol>								
<b>CO1</b>	Define carbohydrate and describe its metabolism.								
<b>CO2</b>	Able to explain the cell cycle and cell division.								
<b>CO3</b>	Describe the metabolism of lipids								
<b>CO4</b>	Explain the process of DNA replication and Protein synthesis								
<b>CO5</b>	Discuss the formation of bile pigment, metabolism of bilirubin.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
<b>I</b>	<b>Metabolism of carbohydrates:</b> Digestion and absorption of carbohydrates. Glycogenesis, Glycogenolysis, Glycolysis, Citric acid cycle, energetic of citric acid cycle, Gluconeogenesis, Regulation of glucose metabolism, Metabolism of Fructose, Metabolism of Galactose, Regulation of blood glucose concentration, Integration of metabolic pathways of carbohydrate.	<b>14</b>	Students will be understanding the different metabolic pathways of carbohydrates and learn the regulation of blood glucose.				1,2		
<b>II</b>	<b>Metabolism of Proteins:</b> Digestion and absorption of proteins. General pathway of protein metabolism, Nitrogen metabolism, catabolism of proteins-Transamination, Oxidative Deamination, trans deamination. Synthesis of urea, Integration of metabolic pathways of proteins.	<b>14</b>	Understanding on the differentiate graded metabolic pathways of proteins.				2,3,5		
<b>III</b>	<b>Metabolism of Lipids:</b> Digestion and absorption of lipids. Role of liver in fat metabolism, Beta Oxidation of fatty acid, Biosynthesis of lipids, Prostaglandin, Cholesterol metabolism, formation of bile acids, plasma lipoproteins, Integration of metabolic pathways of fats.	<b>14</b>	The students will be able to learn and understand the different integrated metabolic pathways of lipids.				1,4,5		
<b>IV</b>	<b>DNA Replication and Protein synthesis:</b> Translation and Transcription	<b>3</b>	Students will learn the sequence of protein synthesis				1,3		
<b>V</b>	<b>Catabolism of heme:</b> Formation of bile pigments, metabolism of bilirubin, catabolism	<b>10</b>	Describe, illustrate and explain the cell cycle				2,4		

	of heme.		and division in general and in some specific cell types	
<b>Practical</b>	Study of instruments, and appliances. 2. Calculation and preparation of percentage solution. 3. Calculation and preparation of Molar solution. 4. Calculation and preparation of Normality solution. 5. Collection and preservation of blood serum and plasma 6. Urine R/E- Biochemical examination – reducing sugar, protein, ketone bodies, bile salts, bile pigments, urobilinogen, and blood. 7. Qualitative estimation of carbohydrates, protein and amino acids.	<b>30</b>	Explain the biochemical examination of urine sample for detection of protein, ketone bodies, bile pigments and understand the calculation and preparation of molar solution, Normality.	1,2,3,4,5

#### TEXT BOOKS:

1. Biochemistry–U.Satyanarayana, U.Chakrapani.
2. Textbook of Medical Biochemistry– MN Chaterjee, Kano Shinde.
3. Principle &Technique of Biochemistry–S.Ramakrishnan, K.G. Prasannan, R.Rajan.
4. Principle & Techniques of Biochemistry & Molecular Biology – Keith Coilson
5. Textbook of Medical Lab Technology– Praful B.Godkar, Darshan P.Godkar

#### REFERENCE BOOKS:

1. Cummings, J. H. "Carbohydrate terminology and classification." *European Journal of Clinical Nutrition* 55, no. Suppl 3 (2001): S5-S12.
2. Kogoma, Tokio, and K. G. Lark. "DNA replication in Escherichia coli: replication in absence of protein synthesis after replication inhibition." *Journal of molecular biology* 52, no. 2 (1970): 143-164.
3. Gefter, Malcolm L. "DNA replication." *Annual review of biochemistry* 44, no. 1 (1975): 45-78.
4. Møller, Niels, and Jens Otto Lunde Jørgensen. "Effects of growth hormone on glucose, lipid, and protein metabolism in human subjects." *Endocrine reviews* 30, no. 2 (2009): 152-177.

#### OTHER LEARNING RESOURCES:

1. <https://www.ncbi.nlm.nih.gov/books/NBK21054/?term=Biochemistry>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Define carbohydrate and describe its metabolism.	<b>1,2, 9</b>
<b>2</b>	Able to explain the cell cycle and cell division.	<b>1, 2, 9</b>
<b>3</b>	Describe the metabolism of lipids	<b>1, 2, 3, 9</b>
<b>4</b>	Explain the process of DNA replication and Protein synthesis	<b>1, 2, 4, 5</b>
<b>5</b>	Discuss the formation of bile pigment, metabolism of bilirubin.	<b>1, 4, 5, 9</b>



**SEMESTER – III**

<b>Course Title</b>	<b>Phlebotomy</b>								
<b>Course code</b>	<b>22BMLT214R</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 16</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Science in Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ III semester of second year of the Programme</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. Students will be taught the technique of collecting different types of specimens for diagnostic purpose.</li> <li>2. The students will also be given the knowledge on the role and responsibilities of phlebotomists, learning how to perform the venipuncture process, drawing blood and other specimen into the correct tubes with the proper additives, accurately learning the procedure.</li> <li>3. Safety and infection control procedures which are important for routine lab practices will also be taught.</li> </ol>								
<b>CO1</b>	Understanding Phlebotomy and underlining the roles and responsibilities of a phlebotomist and Patient Care.								
<b>CO2</b>	Identifying different samples for collection, example: blood, urine, Body fluid, Semen, Pus, scrapping.								
<b>CO3</b>	Demonstrate the sequence of collection and importance of labelling of samples								
<b>CO4</b>	Recognize the common errors and significance of specimen rejection.								
<b>CO5</b>	Categorize the types of infections, its causative agents and steps for management.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>Phlebotomist, Role and Responsibilities</b> Patient Care	<b>3</b>	Execute the technique of sample collection efficiently from patients.				1, 2,3		
<b>II</b>	<b>Type of Samples and site of collection:</b> Blood Urine Body fluid, Semen, Pus, Scrapping	<b>3</b>	Describe collection methods from certain respective sites.				2,3		
<b>III</b>	<b>Specimen Collection:</b> Order Of Draw Labeling Of Samples	<b>3</b>	Explain the importance of drawing and collecting samples in tubes in a specific order.				1,3		
<b>IV</b>	<b>Common errors and Specimen Rejections:</b> Hemolysis Hematomas Specimen Rejections	<b>3</b>	Examine various errors which should be kept in mind while collecting samples				2, 4		
<b>V</b>	<b>Safety And Infection Controls:</b> Osha (Occupational Safety And Health Act) Types of Infections: Blood Borne Pathogens, Airborne Pathogens PPE (Personal Protective Equipment) Finger stick Injury Biomedical Waste Management	<b>4</b>	Discuss the various types of infections and ways for treating them.				1, 3, 4		

**TEXTBOOKS:**

1. Textbook of Medical Lab Technology– PrafulB.Godkar, DarshanP.Godkar.
2. Textbook of Medical LabTechnology–Ramnik Sood.
3. Clinical chemistry-Michael.L.Bishop
4. Essentials in Haematology and Clinical pathology-Ramdas Nayak
5. Textbook of Microbiology–Ananthanarayan& Paniker

**REFERENCEBOOKS:**

1. Textbook of Medical Lab Technology– Ramnik Sood.
2. Clinical chemistry-Michael.L.Bishop

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding Phlebotomy and underlining the roles and responsibilities of a Phlebotomist and Patient Care.	<b>1, 4, 6</b>
<b>2</b>	Identifying different samples for collection, example: blood, urine, Body fluid, Semen, Pus, scrapping.	<b>4, 5</b>
<b>3</b>	Demonstrate the sequence of collection and importance of labelling of samples	<b>4</b>
<b>4</b>	Recognize the common errors and significance of specimen rejection.	<b>2, 4</b>
<b>5</b>	Categorize the types of infections, its causative agents and steps for management.	<b>2</b>

SEMESTER – III									
Course Title	EVS								
Course code	22BMLT215R	Total credits: 2 Total hours: 48	L	T	P	S	R	O/F	C
			2	0		0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ II semester of first year of the Programme								
Course Objectives (Minimum 3)	1. The student will be made aware of our environment in general, Natural Resources, Ecosystems. 2. Understanding the impacts of Environmental Pollution. 3. The importance of social issues related to environment and Human Population.								
CO1	Discuss the importance of Environmental Studies and the need for public awareness.								
CO2	Identify natural resource, its importance, and its impacts on the environment.								
CO3	Explore in-depth knowledge on concept of environmental pollution.								
CO4	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.								
CO5	Explain various environmental pollution and its impact on human and ecosystem.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Understanding Ecosystem:</b> Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Food chains, food webs and ecological pyramids, Destruction of an ecosystem Conservation of an ecosystem, Role of environmental Impact Assessment (EIA)		10	Describe, illustrate and explain the importance of ecosystem and steps for conservation.				1,2	
II	<b>Natural Resources:</b> Renewable resources Non-renewable resources, Mineral resources, forest resources, Water resources, Energy resources Bioenergy, Depletion of resources, Impact of depletion of resources, Practices for conservation of resources		10	Describe about different resources and its impact on depletion.				1,2	
III	<b>Environmental Pollution:</b> Definition, causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Noise pollution, nuclear hazards, Solid waste management: causes, effects and control measures of urban and individual wastes Disaster management: floods, earthquake, cyclone and earthquake, cyclone and landslides		10	Understand the factor contributing to environmental pollution, its effects and the importance of taking control measures				1,2,3	
IV	<b>Social issues and the Environment:</b> Water conservation, rainwater harvesting, water management, Climate change, global warming, acid rain, ozone depletion		8	Evaluate the different environmental problems and Importance of awareness				2,3,	
V	<b>Human Population and the Environment</b> Population explosion-Family welfare		10	Understand on the various environmental issues which				1,2,4,5	

	Programme, Environment and human health, Women and child welfare, Role of information technology in environment and human health. Biodiversity and its conservation Biodiversity, Conservation of biodiversity Environment and human health. Biodiversity and its conservation, Biodiversity Conservation of biodiversity, Biological, classification of India India as a mega diversity nation , Endangered and endemic species of India		Are arising issues which are arising increased human populations.	
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**TEXT BOOKS:**

1. Textbook of environmental studies by Erach Bharucha,UGC.
2. A textbook of environmental studies byDKAsthana, MeeraAsthana, SChand.
3. Environmental studies by RB Singh, Dr. DKThakurandDr.JPSChauhan.
4. Perspective in environmental studies by Anubha Loushik,CPKaushtik.

**REFERENCE BOOKS:**

1. Textbook of environmental studies by Erach Bharucha,UGC.
2. A textbook of environmental studies by D K Asthana, Meera Asthana,SChand.
3. Environmental studies by RB Singh, Dr.DK Thakur and Dr.JPSChauhan.
4. Perspective in environmental studies by Anubha Loushik,CPKaushtik.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Discuss the importance of Environment Studies and the need for public awareness	5,6,8&9
2	Identify natural resource, its importance, and its impacts on the environment.	2&8
3	Explore in-depth knowledge on concept of environmental pollution.	2,3&9
4	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.	8,9
5	Explain various environmental pollution and its impact on human and ecosystem.	1,2,3,8&9

<b>SEMESTER – III</b>																	
<b>Course Title</b>	<b>ENGLISH LANGUAGE PROFICIENCY (Communicative English &amp; Soft Skills)</b>																
<b>Course code</b>	<b>22UBPD211R</b>	<b>Total credits:</b>	<b>1</b>	<b>L</b>	<b>0</b>	<b>T</b>	<b>0</b>	<b>P</b>	<b>2</b>	<b>S</b>	<b>0</b>	<b>R</b>	<b>0</b>	<b>O/F</b>	<b>0</b>	<b>C</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>														
<b>Programme</b>	<b>Bachelor of Medical Laboratory Technology</b>																
<b>Semester</b>	<b>Fall/ III semester of second of the programme</b>																
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To enable students to learn and comprehend about the proficiency of the English language.</li> <li>2. To improve the writing skill of the learners and enable them to prepare CV and cover letter for professional development.</li> <li>3. To evaluate certain attributes in a candidate that can be otherwise difficult for time consuming to a certain</li> </ol>																
<b>CO1</b>	It will develop their writing skills through various techniques of language use.																
<b>CO2</b>	It will enable the learners to manage behaviors, thoughts, and emotions in a conscious and productive way.																
<b>CO3</b>	It will develop their critical thinking ability and develop an independency in their professional career.																
<b>CO4</b>	Develop the ability to comprehend and respond appropriately to spoken English in various contexts.																
<b>CO5</b>	Enhance reading skills for understanding and analyzing texts from diverse genres.																
<b>UnitNo.</b>	<b>Content</b>		<b>Contact Hour</b>	<b>Learning Outcome</b>			<b>K</b>	<b>L</b>									
<b>I</b>	<b>Grammar</b> i. Use of Prepositions ii. Tag Questions.		<b>6</b>	Basics of grammar			<b>1,2</b>										
<b>II</b>	<b>Grammar</b> i. Active and Passive Voice ii. Direct and Indirect Speech.		<b>2</b>	Introduction of grammar			<b>1,2</b>										
<b>III</b>	<b>Writing Skills</b> i. The Basics of Writing; avoid ambiguity and vagueness ii. Paragraph Writing iii. Resume, CV and Cover Letter		<b>8</b>	Learn about writing skills			<b>1,2</b>										
<b>IV</b>	<b>Self-Management Skills</b> i. SWOT Analysis ii. Goal Setting iii. Personal Hygiene		<b>8</b>	Introduction of self-Management skill			<b>1,2</b>										

<b>V</b>	Non-Verbal Communication- Sciences of Body Language i. What is Non-omy/careerhelp Verbal /top-Communication & groupdiscussion Body Language, ii.skills Types of Body Language, iii. Importance and Impact of Body Language	<b>10</b>	Learn about Body languages	1,2
<b>VI</b>	Group Discussion (Theory) i.Importance, ii. Planning, Elements, and Skills assessed; iii. Effectively onskills disagreeing, iv. Summarizing and Attaining the Objective	<b>8</b>	Basic of group discussion	

#### TEXT BOOKS:

- T1. Lata, P. Kumar, S. (2015). *Communication Skills, Second Edition*. India: Oxford University Press.  
T2. Barrett, Grant. 2016. *Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking*. Zephyros Press.  
T3. Mc Dowell, Gayle Laakmann. 2008. *Cracking the Coding Interview (Indian Edition)*

#### REFERENCE BOOKS:

- R1. Zinsser, William. (2006) *On Writing Well: The Classic Guide to Writing Non fiction*, Harper Perennial  
R2. Lacinai, Antonio. (2016) *Understanding Body Language: 51 gestures and what they signal*, Books on Demand.

#### OTHER LEARNING RESOURCES

- <https://learning.shine.com/talenteconomy/career-help/top-group-discussion-skills/>  
<https://www.thoughtco.com/what-is-nonverbal-communication-1691351>

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	It will develop their writing skills through various techniques of language use.	1,6,7
2	It will enable the learners to manage behaviors, thoughts, and emotions in a conscious and productive way.	1,6,7
3	It will develop their critical thinking ability and develop an independency in their professional career.	1,6,7

<b>4</b>	Develop the ability to comprehend and respond appropriately to spoken English in various contexts.	<b>1,6,7</b>
<b>5</b>	Enhance reading skills for understanding and analyzing texts from diverse genres.	<b>1,6,7</b>

**SEMESTER – III**

<b>Course Title</b>	<b>BASIC ACCLIMATIZING SKILLS</b>								
<b>Course code</b>	<b>22UULS201R</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 20</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ III semester of second of the programme</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To impart knowledge of the fundamentals of Hospitality industry and its applications.</li> <li>2. Students will be able to familiarize with the cooking equipment &amp; Utensils.</li> <li>3. Students will be able to handle different modes of reservations</li> </ol>								
<b>CO1</b>	Students will have basic knowledge of cooking methods.								
<b>CO2</b>	Students will gain the knowledge of organizing & Cleaning of Rooms.								
<b>CO3</b>	Students will be able to gain the travel management concept.								
<b>CO4</b>	Students will be able to acquire the knowledge of basic households								
<b>CO5</b>	Students will be able to the physiological and psychological processes involved in acclimatization.								
<b>UnitNo.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>K L</b>	
<b>I</b>	<b>Introduction to Accommodation Management</b> • Telephone handling technique • Organizing of Rooms. • Cleaning agents. • Cleaning equipment and uses. • Bed making Process	<b>6</b>	To acquire knowledge on accommodation Management.					1,2	
<b>II</b>	<b>Fundamentals of Cooking</b> • Definition of cookery– Aim & Objectives of cooking. • Use of basic Cooking equipment's • Personal Hygiene and Safety • Use of Fire & Fuels	<b>6</b>	To acquire knowledge on cooking and personal hygiene and its safety.					1,2	
<b>III</b>	<b>Methods of Cooking Different Cuts.</b> Use of Herbs and Spices. Basic Food and Beverage Preparation. Regional food Habits	<b>6</b>	To acquire knowledge the knowledge of different types of herbs and spices in cooking.					1,2	



<b>IV</b>	<b>Forms &amp; formats</b> C –form Reservation form Registration form Passport Application form Legal Rent Agreement	<b>2</b>	To gain knowledge about forms and formats.	1,2
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#### **TEXT BOOKS:**

T1. Arora K(2011).Theory of cookery, Frank brothers & company (pub) pvt ltd – New Delhi. T2. Bruce H. Axler, Carol A. Litrides (2010) Food and Beverage Service Volume 1 of Wiley Professional Restauranteur, Guides.

#### **REFERENCE BOOKS:**

R1. Mohammed Zulfikar (2010) - Introductions toTourism and Hotel Industry Introduction to Tourism and Hotel Industry. Vikas Publishing.  
R2. Sudhir Andrews (2013) Food and Beverage Service : A Training Manual, Tata Mc Graw Hill,2013

#### **RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME(PO)**

<b>COPO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Students will have basic knowledge of cooking methods.	<b>1,7,8</b>
<b>2</b>	Students will gain the knowledge of organizing & Cleaning of Rooms.	<b>1,7,8</b>
<b>3</b>	Students will be able to gain the travel management concept.	<b>1,7,8</b>
<b>4</b>	Students will be able to acquire the knowledge of basic households	<b>1,7,8</b>
<b>5</b>	Students will be able to the physiological and psychological processes involved in acclimatization.	<b>1,7,8</b>

**SEMESTER – III**

<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>EXTRA CURRICULAR ACTIVITIES</b>								
<b>Course code</b>	<b>22UBEC211</b>	<b>Total credits: 1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ III semester of second of the programme</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To impart knowledge of the fundamentals of Hospitality industry and its applications.</li> <li>2. To enhance specific talents and interests, such as sports, arts, music, drama, and public speaking.</li> <li>3. Develop a sense of responsibility, discipline, and commitment.</li> </ol>								
<b>CO1</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.								
<b>CO2</b>	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.								
<b>CO3</b>	The students will be trained to represent ADTU in various inter university, state and national level competitions.								
<b>CO4</b>	The students will be given a platform to earn from invited experts in their respective fields								
<b>CO5</b>	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics								
<b>UnitNo.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.						1,2		
<b>II</b>	These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.						1,2		
<b>III</b>	Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc						1,2		
<b>IV</b>	The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.						1,2		
<b>V</b>	The student members of the club are trained represent AdtU in various inter University student and national level competitions.								

<b>VI</b>	Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective field			
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**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc	5,7,9
<b>2</b>	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.	5,7,9
<b>3</b>	The students will be trained to represent ADTU in various inter university, state and national level competitions.	5,7,9
<b>4</b>	The students will be given a platform to learn from invited experts in their respective fields.	5,7,9
<b>5</b>	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.	5,7,9

**REFERENCEBOOKS:**

R1: "Extracurricular Activities: Essential Guides for Students" by John G. Gabriel

R2: "Developing Personal, Social and Emotional Skills through Extra-Curricular Activities" by Sally Bailey

**OTHER LEARNING RESOURCES:**

<https://www.prospects.ac.uk/applying-for-university/university-life/the-importance-of-extra-curricular-activities>



Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BMLT211R	Microbiology II	3	3	2	2	0	0	0	2
22BMLT212R	Pathology II	3	2	2	3	2	2	2	1
22BMLT213R	Biochemistry III	3	2	1		3			
22BMLT215R	EVS			2		2	2		3
22BMLT214R	Phlebotomy		3			2		3	2

**SEMESTER – IV**

SEMESTER- IV									
	SEMESTER- IV								
Course Title	MICROBIOLOGY III								
Course code	22BMLT221R	Total credits:	L	T	P	S	R	O/F	C
		Total hours: 48T+96P	3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	BACHELOR MEDICAL LABORATORY TECHNOLOGY								
Semester	FOURTH SEMESTER								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>The candidates undergoing training in medical laboratory technology will learn the techniques of collection of samples, their processing and identification of various pathogens like bacteria using different techniques.</li> <li>The basic knowledge of different diseases caused by various micro-organisms is also imparted.</li> <li>The training is aimed at making the students competent to isolate and identify the causative micro-organisms.</li> </ol>								
CO1	The study will be able to classify parasites and discussing the lifecycle of certain parasites.								
CO2	Understanding different normal flora and colonization								
CO3	Contrasting medically important bacterial pathogen city and laboratory diagnosis								
CO4	To have an understanding on the causative agents of HAIs								
CO5	The students will be able to analyze the different serological tests.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
<b>I</b>	<b>Medical bacteriology:</b> Coryne bacterium diphtheriae Rickettsiae Spirochetes Mycoplasma Chlamydia trachomatis Mycobacterium Clostridium spp	<b>17</b>	Students will be able to understand different medically important bacterial causes, pathogen city and laboratory diagnosis.				1,2		
<b>II</b>	<b>Serological tests:</b> WIDAL, VDRL, ASO, CRP, RIA, RF and ELISA. Rapid test for HIV and HbsAg.	<b>8</b>	Understanding different serological tests and processing.				1,2		
<b>III</b>	<b>Introduction to Medical Parasitology:</b> Introduction and Classification of parasites. Morphology, lifecycle and laboratory diagnosis of: <ul style="list-style-type: none"> <li>- Entamoeba histolytica</li> <li>- Plasmodium</li> <li>- Giardia lamblia</li> </ul>	<b>16</b>	Students will be able to learn important parasites their morphology, life cycle and Laboratory diagnosis.				1,2		

	<ul style="list-style-type: none"> <li>- Balantidium coli</li> <li>- Leishmaniasp.</li> <li>- Trichomonas vaginalis</li> <li>- Toxo plasmagondii</li> </ul>			
<b>IV</b>	<b>Nosocomial infections:</b> Causative agents, transmission methods, prevention and control hospital borne infections.	<b>5</b>	Students will be able to understand the causes of nosocomial infections, transmission and control of HAIs.	1,2
<b>V</b>	<b>Normal microbial flora</b>	<b>2</b>	Understand different normal microbial flora.	1,2
<b>Practical</b>	<b>Blood grouping</b> <b>Serological diagnostic tests</b> WIDAL, VDRL, RPR, ASO,CRP, TPHA, HCG, HIVtridot, HbsAg.	<b>96</b>	Student will be made to learn and understand about blood grouping and serological tests.	1,2,3,4

#### **TEXT BOOKS:**

1. Textbook of Microbiology by CP Baveja,7<sup>th</sup>edition

#### **REFERENCE BOOKS:**

1. Reference: Textbook of microbiology and immunology by S.C. Parija
2. Microbiology by Prescott,Harley,Kleis
3. Textbook of Microbiology by Ananthanarayan and Paniker.

#### **OTHER LEARNING RESOURCES:**

1. <https://www.ncbi.nlm.nih.gov/books/NBK7627/>
2. <https://www.ncbi.nlm.nih.gov/books/NBK546149/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	The study will be able to classify parasites and discussing the life cycle of certain parasites.	<b>1,4</b>
<b>2</b>	Understanding different normal flora and colonization.	<b>1,4</b>
<b>3</b>	Contrasting medically important bacterial pathogenicity and laboratory diagnosis	<b>1,2,3,4</b>
<b>4</b>	To have an understanding on the causative agents of HAIs.	<b>1,2,4</b>
<b>5</b>	The students will be able to analyse the different serological tests.	<b>1,2,3,4</b>





SEMESTER – IV									
<b>Course Title</b>	<b>PATHOLOGYIII</b>								
<b>Course code</b>	<b>22BMLT222R</b>	<b>Total credits: 6</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>3</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Medical laboratory technology</b>								
<b>Semester</b>	<b>Fall/ IV semester of second year of the Programme</b>								
<b>Course Objectives (Minimum 3)</b>	<p>1. Students will be made aware of the composition and methods of estimating different components of urine, body fluids etc.</p> <p>2. Students will understand about various body fluids and the clinical significance of it.</p> <p>3. Students will learn the basic concepts of blood banking &amp; routine clinical investigations including blood banking &amp; donor screening.</p>								
<b>CO1</b>	Discuss on the clinical significance of urine analysis								
<b>CO2</b>	Assessing certain diagnostic methods of stool								
<b>CO3</b>	Explain comprehensive understanding on sputum analysis								
<b>CO4</b>	Analyze various body fluids, formation with different analyzing methods								
<b>CO5</b>	Evaluation on importance of blood banking, donor screening and blood components.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<p><b>Urine Examinations:</b>            Anatomy of urinary system,(Kidney. Ureter, Bladder) functions of kidneys, formation of urine and Clinical importance of urine analysis.            Collection and preservation (preservative) of urine for routine examination and special examination.            Composition of urine, normal and abnormal. Physical, chemical, microscopic and bacteriological examination of urine and clinical importance.            Special examination, Methods etc and its clinical importance of            24hrs.Urineexaminationforproteins.            Occultbloodtest            Pregnancytest            BenceJonesProteins            Urobilinogenetc.</p>	<b>15</b>	Describe, illustrate and explain the normal constituents of urine and their physiological significance and proper techniques for collecting urine samples. Perform and Interpret Routine Urinalysis for diagnosis.				1,2		
<b>II</b>	<p><b>Stool analysis:</b>            Anatomy of GIT and its infection.            Formation of stool            Collection of stools for analysis            Normal composition,            Abnormal composition physical, chemical and micros examination.            Occult blood test</p>	<b>7</b>	Describe, illustrate and explain normal Physiology of GIT and their physiological significance and proper techniques for collecting samples. Perform and Interpret various stool examination				1,2		

	Concentration method of stool examination and Clinical importance.		for diagnosis.	
<b>III</b>	<b>Sputum examination–</b> Collection of specimens Physical examination Microscopic-Gram's stain, Ziehl Neelsen stain for AFB Chemical examination	<b>3</b>	Describe, illustrate and explain the collection and various test for sputum examination for diagnosis.	1,2
<b>IV</b>	<b>Body fluids:</b> Semen analysis Formation of semen Method of collection of semen, Importance and method of semen analysis, motility test, total spermatozoa count. Normal and abnormal morphology of sperms. Medico-legal aspects of specimen analysis b. Pleural fluid, ascetic fluid, pericardial fluid, synovial fluid and cerebrospinal fluid -Collection, sample preparation and processing -Physical examination -Chemical examination -Microscopic examination. Other Body fluids–Amniotic fluid, sweat saliva etc.	<b>10</b>	Describe, illustrate and explain various body fluids their physiological significance and proper techniques for collecting the body fluids samples. Perform and Interpret the samples for diagnosis.	1,2
<b>V</b>	<b>Blood banking and Immune-Hematology</b> i. History of blood group ii. Importance types and iii. Principle of blood grouping v. Blood banking; Requirements iii. Blood components: –separation etc. Clinical importance of all relevant blood banking. iv. Blood components Introduction to Aphaeresis. iv. Methods of ABO blood grouping and Rh Typing vi. Other Blood grouping system vii ABO antibody Titration viii Donor's screening ix. Cross matching, definition, types, methods. x. Coomb's test	<b>13</b>	Describe, illustrate and explain different techniques of staining bone marrow.	1,2

	xi. Transfusion reaction/complication.			
<b>Practical</b>	<p>17. Urine collection for Routine examination Midstream Urine Collection, 24hrs. Urine examination for proteins. Urine R/E-<b>Physical Examination</b>- Color, pH, Specific Gravity. <b>Biochemical Examination</b>- Urine Sugar, Urine Protein, Bile salt, bile pigment Urobilinogen, Occult Blood, Ketone bodies Pregnancy test Bence Jones Proteins. <b>Microscopic Examination.</b></p> <p>2. Fluid-Pleural Fluid examination -Physical, Chemical, Cell count-DLC/TLC, -Bacteriological</p> <p>3. Cerebrospinal Fluid (CSF) examination Physical, Chemical, Cell count-DLC/TLC, -Bacteriological</p> <p>4. Synovial fluid examination Physical, Chemical, Cell count-DLC/TLC, -Bacteriological</p> <p>5. Peritoneal/Pericardial Fluid examination Physical, Chemical, Cell count-DLC/TLC, -Bacteriological</p> <p>6. Semen analysis Physical Examination, Chemical examination, Sperm count, Motility, Morphology study etc</p> <p>7. Stool analysis.</p> <p>8. Sputum analysis.</p> <p>9. Preparation of Blood cells for ABO grouping Preparation of Serum &amp; Cells for reverse grouping.</p> <p>10. Blood grouping Forward grouping - Moist Chamber Slide method and tube method Reverse Grouping-Moist Chamber Slide method and tube method</p> <p>11. Crossmatching</p> <p>12. Donor Screening</p>		Describe, illustrate and explain various techniques to collect the samples and carry out routine, chemical, microscopic examination for diagnosis.	1,2,3,4

**TEXT BOOKS:**

1. Clinical Haematology Principles, procedure, correlations by E. Anne Stiene Martin, Cheryl A. Lotspiech – Steiniger, JohnA.Koepke.

**REFERENCE BOOKS:**

1. Textbook of Medical Lab Technology – Praful B. Godkar, Darshan P. Godkar
2. Clinical Haematology in Medical Practice – de Gruchy
3. Medical Laboratory Technology Methods & interpretation – Ramnik Sood

**OTHER LEARNING RESOURCES:**

<https://vdoc.pub/documents/dacie-and-lewis-practical-haematology-44o9vf6jei70>

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss on the clinical significance of urine analysis	<b>1,4</b>
<b>2</b>	Assessing certain diagnostic methods of stool	<b>2,4</b>
<b>3</b>	Explain comprehensive understanding on sputum analysis	<b>2,4</b>
<b>4</b>	Analyze various body fluids, formation with different analysing methods	<b>6,4</b>
<b>5</b>	Evaluation on importance of blood banking, donor screening and blood components.	<b>2,4,5,8</b>





## **TEXT BOOKS**

1. Biochemistry–U.Satyanarayana,U.Chakrapani Text book Of Medical Biochemistry–MN Chaterjee, Kano Shinde.
- 2.Principle&TechniqueofBiochemistry–SRamakrishnan,K.G.Prasannan,R.Rajan.
  1. Principle&TechniquesofBiochemistry&MolecularBiology–KeithCoilson.
  2. TextbookofMedicalLabTechnology– PrafulB.Godkar, DarshanP.Godkar.
  3. PracticalClinicalBiochemistry–HaroldVarley,4<sup>th</sup>edition.

## **REFERENCE BOOKS:**

1. Biochemistry–U.Satyanarayana,U.Chakrapani.
2. Textbook of Medical Biochemistry–MN Chaterjee,KanoShinde.
3. Principle&TechniqueofBiochemistry–S Ramakrishnan,K.G.Prasannan,R.Rajan.
4. Principle & Techniques of Biochemistry & Molecular Biology–KeithCoilson.
5. Textbook of Medical Lab Technology– PrafulB.Godkar, DarshanP. Godkar.
6. Practical Clinical Biochemistry–HaroldVarley,4<sup>th</sup>edition



**OTHER LEARNING RESOURCES:**

file:///C:/Users/DELL/OneDrive/Desktop/biochemistry/Textbook%20of%20Medical%20Biochemistry%  
2

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Correlating fluid distribution in body with its influencing factors.	<b>1,2&amp; 4</b>
<b>2</b>	Explain metabolism of important minerals.	<b>1,2</b>
<b>3</b>	Evaluate the mechanism action of hormones.	<b>1,2,4</b>
<b>4</b>	Classify vitamins and their disorders.	<b>1,2</b>
<b>5</b>	Analyze the working principle of modern laboratory technique.	<b>1,3</b>

**SEMESTER – IV**

SEMESTER – IV										
Course Title		BASIC COMPUTER SCIENCE								
Course code	22BMLT224R	Total credits: 4		L	T	P	S	R	O/F	C
		Total hours: 45T+30P		1	0	2	0	0	0	2
Pre-requisite	Nil	Co-requisite		Nil						
Programme	BACHELORMEDICALLABORATORYTECHNOLOGY									
Semester	Fall/ I semester of first year of the Programme									
Course Objectives (Minimum 3)	4. Students become familiar with the basics in operating computer 5. Introduce fundamental concepts of computer hardware and software. 6. Proficiency in using common computer applications and tools.									
CO1	Determine the characteristics of computer and acquirement of input and output devices.									
CO2	Contrasting CPU and storage devices.									
CO3	Outline the features and operation of windows.									
CO4	Describe the basic knowledge of Microsoft office.									
CO5	Understanding applications of Internet.									
Unit-No.	Content			Cont act Hour	Learning Outcome				KL	
I	<b>Introduction to computer:</b> Introduction, characteristics of computer, block diagram of computer ,generations of computer, computer languages. <b>Input output devices:</b> Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems).			5	Students will understand characteristic of computer, input and output devices				1,2	
II	<b>Processor and memory:</b> The Central Processing Unit (CPU), main memory. Storage Devices: Sequential and direct access devices,magnetic tape,magnetic disk, optical disk, mass storage devices g Unit(CPU), main memory. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.			4	To understand CPU, Storage devices and various discs.				1,2	
III	<b>Introduction of windows:</b> History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows ( <b>opening, closing, moving, resizing minimizing and maximizing, etc.</b> )			2	Students will able to understand features of windows.				1,2	
IV	Microsoft Office:  Introduction to MS-Word: Introduction, components of a word window, creating,opening and inserting files, editing a document file, page setting and form atting the text, saving the document, spell checking, printing the document file, creating and editing of table, mailmerge.			3	Understanding operation of MS office.				1,2	

	Introduction to Excel: Introduction, about worksheet, entering information, saving work books and formatting, printing the worksheet, creating graphs. Introduction to power-point: Introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs			
V	Internet and its Applications: definition, brief history, basic services(E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW),www browsers, use of the internet. Application of Computers in clinical settings.	2	To be able to learn Internet applications	1,2
Practical	<b>Practical on fundamentals of computers-</b> 1. Demonstration of basic hardware of the computers and laptops. 2. Learning to use MS office: MS word, MS Power Point, MS Excel 3. Data entry efficiency.	32	Describe, illustrate and explain and Demonstration of basic hardware of the computers and laptops. Learning to use MSoffice and Data entry.	1,2,3,4

#### TEXT BOOKS:

1. C.S.French“BataProcessingandInformationTechnology”,BPBPublications1998
2. P.K.Sinha“ComputerFundamentals”,BPBPublication1992
3. GaryBShellyandThomasJ.Cashman,“EssentialIntroductiontoComputers”,CourseTechnology
4. EdwardK.Blum,AlfredVAho,“ComputerScience:TheHardware,SoftwareandHea  
rtofit”,SpringerPublication.

#### REFERENCE BOOKS:

1. C.S.French“BataProcessingandInformationTechnology”,BPBPublications1998
2. P.K.Sinha“Computer Fundamentals”,BPBPublication1992
3. GaryBShellyandThomasJ.Cashman,“EssentialIntroductiontoComputers”,CourseTechnology
4. EdwardK.Blum,AlfredVAho,“ComputerScience:TheHardware,SoftwareandHea  
rtofit”,SpringerPublication.

#### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/?term=basic+computer+sciences>

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Determine the characteristics of computer and acquirement of input and output devices.	1,3 & 4
2	Contrasting CPU and storage devices.	1,2
3	Outline the features and operation of windows.	7,9,10
4	Describe the basic knowledge of Microsoft office.	5,7
5	Understanding applications of Internet.	5,8

SEMESTER – IV									
Course Title	Laboratory Responsibilities and Multitasking Skills								
Course code	22BMLT225R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 16	0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Medical Laboratory Technology								
Semester	Even/ IV semester of second year of the Programme								
Course Objectives (Minimum 3)	<p>The students will be taught about the basics of medical laboratory, its branches and functions along with laboratory responsibilities.</p> <p>The students will be introduced with the basic idea of different branches and functions of a medical laboratory, code of conduct, laboratory equipment with cleaning methods, different types of clinical samples and preparation methods in laboratory.</p>								
CO1	Understand the responsibilities of technician and functions of different branches.								
CO2	Recognition on laboratory code of conduct.								
CO3	Determine the uses and cleaning methods of common laboratory equipment.								
CO4	Illustrate the process of preparation and uses of reagents.								
CO5	Analyze to improve their skills on collection and preparation of various samples.								
Unit-No.	Content	Contact Hour	Learning Outcome						KL
I	<b>Introduction of Medical Laboratory</b> Introduction of Medical laboratory technology, Responsibilities of Laboratory technician, Branches of Medical laboratory,	4	<b>Analyze</b> the various responsibilities of a laboratory technician and branches of Medical Laboratory.						1, 2,3
II	<b>Code of Conduct and laboratory safety</b> Laboratory code of conduct Different lab safety measures	3	<b>Apply</b> the principles of the laboratory code of conduct by <b>demonstrating</b> professional behavior						2,3
III	<b>Introduction of common laboratory equipments</b> Introduction and uses of glass wares, plastic wares and microscope Cleaning methods of glass wares	4	<b>Describe</b> the various types of glassware, and microscopes used in the laboratory with their cleaning methods.						1,3
IV	<b>Preparation of reagents</b> Preparation and use of Sodium/ Potassium hypochlorite Preparation and use of normal saline	3	<b>Demonstrate</b> the uses of various laboratory and medical applications, ensuring proper handling and storage techniques.						1, 3
V	<b>Sample collection and preparation</b> Types of samples Labeling, record maintenance, sample preparation	2	<b>Demonstrate</b> proper techniques for labeling samples, maintaining accurate records, and preparing samples for analysis.						2, 3

**TEXTBOOKS:**

- MLT methods and Technology by Ramnik Sood.
- Text book of MLT by Praful B.Godkarand Darshan P.Godkar.

**REFERENCEBOOKS:**

- MLT methods and Technology by Ramnik Sood.
- Textbook of MLT by Praful B. Godkar and Darshan P.Godkar

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Understand the responsibilities of technician and functions of different branches.	1,5,7,8
2	Recognition on laboratory code of conduct.	5,7,8
3	Determine the uses and cleaning methods of common laboratory equipment.	3,4,5,7,8
4	Illustrate the process of preparation and uses of reagents.	1,2,4
5	Analyse to improve their skills on collection and preparation of various samples.	1,2,4

SEMESTER – IV									
Course Title	Personality development skill for employability (communicative English and soft skills)								
Course code	22UBPD221R	Total credits: 2 Total hours: 45T	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	2
Prerequisite	English Language proficiency	Co-requisite	Nil						
Programme	BACHELOR MEDICAL LABORATORY TECHNOLOGY								
Semester	Autumn/ IV semester of second year of the programme								
Course Objectives	1. To enable the students for effective presentation. 2. To presentations to find new, innovative ways of developing and managing people. 3. To boost their confidence through self-reflection and mock interview techniques.								
CO1	It will prepare the learners to speak with greater control and charisma in front of others.								
CO2	It will have a positive impact in their thought process and problem-solving skills.								
CO3	It will enable students to prepare a professional resume and present themselves in an effective manner.								
CO4									
CO5									
Unit No.	Content	Contact Hour	Learning Outcome					K L	
I	<b>Presentation Skills</b> i. Introduction ii. Essential characteristics of a good presentation iii. Preparation of a good presentation	8	Introduction to skills					1,2,3	
II	<b>Public Skills</b> i. Fear of Public Speaking, ii. Understanding and Overcoming Fear of Public Speaking, iii. Confidence and Control, iv. Tips for Presentations and Public Speaking, iv. Tips for Using Visual Aids in Presentations, v. Delivering Presentation successfully, vii Double Clearing and Summary of Main Points	8	Learn about public skills					1,2,3	
III	Practical session on Resume, Curriculum Vitae, writing cover letter & Linked In	8	Know about Preparation, submission &					2,3,4	

	Profile Preparation, submission & screening of Resume. Practical session on cover letter screening session Creating profile in LinkedIn iv. How to utilize it.		screening of Resume	
<b>IV</b>	<b>Leadership &amp; Management Skills</b> i. Concepts of Leadership ii. Leadership Styles iii. Manager VS Leader iv. How to be an Effective Leader v. Doubt Clearing Session	<b>10</b>	Know about Concepts of Leadership	1,2,3,4
<b>V</b>	<b>Interview Skills &amp; Dress code Ethics</b> i. Types of interviews- telephonic, virtual & face to face ii. Online interview, personal interview iii. Panel interview iv. Group interview v. Types of interview questions- traditional / common interview question vi. General Strategies for answering questions, vii. Preparation before the interview, viii. How to dress up for an interview, ix. How to maintain eye contact and positive body language x. Interview does and don'ts, xi. Introduction to Dress Code Ethics xii. Purpose and Importance What Wear During Interviews or Any Other Formal Meetings	<b>10</b>	Learn about interview skills	1,2,3,4
<b>VI</b>	<b>Mock Interview</b> i. Practical Mock Interview, ii. Feedback – Receiving Feedback, iii. Giving Feedback, iv. Advantages of Effective Feedback, how to deal with negative feedback	<b>6</b>	Knowledge on mock interview	2,3,4

**TEXT BOOKS:**

- T1- Wren, P. C and Martin, H. 1995. High School English Grammar and Composition, S Chand Publishing.  
T2- Barrett, Grant. 2016. Perfect English Grammar : The Indispensible Guide to Excellent Writing and Speaking, Zephyros Press.

**REFERENCE BOOKS:**

- R1-Patil, Shailesh. (2020) Handbook on Public Speaking, Presentation & Communication Skills : Principles & Practices to create high impact presentations & meaningful conversations, Notion Press  
T2- Weiser, Ryan, (2021) Winning Interview: An Ultimate Guidebook of Tricks, Strategies and Tips on Interview Preparations and Answering Questions to Get the Job You Want! : 1(Job Interview), Charlie Creative Lab Ltd Publishes

**OTHER LEARNING RESOURCES:**

<https://www.youtube.com/watch?v=YY2yjEEoB3U><https://www.youtube.com/watch?v=ADJAcYTq1us>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
It will prepare the learners to speak with greater control and charisma in front of others.	<b>6,8</b>
It will have a positive impact in their thought process and problem-solving skills.	<b>6,8</b>
It will enable students to prepare a professional resume and present themselves in an effective manner.	<b>6,8</b>



		SEMESTER – IV							
Course Title		Introduction to Financial Budgeting and Planning							
Course code	22UUFL201R	Total credits: 2 Total hours: 45T	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	2
Prerequisite	Compulsory	Co-requisite	Nil						
Programme	BACHELOR OF MEDICAL LABORATORY TECHNOLOGY								
Semester	Autumn/ IV semester of second year of the programme								
Course Objectives	1. To create awareness among students about the need for possessing financial literacy education. 2. Identification of money as a working asset. 3. Impart the ability to make better financial decisions								
CO1	The students would be able to understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.								
CO2	The students would be able to understand the need and various kind of banking institutions' instrument and their utilities.								
CO3	The student would be able to describe the importance of insurance services as social security measures.								
CO4	The student would be able to manage the money and debt more effectively								
Unit No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Introduction:</b> Meaning, need and importance of Financial Literacy; Different components of Financial Literacy; Prerequisites of financial literacy; Savings – Meaning and Difference between savings and investment; Types of Financial Institutions and the services provided - Banking and Non- Banking; Different investment avenues.		5	To learn about the financial literacy				1,2,3	
II	<b>Financial Planning:</b> •Meaning, need and importance for financial planning. •Economic needs, balancing between economic need and resources. •Three pillars of investments - risk, return, liquidity. •Budgeting and its importance in financial planning; •Steps involved in Financial		10	To learn about the financial planning, economic needs and investments and budgeting.				1,2,3	

	<p>Planning Process. Preparation of personal budgets, budget surplus and budget deficit, avenues for savings from surplus, sources for meeting deficit.</p> <ul style="list-style-type: none"> <li>• Informal Society funds and crowdfunding</li> </ul>			
<b>III</b>	<p><b>Banks &amp; Post Office - As financial service provider:</b></p> <ul style="list-style-type: none"> <li>• Meaning and evolution of money</li> <li>• Banks – meaning, types &amp; functions; types of accounts; Formalities to open various accounts.</li> </ul> <p>Different types of Post Office saving schemes: Recurring deposit, savings, term deposit; NSC; KisanVikas Patra; Monthly Income scheme (MIS) Account</p> <ul style="list-style-type: none"> <li>• Public Provident Funds (PPF), Senior citizen savings scheme (SCSS), SukanyaSamriddhi Accounts,</li> <li>• Indian Postal Order; International Money transfer service; Forex Services; Money remittance services; Jansuraksha Scheme.</li> </ul>	<b>10</b>	To understand the knowledge about different types of banks.	1,2,3,4
<b>IV</b>	<p><b>Insurance - As financial service provider:</b></p> <ol style="list-style-type: none"> <li>Different types of Risks and their Management, Diversification of risk;</li> <li>Meaning, need and importance of Insurance;</li> <li>Types of Insurance – Life Insurance, Health Insurance, General Insurance, Term Insurance,</li> <li>Pension and retirement policies;</li> <li>Post office life insurance schemes,</li> <li>Postal life insurance and</li> </ol>	<b>10</b>	To acquire the knowledge about different types of insurance company.	1,2,3,4

	rural postal life insurance			
<b>V</b>	<b>Transformations in Digital Money market:</b> <ol style="list-style-type: none"> <li>i. Various functions &amp; innovative services of Banks; Mobile Banking, NEFT, IMPS, RTGS, Money transfer, Different types of cards- Debit &amp; Credit, E- Banking, Unified payment interface (UPI),</li> <li>ii. Credit Scoring - CIBIL, Digital Banking, crypto currency and related transactions, Fintech, Block chain; Understanding Digital Payments</li> </ol>	<b>10</b>	To acquire the knowledge about the Various functions & innovative services of Banks.	1,2,3,4

#### **TEXT BOOKS:**

T1- The Young Adult's Guide to Financial Success – How To Manage Your Money& Live Better On Less By Edward M. Wolpert

T2-Financial Freedom with Financial Control by Jagmohan Singh Pendown Press

T3- The Richest Man in Babylon (DeluxeHardboundEdition) by George S. Clasonixia Press Garden City, NewYork, Ships from and sold by MG BOOKS.

#### **REFERENCE BOOKS:**

R1- Financial literacy to financial planning by Dr. Purvi Kothari and Mr. Keyur Mehta Nexus Publications Surat Gujarat

R2- Ernst & Young's Personal Financial Planning Guide: Take Control of Your Future and Unlock the Door to Financial Security by Ernst & Young, Robert J. Garner, Robert B. Coplan, Barbara J. Raasch, Charles L. Ratner

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
The students would be able to understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.	<b>6,7</b>
The students would be able to understand the need and various kind of banking institutions' instrument and their utilities.	<b>7</b>
The student would be able to describe the importance of insurance services as social security measures.	<b>5</b>
The student would be able to manage the money and debt more effectively	<b>8</b>

SEMESTER – IV									
Course Title	Basic Life Saving Skills								
Course code	22UULS202R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	BACHELOR OF MEDICAL LABORATORY TECHNOLOGY								
Semester	Autumn/ IV semester of second year of the programme								
Course Objectives	1. The aim of the course is to provide the learners with basic knowledge and practical skills needed in an emergency fire situation, and to provide appropriate basic management and treatment for injuries.								
<b>CO1</b>	The students will be able to recognize respiratory arrest/cardiac arrest, and provide oxygen to the patients to sustain tissue viability.								
<b>CO2</b>	The students will be able to perform the importance of early CPR on Adult, child and infants' victims.								
<b>CO3</b>	The students will be able to perform the basic steps to relive choking for responsive and unresponsive victims								
<b>CO4</b>	The students will be able to prevent injury from getting worse, aid in recovery, relieving pain and protecting the victims from deterioration.								
<b>CO5</b>	The students will be able to learn about the fire equipment requirements, methods of operation and getting out alive.								
Unit No.	Content		Contact Hour	Learning Outcome				KL	
<b>I</b>	<b>Basic Life Support (BLS)</b> • Introduction of BLS • Chain of survival • ABCs Assessment • CPR and Ventilation Technique • AED Choking for adult and children		<b>4</b>	To learn the knowledge about basic survival skills.				1,2	
<b>II</b>	<b>First Aid</b> • Golden rules of First aid First aid Kits		<b>4</b>	To acquire the knowledge about the golden rules of first aid.				1,2,3,4	
<b>III</b>	<b>Trauma emergencies</b> •Introduction •Priorities of Initial approach in prehospital care a) Scene safety b) Primary assessment c)Bleeding control d)Extrication of victims and safe transfer e) Cervical spine stabilization and C-collar application Splinting of broken Limbs		<b>4</b>	To learn the knowledge about the handling of trauma patients and patient safety.				1,2,3,4	

<b>IV</b>	<b>Tri age system</b> •Introduction •Flow chart approach of Triage Triage of Single and Multiple Casualties in Pre- Hospital setting	<b>4</b>	To learn the knowledge about the Triage system.	1,2,3,4
<b>V</b>	<b>Medical emergencies</b> •Introduction •Victim cantered approach and Management of: - a) Seizures b) Heart attack c) asthma d)diabetic emergencies e) emergency childbirth Respiratory distress and failure	<b>4</b>	To acquire the knowledge on the approach to medical emergencies.	1,2,3,4
<b>VI</b>	<b>Environmental Emergency</b> •Recognizing and caring for heat related illness such as: Heat stroke, heat cramps, heat exhaustion, dehydration. •Recognizing and caring for cold related illness such as frostbite, hypothermia. Poisoning, Snakebite.	<b>2</b>	To acquire the knowledge on the illness and treatment.	1,2,3,4
<b>VII</b>	<b>Safety of people in the event of fire</b> •Recognition of possible fire sources and emergency procedures, construction techniques for eliminating fire. •Types of detecting devices and extinguishing agents and systems • Devising procedures in the event of fire and react to fire danger. Safety goals and objectives, Identifying hazards and risks	<b>2</b>	To acquire the knowledge on identifying the hazards and safety measures.	1,2,3,4

### TEXT BOOKS:

T1- Nancy Caroline's Emergency Care in the streets eight edition by Jones and Bartlett

T2- First Aid book by LC Gupta; Publisher Jay pee Brothers, 7thEdition.

T3- Advance Cardio vascular life support and Basic life support provider manual@ American Heart Association (AHA)

## REFERENCE

1. Nancy Caroline's Emergency Care in the Street, 8th Edition by Jones and Bartlett
2. First Aid book by LC Gupta; Publisher Jaypee Brothers, 7<sup>th</sup> Edition.

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>	
<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
The students will be able to recognize respiratory arrest/cardiac arrest, and provide oxygen to the patients to sustain tissue viability.	<b>1,2,6,7</b>
The students will be able to perform the importance of early CPR on Adult, child and infants' victims.	<b>1,2</b>
The students will be able to perform the basic steps to relieve choking for responsive and unresponsive victims	<b>7</b>
The students will be able to prevent injury from getting worse, aid in recovery, relieving pain and protecting the victims from deterioration.	<b>1,6,7</b>
The students will be able to learn about the fire equipment requirements, methods of operation and getting out alive.	<b>1,3</b>

SEMESTER – IV									
Course Title	Extra-curricular								
Course code	22UBEC221	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 15T	0	0	0	4	0	0	1
Prerequisite	Compulsory	Co-requisite	Nil						
Programme	BACHELOR OF MEDICAL LABORATORY TECHNOLOGY								
Semester	Autumn/ IV semester of second year of the programme								
Course Objectives	It is to develop the social and soft skills and to promote a holistic development of the learners.								
<b>CO1</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.								
<b>CO2</b>	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.								
<b>CO3</b>	The students will be trained to represent ADTU in various inter university, state and national level competitions.								
<b>CO4</b>	The students will be given a platform to learn from invited experts in their respective fields.								
<b>CO5</b>	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest. These activities are aimed to develop the social and soft skills and promote a holistic development of the learners. Keeping in mind the 360-degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc. The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies. The student members of the club are trained represent AdtU in various inter University student and national level competitions. Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective field								



### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc	5,7,9
2	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.	5,7,9
3	The students will be trained to represent ADTU in various inter university, state and national level competitions.	5,7,9
4	The students will be given a platform to earn from invited experts in their respective fields.	5,7,9
5	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.	5,7,9

SEMESTER – IV									
Course Title	Co-curricular								
Course code	22UBCC221	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Prerequisite	Compulsory	Co-requisite	Nil						
Programme	BACHELOR OF MEDICAL LABORATORY TECHNOLOGY								
Semester	Autumn/ IV semester of second year of the programme								
Course Objectives	<p>Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.</p> <p>Co-curricular activities facilitate in the development of various domains of mind and personality such as intellectual development, emotional development, social development, moral development and aesthetic development. Creativity, Enthusiasm, and Energetic, Positive thinking are some of the facets of personality development and the outcomes of extracurricular activities.</p>								
Unit No.	Content	Contact Hour	Learning Outcome				K	L	
I	<p>The institute provides the opportunity to the teacher trainees to participate in various activities for their overall development. The institute conducts Seminars and Workshops, Guest Lectures, Essay writing, projects, general knowledge debates, quiz and discussion on current affairs, Discussion on social justice, National Days Celebrations, Assembly, Weekly meetings and Value Education programme, and also organize Dance, Dramatics, Singing competitions. Games and Sports are compulsory for all the students. Provision has, therefore been made for games and sports in college. The college will have unit of N.S.S. and will also give the opportunity to students to participate in it.</p>								

SEMESTER – IV									
Course Title	MOOCS								
Course code	MOBMLSW223	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Prerequisite	NIL	Co-requisite	NIL						
Programme	BACHELOR MEDICAL LABORATORY TECHNOLOGY								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. Equip students with a thorough understanding of the course material through engaging online content. 2. Provide hands-on experience through interactive exercises and real-world projects. 3. Promote effective communication and teamwork through online discussions and group activities.								
CO 1	Demonstrate strong grasp of key principles and theories covered in the course.								
CO 2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO 3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO 4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO 5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate strong grasp of key principles and theories covered in the course.	7.8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7.8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7.8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7.8
5	Demonstrating strong collaboration and teamwork skills..	7.8

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
<b>22BMLT221R</b>	Microbiology iii	3	2	2	3	0	0	0	0	
<b>22BMLT222R</b>	Pathology III	2	3	3	3	1	2	1	2	
<b>22BMLT223R</b>	Biochemistry-iv	3		3	2					
<b>22BMLT224R</b>	Basic computer science			3						3
<b>22BMLT225R</b>	Laboratory Responsibilities and Multitasking Skills				3	2				
<b>22BMLT225R</b>	Techno professional skills iii	2	1	1	3	2		2	2	



**SEMESTER – V**

SEMESTER – V										
Course Title	MICROBIOLOGY -IV									
Course code	22BMLT311R	Total credits: 6		L	T	P	S	R	O/F	C
		Total hours: 48T+96P		3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil							
Programme	Bachelor of Medical Laboratory Technology									
Semester	Fall/ 5 <sup>th</sup> semester of Third year of the Programme									
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. The candidates undergoing training in medical laboratory technology will earn the techniques of collection of samples, their processing and identification of various pathogens like parasite using different techniques.</li> <li>2. The basic knowledge of different diseases caused by various micro-organisms is also imparted.</li> <li>3. The student will be taught about introduction, general characteristics, life cycle and laboratory diagnosis of Helminthology/Helminthicparasites.</li> <li>4. The student will also be taught about introduction, general characteristics, lifecycle and laboratory diagnosis of various medically important Fungi.</li> </ol>									
CO1	To have a comprehensive understanding on parasite and it's classification.									
CO2	To acquire basic knowledge about Mycology.									
CO3	The students will be able to elaborate on the morphology, life cycle, pathogenesis and laboratory diagnosis of pathogen.									
CO4	Introduction to immunology, immunity and its types and classification.									
CO5	Importance of knowing the Antibiotic susceptibility testing in bacteriology.									
Unit-No.	Content			Contact Hour	Learning Outcome				KL	
I	Parasitology (Helminths: Nematodes) Ascaris lumbricoides Wuchereriabancrofti Ancylostomaduodenale Enterobiusvermicularis Trichuristrichiura			16	Describe, illustrate and explain morphology, life cycle of nematodes.				1,2	
II	Parasitology (Helminths: Cestodes & Trematodes) Taeniasolium and Taenia saginata Schistosoma haematobium Fasciolahepatica			8	Describe, illustrate and explain morphology, life cycle of Cestodes and Trematodes.				1,2	
III	Introduction Mycology General properties of fungus Classification: yeast, yeast like fungus, moulds, dimorphic fungus			8	Describe, illustrate and explain properties of fungus and its classification.				1,2	
IV	Immunology Introduction, Structure and function of Immune system. Antigen and Antibodies, Ag-Ab reactions. Hypersensitivity Basic of Autoimmunity and			8	Describe, illustrate and explain the structure and function of immune system, types of antigen and antibodies.				1,2	

	Immunodeficiency.			
<b>V</b>	<p><b>Antibiotic susceptibility testing in bacteriology:</b></p> <p>Definition of antibiotics  Culture medium used for Antibiotic Susceptibility testing  Preparation of inoculums</p> <ul style="list-style-type: none"> <li>• Choice of antibiotics</li> <li>• MIC and MBC: Concepts and methods for determination</li> </ul> <p>Various methods of Antibiotic susceptibility testing.</p>	<b>8</b>	Describe, illustrate and explain the various methods of Antibiotic susceptibility testing, Concepts and methods for determination of MIC and MBC.	1,2
<b>Practical</b>	<p><b>Biochemical tests:</b></p> <p>I. Catalase test  II. Coagulase test  III. Oxidase test  IV. IMViC test  V. TSI test  VI. Sugar utilization</p> <p><b>Stoolexamination:</b></p> <p>Wet Mount preparation  Saline and iodine  Concentration methods  Bacteriological examination of water, air and milk.  -Antibiotic Susceptibility Testing</p>	<b>96</b>	Describe, illustrate and explain and apply staining techniques and carry out microscopic examination.	1,2,3,4

#### TEXT BOOKS:

- 1: Textbook of Microbiology Immunology by Subash Chandra Parija 2<sup>nd</sup> edition.

#### REFERENCE BOOKS:

1. Reference book of Medical Lab Technology – Praful B. Godkar, Darshan P. Godkar 3<sup>rd</sup> edition
2. Ananthanarayan and Paniker, “Textbook of Microbiology 8<sup>th</sup> edition.
- 3: Textbook of Essentials Microbiology Apurba Sankar Sastry, Sandhya Bhat 4<sup>th</sup> edition

#### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>S N</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	To have a comprehensive understanding on parasite and its classification.	<b>1,3,4</b>
<b>2</b>	To acquire basic knowledge about Mycology.	<b>1,3,4</b>
<b>3</b>	The students will be able to elaborate on the morphology, pathogenesis and laboratory diagnosis of pathogen.	<b>1,4</b>
<b>4</b>	Introduction to immunology, immunity and its types and classification.	<b>1,4</b>
<b>5</b>	Importance of knowing the Antibiotic susceptibility testing in bacteriology.	<b>1,3,4</b>



SEMESTER – V									
Course Title	PATHOLOGY-IV								
Course code	22BMLT312R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 48+96=144	3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Medical laboratory Science								
Semester	FIFTH								
Course Objectives (Minimum 3)	1. Understand the microscopic structure of tissues and cells, including normal and pathological changes. 2. Master immune histochemistry, molecular pathology, and other advanced diagnostic methods. 3. Interpret hist pathological findings for accurate diagnoses and contribute to research on disease mechanisms.								
CO1	Understanding basics on cells, tissues and a brief outline on tissue processing.								
CO2	Describe the concept of Microtome knife, its types and functions.								
CO3	Analyze the basic structure of a dye, and concept of special staining techniques.								
CO4	Explain the concept of pigment staining.								
CO5	Illustrate the Immunohistochemistry (IHC) and its relation with cancer biology.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Histo-Cytology:</b> <ul style="list-style-type: none"> <li>Introduction to Cells, Tissues, Outline of methodology</li> <li><b>Fixation</b>-Definition, Classification of fixatives, Details of each fixative</li> <li><b>Tissue Processing</b>- Definition, Grossing, Dehydration, Clearing, Impregnation, Embedding.</li> <li>Paraffin waxes and its properties</li> <li><b>Frozen section studies of tissues</b> - Description of instruments, Utility</li> </ul>	15	Students will identify various tissue types and cells, understand the principles of tissue processing, and recognize the properties of paraffin waxes.				1,2,3		
II	<b>Microtomy:</b> Definition, Microtome knife, Microtome types and its functions, honing and stropping, Blocking, Section cutting, Mounting	7	Students will understand the principles, types, and functions of microtomes, as well as their role in preparing thin tissue sections for microscopic examination				1,2		
III	<b>Staining:</b> Basic structure of a dye, Production of colour, Mechanism of staining, Metachromasia, Progressive and regressive staining, Mordant, Accentuators, Classification of dyes, Preparation of Solvent, <b>Routine staining</b> Haematoxylin& Eosin stains Preparation & compositions, Technique <b>Special stains</b> <ol style="list-style-type: none"> <li>Connective tissue stains- Van Gieson's stain, Masson's trichrome stains, Mallory trichrome stains, Gordon's and sweets methods, Orcein method for</li> </ol>	12	Students will understand the principles, classifications, and practical applications of various stains in histopathology. They'll be able to interpret stained tissue sections effectively.				1,2,3,4		

	elastic fibres, PTAH b) Carbohydrates staining-PAS, Mucicarmine stain c) RNA stain- Fuelgen stain, Unna preparation,			
<b>IV</b>	<b>Pigments and its stains:</b> Endogenous pigments. Eg: Haem pigments, Perl's Prussian blue, Haemozoin pigments, Haematoidin pigments, Bile pigments, Tyrosine pigments, Lipid pigments	<b>7</b>	Students will understand different pigments their origins, staining methods, and its clinical significance.	1,2,3,4
<b>V</b>	<b>Immunohistochemistry (IHC)</b> <b>Cancer Biology</b>	<b>7</b>	Students will understand the concept of cancer; learn Immuno histochemistry and its principles, clinical applications, and the significance of tumor markers.	1,2,3,4
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Labeling of specimen, Filling of forms</li> <li>2. Receiving, entering and labeling and register</li> <li>3. Slide demonstration of different types of cells</li> <li>4. Common instruments for histopathology</li> <li>5. Fixative preparation, Preparations of graded alcohols</li> <li>6. Grossing, role of technicians</li> <li>7. Tissue Processing, Decalcification</li> <li>8. Preparation of blocking and section cutting, staining, mounting and labeling.</li> <li>9. Staining-           <ul style="list-style-type: none"> <li>• Haematoxylin &amp; Eosin stain,</li> <li>• PAS stain</li> <li>• Oil Red O'</li> <li>• Sudan Black stain</li> </ul> </li> <li>Special stains –           <ul style="list-style-type: none"> <li>• Van Gieson,</li> <li>• Masson Fontana trichrome,</li> <li>• Verhoeff's, Field's staining etc.</li> </ul> </li> <li>10. Preservation and museum technique.</li> </ol>		Develop proficiency in all stages of histopathological specimen processing, including specimen labeling, form filling, reception, registration, slide preparation, and demonstration of different cell types.	1,2,3,4,5

### TEXT BOOKS:

T1: Text book of pathology by Harsh Mohan

T2: Medical Laboratory Technology Methods & interpretation – Ramnik Sood

T3: Text book of Medical Laboratory Technology – Praful B. Godkar, Darshan P Godkar.

**REFERENCE BOOKS:**

R1: Bancroft's theory and practice of Histological techniques by S. Kim Suvarna, Christopher Layton, John D. Bancroft.

R2: Histopathology, A self-instructional text by Freida L. Carson.

**OTHER LEARNING RESOURCES:**

<https://doi.org/10.5539%2Fgjhs.v8n3p72>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding basics on cells, tissues and a brief outline on tissue processing.	<b>1, 2, 3</b>
<b>2</b>	Describe the concept of Microtome knife, its types and functions.	<b>2</b>
<b>3</b>	Analyze the basic structure of a dye, and concept of special staining techniques.	<b>2</b>
<b>4</b>	Explain the concept of pigment staining.	<b>2 &amp; 3</b>
<b>5</b>	Illustrate the Immunohistochemistry (IHC) and its relation with cancer biology.	<b>1 &amp; 2</b>

SEMESTER – V									
Course Title	Biochemistry V								
Course code	22BMLT313R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 48T+96P	3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor Medical Laboratory Technology								
Semester	Fall/ v semester of third year of the Programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. This subject shall give information about all the major clinical enzymology and bio markers used for diagnosis.</li> <li>2. The students will learn the details about radioactivity and various organ function test.</li> <li>3. The students will also learn the methods/principles and procedures used to determine the various organ function tests.</li> </ol>								
CO1	Define the relationship of various clinical important enzyme and their role as biomarkers.								
CO2	Recognize the radio activity and its diagnostic importance.								
CO3	Execute the comprehensive knowledge on liver functions.								
CO4	Evaluate the assessment method used to determine renal function.								
CO5	Appraise about the Gastric and Thyroid function tests.								
Unit-No.	Content		Contact Hour	Learning Outcome			KL		
I	<b>CLINICAL ENZYMOLOGY AND BIOMARKERS:</b> Iso enzymes, Lactate dehydrogenase, Creatine kinase, Alkaline phosphatase, Alanine transaminase (ALT), Aspartate transaminase (AST), prostate specific antigen (PSA), Troponin, Acid phosphatases (ACP), Amylase and Lipase, Enzymes as therapeutic agents, Enzymes used for diagnosis. Immobilized enzyme.		10	Students will understand the different metabolic pathways of enzymes and learn the biomarkers.			1,2		
II	<b>RADIOACTIVITY:</b> Introduction, properties of alpha, beta and gamma radiations, radio isotopes, measurement of radioactivity, Radio isotope medicine, radiation hazards, radiation safety and precaution, diagnostic, therapeutic uses of radioisotopes.		10	Understanding on the different properties of radioactive.			2,4		
III	<b>ORGAN FUNCTION TEST:</b> <b>Liver function tests:</b> Functions of Liver, Classification of LFT, Serum bilirubin, Classification of jaundice, Bile acids and bile salts, Tests based on metabolic capacity of liver, Tests based on synthetic function		8	The students will be able to learn and understand the different integrated metabolic pathways of liver.			2, 4, 5		
IV	<b>ORGAN FUNCTION TEST</b> <b>Renal function tests:</b> Functions of kidney, Urea clearance tests, Endogenous creatine clearance tests, Tests for renal blood flow, Test based on tubular function.		7	Students will learn the function of renal			1, 4, 5		

V	<p>ORGANFUNCTIONTEST</p> <p><b>Gastric function tests:</b></p> <p>Test for determining gastric function, Examination of resting contents, Fractional gastric analysis, Histamine stimulation tests.</p> <p><b>Thyroid function tests:</b></p> <p>Tests based on primary function –RIU, PBI<sup>131</sup>. Test based on blood levels of thyroid Hormones–T<sub>3</sub>, T<sub>4</sub>, TSH. Test based on metabolic effects of thyroid hormone, Scanning of thyroid gland</p>	13	Students will be able to understand the gastric function and Thyroid Function	1,3
Practical	<ol style="list-style-type: none"> <li>1. Glucosetolerancetest(GTT)</li> <li>2. Liverfunctiontests</li> </ol> <p>Bilirubin (total,direct,indirect)-SGOT,SGPT</p> <ol style="list-style-type: none"> <li>3. Renal function tests-Urea,Creatinine, Uric acid</li> <li>4. Thyroid function tests (Demonstration) TSH, T<sub>3</sub>, T<sub>4</sub></li> <li>5. Clinical enzymology-LDH,Serum amylase,ALP,ACP</li> </ol>	96	Determine and estimate the various parameters used to assess the liver and kidney's health and its function. Also, the tests used to assess the function of Thyroid gland.	3,4,5

**TEXT BOOKS:**

1. Biochemistry–U.Satyanarayana,U.Chakrapani.
2. Textbook of Medical Biochemistry–MNChaterjee,KanoShinde.
3. Principle and technique of Biochemistry–SRama krishnan,K.G.Prasannan,R.Rajan.
4. Principle & Techniques of Biochemistry & Molecular Biology – KeithCoilson.
5. Textbook of Medical Lab Technology- Praful B.Godkar, Darshan P. Godkar

**REFERENCE BOOKS:**

1. Biochemistry–U.Satyanarayana,U.Chakrapani.
2. TextbookofMedicalBiochemistry–MNChaterjee,KanoShinde.
3. Principle & Technique of Biochemistry – S Ramakrishnan, K.G.Prasannan,R.Rajan.
4. Principle & Techniques of Biochemistry & Molecular Biology – KeithCoilson.
5. Textbook of Medical Lab Technology- Praful B.Godkar, Darshan P.Godkar

**OTHER LEARNING RESOURCES:**

[Fundamentals Biochemistry 4th edition : Free Download, Borrow, and Streaming : Internet Archive](#)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Define the relationship of various clinical important enzyme and their role as biomarkers.	<b>1,2, 4</b>
<b>2</b>	Recognize theradioactivity and its diagnostic importance.	<b>2,3,8</b>
<b>3</b>	Execute the comprehensive knowledge on liver functions.	<b>1,4</b>
<b>4</b>	Evaluate the assessment method used to determine renal function.	<b>2,3&amp;4</b>
<b>5</b>	Appraise about the Gastric and Thyroid function tests.	<b>1,2,3&amp;4</b>

<b>COURSE TITLE</b>	<b>BIO-HAZARD</b>								
<b>COURSE CODE</b>	<b>22BMLT314R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>		<b>CO-REQUISITE</b>							
<b>ANTI-REQUISITE</b>									
<b>PROGRAMMES</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>FIFTH</b>								

<b>COURSE OBJECTIVES:</b>	<ol style="list-style-type: none"> <li>1. Students are taught about the various biomedical wastes, types, and its management.</li> <li>2. The students will also learn about safety measures in the lab and documentation accidental records and information in the laboratory.</li> </ol>
<b>COURSE OUTCOMES:</b>	<p>CO1-Understanding the importance of safety awareness for clinical laboratory personnel and listing the responsibilities of employer.</p> <p>CO2-To Identify the hazards related to handling chemicals, biologic specimens, and radiologic materials and learn about PPE kits.</p> <p>CO3-Students will learn the precautionary measures when working with electrical equipment, cryogenic materials, and compressed gases and avoiding mechanical hazards associated with laboratory equipment.</p> <p>CO4- Students will learn how to select the correct means for disposal of waste generated in the clinical laboratory.</p> <p>CO5-Students will be able to outline the steps required in documentation of an accident in the workplace.</p>

**COURSE DESCRIPTION:**

<b>UNIT-NO</b>	<b>CONTENT</b>	<b>CONTACT HRS</b>	<b>LEARNING OUTCOME</b>	<b>KNOWLEDGE LEVELS</b>
<b>1</b>	<p><b>LABORATORY SAFETY AND REGULATIONS</b></p> <p>Occupational safety and health</p> <p>Safety awareness for clinical laboratory personnel, Signage and labelling</p>	<b>3</b>	Students can learn about the safety measures in laboratory	2,3
<b>2</b>	<p><b>SAFETY EQUIPMENT</b></p> <p>Chemical fume hoods and bio safety cabinets</p> <p>Chemical storage</p> <p>PPE and hygiene</p>	<b>3</b>	Students can learn how to use safety equipments	1,2

3	<p style="text-align: center;"><b>SAFETY</b></p> <p>Biological safety</p> <ul style="list-style-type: none"> <li>• Chemical safety</li> <li>• Radiation safety</li> </ul> <p>Fire safety</p>	4	Students will learn about the different types of safety precaution.	1,3,4
4	<p style="text-align: center;"><b>DISPOSAL OF HAZARDOUS MATERIALS</b></p> <ul style="list-style-type: none"> <li>• Biomedical waste Management, classification, types</li> <li>• Chemical Waste</li> <li>• Radioactive waste</li> </ul> <p>Biohazardous waste</p>	4	Students can understand different waste generated and it's treatment in Health care sector.	2,3,5
5	<p style="text-align: center;"><b>ACCIDENT DOCUMENTATION AND INVESTIGATION</b></p>	2	Student will learn how to maintain the records.	2,3,4

**BOOKREFERENCES:**

1. Text book on biohazard By Jesse Caignou.
2. Textbook of Microbiology by Ananthanarayan and Paniker.
3. Textbook on Biohazard– By Ken Alibek with Stephen Handelman

**REFERENCES:**

Biohazard– By Ken Alibek with Stephen Handelman



<b>COURSE TITLE</b>	<b>LABORATORY MANAGEMENT (DEPARTMENT ELECTIVE)</b>								
<b>COURSE CODE</b>	<b>22BMLT315R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>		<b>CO-REQUISITE</b>							
<b>ANTI-REQUISITE</b>									
<b>PROGRAMMES</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>FIFTH</b>								
<b>COURSE OBJECTIVES:</b>	<ol style="list-style-type: none"> <li>1. Understanding the responsibilities of managing a medical lab.</li> <li>2. Ability to put plans for the established laboratory.</li> <li>3. Demonstrate the ability to apply these plans without losing any rights.</li> </ol>								
<b>COURSE OUTCOME:</b>	<p>CO1-It will provide the basic concept of DO and DON'T in Laboratory.</p> <p>CO2-The students should be able to know how to establish a laboratory managing system.</p> <p>CO3-It will provide the important knowledge on understanding the different bio hazard symbols.</p> <p>CO4-To understand the role of lab personnel in management of the patients. CO5- To understand the basic concepts of MS word, Excel sheets and Email.</p>								

**COURSE DESCRIPTION:**

<b>UNIT- NO</b>	<b>CONTENT</b>	<b>CONTACT HRS</b>	<b>LEARNING OUTCOME</b>	<b>KNOWLEDGE LEVELS</b>
<b>I</b>	Code and conduct of Laboratory	<b>3</b>	Students need to learn DO and DON'T of Laboratory.	1,2
<b>II</b>	Safety symbols of Laboratory	<b>4</b>	Students need to learn about the different safety symbols used in the laboratory.	1,2,3
<b>III</b>	Role of Lab Personnel inpatient Management, soft's skill in patient handling.	<b>4</b>	Students need to learn how to handle the patients.	1,2,3

	Vaccination of technician and post exposure prophylaxis.			
<b>IV</b>	Biomedical waste management	<b>3</b>	Understand Different waste Generated and it's treatment in health care sector.	1,4,5
<b>V</b>	Computer basics, word processing, spreadsheets Data-Base, Email, Lis (Laboratory information system)	<b>2</b>	Students need to understand the basic Concepts of MS word, Excel Sheets and Email to understand.	1,4,5

**REFERENCES:**

1. Laboratory management 4<sup>th</sup> edition–ByDr.DeniseM.Harmening
2. Clinical Diagnosis and management by laboratory methods by John Bernard Henry.
3. Biochemistry–U. Satyanarayana,U.Chakrapani.
4. Laboratory management,quality in Laboratory diagnosis–By CandisA.Kinkus.

**BOOKREFERENCES:**

1. Laboratory management 4<sup>th</sup> edition– ByDr.DeniseM.Harmening
2. Clinical Diagnosis and management by laboratory methods by John Bernard Henry.
3. Biochemistry–U.Satyanarayana,U.Chakrapani.
4. Laboratory management,quality in Laboratory diagnosis–By Candis A.Kinkus.

<b>COURSE TITLE</b>	<b>LABORATORY INSTRUMENTS (DEPARTMENT ELECTIVE)</b>								
<b>COURSE CODE</b>	<b>22BMLT315R</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>		<b>CO-REQUISITE</b>							
<b>PROGRAMMES</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>FIFTH</b>								

<b>COURSE OBJECTIVES:</b>	<p>1. To understand basic instruments used in Laboratory.</p> <p>2. To know the handling and understanding the working principle behind laboratory instruments.</p> <p>3. To understand the importance of calibration of laboratory instruments.</p>
<b>COURSE OUTCOME:</b>	<p>CO1-To have basic concept to n the general instruments used in the laboratory.</p> <p>CO2-Students will get the idea on different type of sterilization methods.</p> <p>CO3-The students will learn the significance of quality control</p> <p>CO4-Students will be able to analyze the working principle behind all the laboratory instruments.</p> <p>CO5-Summarized on automation and importance on its approach.</p>

<b>UNIT-NO</b>	<b>CONTENT</b>	<b>CONTACT HRS</b>	<b>LEARNING OUTCOME</b>	<b>KNOWLEDGE LEVELS</b>
1	Introduction of basic Instruments in laboratory	2	Students can learn the basics like name and use if instruments.	1,2
2	Working principle of the Instruments	4	Students can learn how the instruments Functions.	2,3
3	Maintenance of the Instruments	3	Students can learn how to maintain the instruments	1,2,3
4	Quality control of the instruments	4	Students can learn how to run the QC.	1,2,3

5	Automation of the instruments.	3	Students can learn about there centautomation	1,3,4
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**REFERENCES:**

1. Laboratory Instruments Operation and Maintenance- By Sushant Punekar.
2. Analytical instruments– By Gillian Mc Mahon.
3. Laboratory Instrumentation, 4<sup>th</sup>Edition– By GregoryA. Tetrault and Jerald R.Schenken.

**BOOKREFERENCES:**

1. Analytical instruments– By Gillian Mc Mahon.
2. Laboratory Instrumentation, 4<sup>th</sup>Edition– By Gregory A.Tetrault and Jerald R.Schenken.

<b>COURSE TITLE</b>	<b>CO CURRICULAR</b>								
<b>COURSE CODE</b>	<b>22UBCC311</b>	<b>TOTAL CREDITS:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>		<b>CO-REQUISITE</b>							
<b>PROGRAMMES</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>FIFTH</b>								

<b>COURSE OBJECTIVES:</b>	Co-curricular Activities are enabled to supplement and complement the curricular or main syllabi activities. These are the part and parcel of educational institutions to develop the students' personality as well as to strengthen the classroom learning. Co-curricular Activities have wide horizon to cater to the cultural, social, aesthetic development of the child.
<b>COURSE OUTCOME:</b>	Students will develop effective leadership qualities through practical activities and projects, fostering teamwork and decision-making abilities.
	Students will develop critical thinking skills by analysing complex issues, evaluating evidence, and proposing innovative solutions.
	Students will engage in community service projects or advocacy efforts, promoting social justice, environmental sustainability, and ethical leadership.
	Students will unleash their creative potential by exploring new ideas, experimenting with different mediums
	Through mock interviews and resume workshops, students will enhance their employability and prepare for future career opportunities

<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	Co-curricular activities cover a wide range of experiences and pursuits that complement academic learning. They are typically organized and managed within educational institutions or communities and play a crucial role in holistic development. Some examples are  Sports and Physical Activities Cultural Activities: Academic Clubs and Competitions Community Service and Volunteering Leadership and Personal Development Creative and Hobby-based Activities	<b>60</b>	Skill Development: Enhancing skills such as teamwork, leadership, communication, and critical thinking. Holistic Growth: Supporting emotional, social, and physical development alongside academic learning. Building Networks: Creating opportunities to interact with peers, mentors, and professionals. Personal Fulfillment: Providing avenues for creativity, self-expression, and exploring personal interests.	1,2

	<b>SEMESTER – V</b>								
<b>COURSE TITLE</b>	<b>EXTRA CURRICULAR ACTIVITIES</b>								
<b>COURSE CODE</b>	<b>22UBEC311</b>	<b>TOTAL CREDIT :1</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>
		<b>TOTAL HOURS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>PRE-REQUISITE</b>	<b>COMPULSORY</b>	<b>CO-REQUISITE</b>	<b>NIL</b>						
<b>Programme</b>	<b>BACHELOR MEDICAL LABORATORY TECHNOLOGY</b>								
<b>SEMESTER</b>	<b>Fall / V semester of third year of the programme</b>								
<b>COURSE OBJECTIVE</b>	It is to develop the social and soft skills and to promote a holistic development of the learners.								
<b>CO1</b>	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc								
<b>CO2</b>	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.								
<b>CO3</b>	The students will be trained to represent ADTU in various inter university, state and national level competitions.								
<b>CO4</b>	The students will be given a platform to earn from invited experts in their respective fields.								
<b>CO5</b>	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics								
<b>Sl no</b>	<b>COURSE CONTENTS</b>								
1	AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.								
2	These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.								
3	Keeping in mind the 360-degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.								
4	The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.								
5	The students' members of the club are trained represent AdtU in various inter University student and national level competitions.								
6	Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective field.								

SEMESTER – V									
Course Title	MOOCS								
Course code	MOBMLSW314	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Prerequisite	NIL	Co-requisite	NIL						
Programme	BACHELOR MEDICAL LABORATORY TECHNOLOGY								
Semester	V semester of second year of the programme								
Course Objectives (Minimum 3)	<p>1. Equip students with a thorough understanding of the course material through engaging online content.</p> <p>2. Provide hands-on experience through interactive exercises and real-world projects.</p> <p>3. Promote effective communication and teamwork through online discussions and group activities.</p>								
CO 1	Demonstrate strong grasp of key principles and theories covered in the course.								
CO 2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO 3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO 4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO 5	Demonstrating strong collaboration and teamwork skills..								

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BMLT311R	Microbiology-IV	3	3	3	3	0	0	0	0
22BMLT312R	PATHOLOGY-IV	3	2	3	3	1	2	1	1
22BMLT313R	Biochemistry v	3	2	3	2				





SEMESTER – VI									
Course Title	Microbiology-V								
Course code	22BMLT321R	Total credits: 3 Total hours:	L	T	P	S	R	O/F	C
			3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Even/VI semester of third year of the Programme								
Course Objectives (Minimum 3)	<p>1. The student will be taught about introduction, general characteristics, morphology, pathogenesis, and laboratory diagnosis of various medically important viruses.</p> <p>2. It will sensitize them in basic infection, prevention &amp; control with knowledge of bio-medical waste management and bacteriological examination of water, milk, food, and air.</p> <p>3. The student will be taught about common infection like UTI and Pyrexia and its diagnostic approach.</p>								
CO1	It will give an introduction on the concept and classification of viruses and fungus								
CO2	Understanding the process of sample collection and transport processing								
CO3	An outline on diagnostic approach to viral and fungal infection								
CO4	Students will learn how to implement the importance of Biomedical Waste Management								
CO5	Summary about common infection like UTI and pyrexia and its diagnostic approach.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
<b>I</b>	<b>General virology:</b> Introduction and classification of viruses HIV Hepatitis virus Rabies virus Dengue virus Influenza and Para influenza virus Chikungunya Polio Toga/Flavi viruses	<b>15</b>	Describe the basic introduction and classification on virology and discuss about the common viruses that causes various viral infection.				1,2,3		
<b>II</b>	<b>Diagnostic Virology</b> Sample collection, processing and transport Identification vaccines	<b>6</b>	Illustrate the knowledge on handling and processing of infected samples.				2, 3		
<b>III</b>	<b>Medical mycology</b> Superficial mycoses Subcutaneous mycoses Systemic mycoses Opportunistic mycoses	<b>15</b>	Understanding about the clinically important fungus.				1,2		
<b>IV</b>	<b>Diagnostic mycology</b> Sample collection, processing, identification. Antifungal susceptibility testing.	<b>2</b>	Discuss about the sample collection, processing and perform on Antifungal susceptibility testing.				3,4		
<b>V</b>	<b>Applied microbiology</b> Pyrexia of unknown origin Urinary tract infection Meningitis	<b>10</b>	Explain about the common infection like UTI and pyrexia.				2,4		
<b>Practical</b>	<b>Mycology</b> Media preparation for mycology	<b>96</b>	Demonstrate proficiency in the collection and processing				1,2,3,4,5		

	Fungal culture Slide culture Germ tube test Wet mount: Lacto phenol cotton blue and KOH Preparation <b>Culture and Sensitivity</b> Urine culture Sputum culture Pus culture Antibiotic Susceptibility Testing		of diverse mycological specimens, performing direct microscopy using stains in identifying fungal elements accurately.	
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**TEXTBOOKS:**

1. Textbook of Microbiology by C.PBaveja 5<sup>th</sup> Edition
2. Textbook of Microbiology by H.Ruth Ashbee and Mary S.Methews.
3. Textbook of Microbiology by Ananthanarayan and Paniker
4. Microbiology by Prescott, Harley, Kleis
5. Microbiology, an introduction – Tortora, Funke, Case.
6. Microbiology by Micheal J .Pelezar, Jr. E.C.S. Chan, Noel R, Krieg

**REFERENCEBOOKS:**

1. Textbook of Microbiology by Anantha Narayan and Paniker.
2. Mackie & Maecartney practical Medical Microbiology S.Geral Gollee, Bamic P.Marmion, Andrew G.Fraser.
3. Textbook of Medical Lab Technology – Praful B.Godkar, Darshan P.Godkar.
4. Laboratory immunology & Serology – Neville J.Bryant.
5. Manual of medical Lab Techniques – S.Ramakrishnan, K.N.Sulochona.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	It will give an introduction on the concept and classification of viruses and fungus.	<b>1</b>
<b>2</b>	Understanding the process of sample collection and transport processing	<b>4</b>
<b>3</b>	About line on diagnostic approach to viral and fungal infection	<b>1, 2 &amp; 3</b>
<b>4</b>	Students will learn how to implement the importance of Biomedical Waste Management	<b>8</b>
<b>5</b>	Summary about common infection like UTI and pyrexia and its diagnostic approach.	<b>1, 2 &amp; 3</b>

SEMESTER – V									
Course Title	PATHOLOGY-V								
Course code	22BMLT322R	Total credits: 6 Total hours: (T)48+(P) 96	L	T	P	S	R	O /F	C
			3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Medical laboratory Science								
Semester									
Course Objectives (Minimum 3)	1. Understand the microscopic structure of tissues and cells, including normal and pathological changes. 2. Master immune histochemistry, molecular pathology, and other advanced diagnostic methods. 3. Interpret histopathological findings for accurate diagnoses and contribute to research on disease mechanisms.								
<b>CO1</b>	Describe the basics of cytology and its classification with their role.								
<b>CO2</b>	Summarize the process of collection of specimens from different parts of the body.								
<b>CO3</b>	Execute the techniques of Fine Needle Aspiration Cytology								
<b>CO4</b>	Illustrate the collection and processing of body cavity fluid specimens.								
<b>CO5</b>	Analyze the significance of different staining pattern and develop a practical understanding of laboratory layout.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
<b>I</b>	<b>Introduction to cytology</b> <ul style="list-style-type: none"> <li>Definition of cytology, Cells &amp; tissues, Normal tissues.</li> <li>Classification of cytology- Exfoliative and interventional cytology, Role of Cytology, Nuclear criteria of inflammation &amp; malignancy,</li> <li>Progressive changes of the cells               <ol style="list-style-type: none"> <li>Changes in inflammation</li> <li>Dyskariotic Changes in malignancy.</li> </ol> </li> </ul>		<b>10</b>	Students will understand the dynamic alterations that occur in cells during inflammation and malignancy. They will be able to describe the sequential changes, including hyperplasia, metaplasia, and dysplasia.				L1, L2,	
<b>II</b>	<b>Collection of specimen from female genital tract specimen for routine screening.</b> <ul style="list-style-type: none"> <li>Cervical smear</li> <li>Vaginal pool smear</li> <li>Lateral vaginal smear</li> <li>Combined (fast) smear</li> <li>Triple smear Endo-cervical and endometrial smear.</li> </ul>		<b>5</b>	Students will be able to perform a triple smear, including cells from the end cervix and endometrial.				L1, L2, L3	
<b>III</b>	<b>Urinary cytology</b> <ul style="list-style-type: none"> <li>Collection of urinary tract specimens</li> <li>Diagnostic utility of urinary cytology</li> </ul> <b>Fine Needle Aspiration Cytology</b> <ul style="list-style-type: none"> <li>Application of FNAC</li> <li>Advantages of FNAC</li> <li>General procedure of FNAC</li> <li>Limitation of FNAC</li> </ul>		<b>10</b>	Understand the principles of urinary cytology and its role in diagnosing urinary system cancers. Describe the advantages and limitations of FNAC. Differentiate between wet and dry fixed smears. Recognize the applications of imprint, crush smear, and biopsy				L1, L2, L3, L4,	

	<ul style="list-style-type: none"> <li>Wet and Dry fixed smear, its difference</li> </ul> <p>Imprint cytology, Crush Smear cytology, Biopsy sediment cytology</p>		sediment cytology.	
<b>IV</b>	<p><b>Body cavity Fluids</b></p> <ol style="list-style-type: none"> <li>Effusions</li> <li>Collection and processing of body cavity fluid specimens</li> <li>Cyto-preparation and staining</li> <li>Processing of clotted and Blood specimen.</li> </ol> <p><b>Cellular Components in effusions</b></p> <ol style="list-style-type: none"> <li>Principal Cellular Components</li> <li>Cellular components in benign Effusions</li> <li>Cellular components in malignant Effusions</li> </ol>	<b>8</b>	<p>Understand the importance of proper handling in effusion cytology.</p> <p>Describe different collection and processing techniques.</p> <p>Recognize cellular components in benign and malignant effusions.</p>	L1, L2, L3
<b>V</b>	<p><b>STAINING:</b> R/E stain types-Methods, Maintenance, Preparation of stain, Pap's stain</p> <p><b>Special stains-</b> MGG, PAS, ZN, Mucicarmine etc. Mounting and Labeling Cell Block preparation Cytological fixative- Definition, types/classification Mailing of smears</p> <p><b>Establishments of lab-</b> Manpower, Space, Ventilation, Light, Water, working benches, Room arrangements, Reception of specimens, Instruments required.</p>	<b>15</b>	<p>Understand staining principles and methods.</p> <p>Recognize the importance of special stains.</p> <p>Describe cell block preparation and cytological fixatives.</p> <p>Identify key factors in establishing a cytology lab.</p>	L1, L2, L3, L4
<b>Practical</b>	<ol style="list-style-type: none"> <li>Sample receiving labeling and entering</li> <li>Preparation of Exfoliative cytological smears</li> <li>Fixation – types and methods</li> <li>Preparation of different solution</li> <li>Preparation of smears in interventional cytology, Fixation and stains.</li> <li>Staining R/E <ul style="list-style-type: none"> <li>Preparations of stains</li> <li>Methods – MGG &amp;PAPs</li> <li>Mounting</li> <li>Labeling</li> </ul> </li> <li>Special Stains <ul style="list-style-type: none"> <li>PAS</li> <li>AFB</li> <li>Mucicarmine etc</li> </ul> </li> <li>Record keeping of reports and blocks</li> <li>Lab safety</li> <li>Quality controls</li> </ol>	<b>96</b>		

**TEXT BOOKS:**

**T1:** Bancroft's theory and practice of Histological techniques by S.KimSuvarna, Christopher Layton, John D.Bancroft.

**T2:** Textbook of Medical Laboratory Technology–PrafulB.Godkar, Darshan P Godkar

**T3:** Manual of Medical Laboratory Techniques by S.Ramakrishna

**REFERENCE BOOKS:**

**1.** Histological Techniques for Medical Laboratory Technology by Sudha R.

**2:** Histopathology, A self-instructional text by Freida L. Carson

**OTHER LEARNING RESOURCES:**

[https://doi.org/10.1016/S0002-9440\(10\)64472-0](https://doi.org/10.1016/S0002-9440(10)64472-0)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe the basics of cytology and its classification with their role.	<b>1</b>
<b>2</b>	Summarize the process of collection of specimens from different parts of the body.	<b>2,3,4,5,6</b>
<b>3</b>	Execute the techniques of Fine Needle Aspiration Cytology	<b>2,3,4,5,6,7</b>
<b>4</b>	Illustrate the collection and processing of body cavity fluid specimens.	<b>2,3,4,5,6</b>
<b>5</b>	Analyze the significance of different staining pattern and develop a practical understanding of laboratory layout.	<b>3&amp;6,7</b>

SEMESTER – VI									
Course Title	Biochemistry-VI								
Course code	22BMLT323R	Total credits: 4 Total hours: 45T+30P	L	T	P	S	R	O/F	C
			3	0	6	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor Medical Laboratory Technology								
Semester	Even/ VI semester of Third year of the Programme								
Course Objectives (Minimum 3)	1. They are taught the technique of collection of clinical samples and their processing along with recording of data. 2. The students will also be given the basic knowledge of inborn error of carbohydrate, proteins and lipids metabolism of various metabolites which are routinely estimated in different diseases so that a clear understanding of the different tests is obtained.								
CO1	Explain the fundamentals of standardization guidelines, focusing on their relevance to laboratory practices and specimen analysis.								
CO2	Demonstrate the skills necessary to diagnose and manage inborn errors of carbohydrate metabolism.								
CO3	Recognize and categorize various inborn errors of protein metabolism, including enzymatic deficiencies and metabolic pathway disruptions.								
CO4	Describe the clinical significance of inborn errors of lipid metabolism								
CO5	Illustrate the properties of cancer cells and correlate the biochemical changes								
Unit-No.	Content		Contact Hour	Learning Outcome					KL
I	<b>Specimen collection and analysis:</b> Concept of accuracy, precision, reliability, reproducibility, referenc eranges, Quality control, LJ graph, collection, d istribution, preservation, storage of specimen for appropriate test, introduction to NABL, NABH and ISO guidelines		10	Students can learn about the maintenance of quality control.					1,2
II	<b>Inborn error of carbohydrate metabolism:</b> Disorders of carbohydrate metabolism, diabetes mellitus, glycosuria, glycogen storage diseases, galactosemia, pentosuria, fructosuria, G6PD deficiency and, acid mucopolysaccharidosis		13	Students can learn about disease caused by carbohydrate metabolic dysfunction.					1,2, 3
III	<b>Inborn error of Protein metabolism:</b> Disorders of protein and amino acid metabolism, inherited disorders associated with urea cycle, proteinuria, sickle cell anaemia, thalassemia, multiple myeloma, plasma protein profile in various diseases, aminoaciduria, Alkaptonuria, maple syrup urine disease, phenylketonuria, cystinuria, homocystinuria, Fancon isyndrome, tyrosinemia, albinism		13	Learn about the disease caused by protein metabolic dysfunction.					1,4, 5
IV	<b>Inborn error of lipid metabolism:</b> Hyper lipidemia, Carnitine deficiency, hyper lipo proteinemia's, hypo lipoproteinemia, atherosclerosis, and fatty liver.		6	Understand about the disease caused by lipid metabolic disorders.					1,3, 4
V	<b>Cancer biochemistry:</b> Properties of cancer cells, morphological and biochemical changes in cancer cells, carcino genesis,		6	Students can learn about the biochemical markers of cancer cells					1, 3

	carcinogens, diagnosis of cancer onco genic markers.			
<b>Practical</b>	1.Laboratory test for inborn error of Carbohydrate metabolism. 2.Laboratory test for inborn error of Protein metabolism. 3.Laboratory test for Inborn error of Lipid metabolism 4.Biochemical test for body fluids	<b>96</b>	Students can learn about the tests for inborn errors of metabolism provides essential skills in diagnosing genetic disorders affecting carbohydrates, proteins, and lipids, as well as biochemical abnormalities in body fluids. Learners gain expertise in enzymatic assays, genetic testing, and interpreting biomarkers to effectively diagnose and manage these conditions.	1,2, 4.5

### TEXT BOOKS:

- T1: Biochemistry–U.Satyanarayana,U.Chakrapani.  
T2: Textbook of MedicalBiochemistry– MN Chaterjee,KanoShinde.  
T3: Principle & Technique of Biochemistry– SRamakrishnan,K.G.Prasannan,R.Rajan.  
T4: Principle & Techniques of Biochemistry&MolecularBiology–KeithCoilson  
T5: Textbook of Medical Lab Technology– Praful B.Godkar,DarshanP.Godkar

### REFERENCE BOOKS:

- R1: Mayatepek, Ertan, Björn Hoffmann, and Thomas Meissner. "Inborn errors of carbohydrate metabolism." *Best Practice & Research Clinical Gastroenterology* 24, no. 5 (2010): 607-618.  
R2: Jakubowski, H. I. E. R. O. N. I. M., and E. M. A. N. U. E. L. Goldman. "Editing of errors in selection of amino acids for protein synthesis." *Microbiological reviews* 56, no. 3 (1992): 412-429.  
R3: Di Mauro, Salvatore, Carlo Trevisan, and Arthur Hays. "Disorders of lipid metabolism in muscle." *Muscle & Nerve: Official Journal of the American Association of Electrodiagnostic Medicine* 3, no. 5 (1980): 369-388.  
R4: Weinberg, Robert A., and Robert A. Weinberg. *The biology of cancer*. WW Norton & Company, 2006.

### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK21054/?term=Biochemistry>



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain the fundamentals of standardization guidelines, focusing on their relevance to laboratory practices and specimen analysis.	<b>2, 3, 4</b>
<b>2</b>	Demonstrate the skills necessary to diagnose and manage inborn errors of carbohydrate metabolism.	<b>2, 3,9</b>
<b>3</b>	Recognize and categorize various inborn errors of protein metabolism, including enzymatic deficiencies and metabolic pathway disruptions.	<b>1, 3, 9</b>
<b>4</b>	Describe the clinical significance of inborn errors of lipid metabolism	<b>1, 2, 9</b>
<b>5</b>	Illustrate the properties of cancer cells and correlate the biochemical changes	<b>1, 3, 5,9</b>

SEMESTER- VI									
<b>Course Title</b>	<b>First Aid</b>								
<b>Course code</b>	<b>22BMLT324R</b>	<b>Total credits:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Science in Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Even/ VI semester of second year of the Programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. To know the importance of first aid in saving life 2. Identify the type of emergency for selected situation 3. To analyze situation on situational emergency								
<b>CO1</b>	Understand different terms used in first aid and how to be a good first aider.								
<b>CO2</b>	Demonstrate the skills necessary to provide effective first aid and prevent cross infections.								
<b>CO3</b>	Recognize and manage emergencies involving hemorrhage, burns, and shock.								
<b>CO4</b>	Develop the confidence to act swiftly and effectively in life-threatening situations.								
<b>CO5</b>	Demonstrate practical skills to show competence in first aid techniques for poisoning, bites, and stings.								
<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>Introduction</b> Definition Hygiene Hand washing Characteristic of a good first aider	<b>3</b>	Understand the role and responsibilities of a first aider.				1, 2,3		
<b>II</b>	<b>First aid measures for selected situation</b> First aid kit Preventing cross infection Recording incidents and actions Use of available equipment	<b>4</b>	Discuss the necessary first aid measures for various situations, including the proper use of a first aid kit.				2,3		
<b>III</b>	<b>First aid in emergency situation</b> Hemorrhage Burns shock	<b>4</b>	Analyze the severity of a hemorrhage along with burn and shock.				1,3		
<b>IV</b>	<b>Medical emergencies</b> Cardio pulmonary Resuscitation (CRP) Treating an unconscious casualty Wounds and Bleeding	<b>3</b>	Explain about life saving process like giving CRP				2, 4		
<b>V</b>	<b>First aid related with Poisoning, bites and stings.</b>	<b>2</b>	Illustrate on how to handle the cases of food poisoning and snake bites				1, 3, 4		

**TEXT BOOKS:**

1. Textbook of first aid by Dr A Helen Perdita
2. Textbook on first aid and emergency by Jaypee
3. First aid and emergency care by Dr. Swapna Naskar Williamson, Mala Goswami
4. First aid and emergency care by N.C. Jain

**REFERENCE BOOKS:**

1. First aid and emergency care by Dr. Swapna Naskar Williamson, Mala Goswami
2. First aid and emergency care by N.C. Jain

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand different terms used in first aid and how to be a good first aider.	<b>1, 5</b>
<b>2</b>	Demonstrate the skills necessary to provide effective first aid and prevent cross infections.	<b>3, 4, 5</b>
<b>3</b>	Recognize and manage emergencies involving hemorrhage, burns, and shock.	<b>1, 2, 4, 6</b>
<b>4</b>	Develop the confidence to act swiftly and effectively in life-threatening situations.	<b>1, 2, 6, 7</b>
<b>5</b>	Demonstrate practical skills to show competence in first aid techniques for poisoning, bites, and stings.	<b>3, 4, 5, 6, 7, 9</b>

SEMESTER- VI									
Course Title	RESEARCH PROJECT								
Course code	22BMLT325R	Total credits:	L	T	P	S	R	O/F	C
		Total hours:	0	0	0		18	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Medical Laboratory Technology								
Semester	Even/ VI semester of second year of the Programme								
Course Objectives (Minimum 3)	<p>1. Students get the opportunity and freedom to explore in depth research in to the topic of their choice.</p> <p>2. Students learn how to access the articles in Pub Med and Google Scholar and it allows the students to specialize in an area that they have previously covered in class.</p> <p>3. It allows the students to develop their skills in writing research and review papers.</p>								

Course code	Course Name	PO 1*	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
22BMLT321R	Microbiology-V	3	2		2					
22BMLT322R	PATHOLOG YV	2	1	3	3	3	3	2	1	1
<b>22BMLT323 R</b>	Biochemistry VI	3	3	2	3	1				3
22BMLT324R	First Aid				3	3				



# Assam down town University

## Curriculum and Syllabus

### Bachelor of Operation Theatre Technology



OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**

July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022



*Chairperson  
Board of Studies*



*Member Secretary  
Academic Council*



## Vision

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## Missions

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community.

# Programme Details

## Programme Overview

Operation Theatre Technicians are allied healthcare professionals. Their tasks include assisting Doctors in Surgery, arranging surgical instruments before surgery, sterilizing instrumentation before surgery, cleaning surgical instruments after surgery, carrying out Surgeons commands during surgery and taking care of anesthesia equipment. The duration of the study for Bachelor in Operation theatre technology will be of 3 years

## Specific Features of the Curriculum

Healthcare sector is going through a phase of growth. This sector, to function efficiently, will need more qualified allied healthcare professionals. Operation Theatres in hospitals, Emergency Care Departments as well as ICUs in hospitals are places where OT Technicians are needed. For any operation theatre to function smoothly, OT Technicians are needed.

## Eligibility Criteria:

He/she has passed the Higher Secondary (10+2) with Science (PCB) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks in Chemistry, and Biology □ Minimum percentage of marks: 45% aggregate.

### I. Program Educational Objectives (PEOs):

**PEO-1:** Operation Technology graduates will be well prepared for successful careers in the operation theatre, surgical centers and emergency services provided by the government and/ or private healthcare organizations.

**PEO-2:** The graduates will be engaged in professional activities to enhance their stature and simultaneously contribute to the healthcare profession and society at large.

**PEO-3:** Graduates will be successful in higher education in inter-disciplines of operation theatre technology if pursued.

### II. Program Specific Outcomes (PSOs):

**PSO1: Clinical Competency:** Demonstrate effective clinical competency and efficiency in operation theatre procedures and technology.



**PSO2:Techno-Professional Efficiency:** Apply comprehensive knowledge proficiently to operate modern surgical equipment, adopt techniques and maintain high standards in diverse medical settings for better health outcomes.

**PSO3: Global Competency:** Attain global competency through interdisciplinary certification courses at international learning platforms.

### **III. Program Outcome:**

**PO 1: Human Health Knowledge:** Apply the knowledge of human anatomy, physiology, microbiology, biochemistry, and Pathophysiology to provide effective support to doctors, surgeons and anesthesiologists during surgical procedures in diverse settings.

**PO 2: Procedures and Techniques:** Apply modern sterilization methods, life-saving techniques, loading and labeling of medications, drug interventions, anesthesia induction, patient preparation, and crisis management in the operation theatre.

**PO 3: Modern Equipment Use:** Efficiently operate modern patient monitoring and support systems including an anesthesia workstation, surgical diathermy etc.

**PO 4: Health Crisis Management:** Ability to think critically and function as a member of rescue/ code-blue team in recognizing health crises including cardiac arrest and participate in revival cum cardiopulmonary resuscitation.

**PO 5: Teamwork:** Perform efficiently as a member or leader in diverse teams/ multidisciplinary settings.

**PO 6: Professional Ethics:** Prepare and maintain patient information, and apply ethical principles in the profession.

**PO 7: Communication:** Use effective communication within the healthcare team rendering seamless collaboration and timely sharing of critical information.

**PO 8: Lifelong Learning:** Ability to engage in independent and lifelong learning in the broadest sense of procedural and technological advancements.

### **IV. Total Credits to be Earned:**

Credits distribution for bachelor of operation theatre technology		
SL. No.	Semester	Credit
1	1 <sup>st</sup>	19
2	2 <sup>nd</sup>	25
3	3 <sup>rd</sup>	25
4	4 <sup>th</sup>	21
5	5 <sup>th</sup>	24
6	6 <sup>th</sup>	23
<b>Total</b>		137

### **Career Prospects:**

A Bachelor's degree in Operation Theatre Technology (BOTT) opens up various career opportunities in healthcare. Graduates can work as operation theatre technologists, surgical assistants, or anaesthesia technicians in hospitals and clinics and also in the academics by going for a higher studies.

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 40% or as prescribed by the programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting insemester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Sem Exam – I (ISE-I) (Written Examination)*	30
2.	In-Sem Exam – II (ISE-II) (Written Examination)*	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*are compulsory*

**Note:** Total Internal assessment should be out of 40

### INSTRUCTION

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.

2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.
3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

## **B. SEMESTER END EXAMINATION:**

Time table for end semester examination is published at least 25 days prior to the start of Examination.

### **I. Pre-Examination:**

#### **Eligibility Criteria for a student to appear in University Examinations:**

The student shall only be allowed to appear in a University

Examination, if: i) He/ She is a registered student of the University; ii)

He/ She is of good conduct and character;

iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

### **II. Admit Card:**

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds.

### **III. Pattern of Question Papers:**

The question paper shall follow the principles of Bloom's Taxonomy.

Table

S. N.	Level	Questions /verbs for test
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify
4	Analyze	Classify, outline, categorize, analyze, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.
6	Create	Design, Formulate, Modify, Develop, integrate, etc.

**Note:** No course is to be evaluated on basis of **all 6 knowledge levels**.

The format of the question paper across all the program follow a unique pattern and the total marks is 60

**Table 1: Question paper pattern for End semester examination**

Sl no	Question pattern	Total marks
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

**V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

**VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Office-inCharge of the center may take appropriate decisions as per the rules and procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfairmeans. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

**VII. Instruction to the Students:**

- i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.
- iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.

- v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.
- viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

### **VIII. Provision for an Amanuensis (writer):**

- i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.
- ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.
- iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process.

### **C. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times$

### **CR i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a

single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

## ii. Grade Point:

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

## iii. Letter Grade:

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent

ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

Letter Grade	Grade Points	Description
O	10	Outstanding
A+	9	Excellent
A	8	Very Good



B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

**iv. Grade Point Average:**

**a. SGPA (Semester Grade Point Average)**

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter

Grades ‘O’ to ‘F’ as given in Table 1.

$$SGPA = \frac{\sum_{i=1}^n G_i C_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{th}$  registered Course and  $C_i$  is the Credit (weight) of that Course.

**b. CGPA (Cumulative Grade Point Average)**

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrollment in the Programme. In other words, taking into account all the Courses graded with ‘O’ to ‘P’ as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrollment.
- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i$ th completed Course and  $C_i$  is the Credit (weight) of that Course.

$$CGPA = \frac{\sum_{i=1}^N G_i C_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

- (iii) The CGPA shall be convertible into equivalent percentage of marks using Equation Conversion of CGPA to percentage marks: = CGPA \* 10

## **D. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### **ii. Grievance Readdress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Reevaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.
- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite proforma available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.
- (vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.
- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.
- (ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# INSTRUCTION TO TEACHERS AND STUDENTS

## (Teaching and Learning Methods)

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

### **1.Student- centric / Constructivist Approach:**

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which

becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer and discuss in the successive class. This will help in the preparation for various competitive examination and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student- centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

**The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures	20%
Student-centric Approach, Students present and deliver lectures in the presence of teacher and supervised by teacher	60%
Students visit fields or perform experiments or teachers perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

### **Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned approaches and prepare a lesson plan for execution and maintain a file.

## **Curriculum Framework**

### **Breakdown of Credits**

<b>Sl. No</b>	<b>Category</b>	<b>Total number of Credits</b>
1	University Core(UC)	14
2	University Elective (UE)	5
3	Program Core(PC)	105
4	Program Elective (PE)	0
5	Faculty Elective (FE)	13
<b>Total number of credit</b>		<b>137</b>

### **Breakdown by categories of courses**

<b>Sl no</b>	<b>Category</b>	<b>Credits</b>	<b>%</b>
1	Paramedical Sciences	127	92.70
2	Engineering	1	0.73
3	Humanities and social sciences	8	5.84
4	Commerce and Management	1	0.73
<b>Total</b>		<b>137</b>	<b>100</b>

**PCI, INC, AICTE regulated programs shall have to follow the regulating body**

**SEMESTER WISE COURSE DISTRIBUTION**

Semester I	S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
	1.	22BOTT111R	ANATOMY I	PC	3	0	4	0	0	0	5	40	60	100	200
	2	22BOTT112R	PHYSIOLOGY I	PC	3	0	4	0	0	0	5	40	60	100	200
	3	22BOTT113R	BIOCHEMISTRY I	PC	3	0	2	0	0	0	4	40	60	100	200
	4	22BOTT114R	HDPC I	PC	2	0	0	0	0	0	2	40	60	0	100
	5	22UBPD112R	BASIC ENGLISH	UE	0	0	4	0	0	0	2	40	60	100	100
	6	22UBEC111	Extra-curricular (Non -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
	<b>Total</b>				<b>11</b>	<b>0</b>	<b>16</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>200</b>	<b>300</b>	<b>500</b>	<b>900</b>
Semester II	S. No.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
	1.	22BOTT121R	ANATOMY II	PC	3	0	4	0	0	0	5	40	60	100	200
	2	22BOTT122R	PHYSIOLOGY II	PC	3	0	4	0	0	0	5	40	60	100	200
	3	22BOTT123R	BIOCHEMISTRY II	PC	3	0	2	0	0	0	4	40	60	100	200
	4	22BOTT124R	HDPC II	PC	2	0	0	0	0	0	2	40	60	100	200
	5	22BOTT125R	BASIC CLINICAL EXAMINATION(TP S)	PC	0	0	2	0	0	0	1	00	00	100	100
	6	22UBCC121	Co-curricular (non -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
	7	22UBEC121	Extra-curricular (non -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
	8	22UBPD121R	EFFECTIVE ENGLISH	PC	1	0	2	0	0	0	2	40	60	100	200
	9	22UCDL102R	BASIC DIGITAL LITERACY	UE	0	0	2	0	0	0	1	0	0	100	100

	10	22UUVH104R	UHV+PROFESSIONAL ETHICS	UE	1	0	2	0	0	0	2	0	0	100	100
	11	MOBEDMR123	(MOOCS)SCIENTIFIC WRITING IN HEALTH RESEARCH	UC	1	0	0	0	0	0	1	0	0	100	100
	<b>Total</b>				<b>14</b>	<b>0</b>	<b>18</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>200</b>	<b>300</b>	<b>1100</b>	<b>1600</b>
<b>Semester III</b>	<b>S. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Course Category</b>	<b>Engagement</b>							<b>Maximum Marks for</b>			
					<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O</b>	<b>C</b>	<b>IA*</b>	<b>SEE*</b>	<b>PE*</b>	<b>Total</b>
	1.	22BOTT211R	PATIENT ASSESSMENT, VENOUS ACCESS & DRUG ADMINISTRATION	PC	4	0	4	0	0	0	6	40	60	100	200
	2	22BOTT212R	AIRWAY MANAGEMENT AND RESPIRATORY EMERGENCIES	PC	4	0	4	0	0	0	6	40	60	100	200
	3	22BOTT213R	MICROBIOLOGY-I	PC	3	0	0	0	0	0	3	40	60	00	100
	4	22BOTT214R	PHARMACOLOGY I	PC	2	0	0	0	0	0	2	40	60	00	100
	5	22BOTT215R	SYSTEMIC EXAMINATION OF THE PATIENT(TPS)	PC	0	0	2	0	0	0	1	00	0	100	100
	6	22BOTTGE01	DATA ANALYTICS IN SPORTS LAW AND MANAGEMENT SPECIALIZATION( GENERIC ELECTIVE)	UE	2	0	0	0	0	0	2	00	100	0	100
	7	22BOTTMO01	INTRODUCTION TO PSYCHOLOGY(MO OCS)	UE	1	0	0	0	0	0	1	00	100	0	100
	8	22UBCC211	Co-Curricular (Non - CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
	9	22UBEC211	Extra-curricular (Non -CGPA)	UC	0	0	0	4	0	0	1	0	0	100	100
10	22UBPD211R	EXECUTIVE ENGLISH	UC	0	0	2	0	0	0	1	0	0	100	100	



11	22UULS211R	BASIC ACCLIMATIZING SKILLS	UC	0	0	2	0	0	0	1	0	0	100	100
<b>Total</b>				<b>16</b>	<b>0</b>	<b>14</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>160</b>	<b>440</b>	<b>700</b>	<b>1300</b>

S. N.	Course Code	Course Title	Course Category	Engagement							C	Maximum Marks for			
				L	T	P	S	R	O	IA*		SEE*	PE*	Total	
1.	22BOTT221R	CARDIOVASCULAR & NEUROLOGICAL EMERGENCY MANAGEMENT	PC	3	0	4	0	0	0	5	40	60	100	200	
2	22BOTT222R	MICROBIOLOGY II	PC	3	0	0	0	0	0	3	40	60	0	100	
3	22BOTT223R	PHARMACOLOGY II	PC	2	0	0	0	0	0	2	40	60	0	100	
4	22BOTT225R	TRAUMA EMERGENCIES (TECHNO PROFESSION SKILLS)	PC	0	0	2	0	0	0	1	0	0	100	100	
5	22BOTTGE21	LEADERSHIP SKILLS	FE	2	0	0	0	0	0	2	0	100	0	100	
6	22BOTTMO21	SOCIAL PSYCHOLOGY	FE	1	0	0	0	0	0	1	0	100	0	100	
7	22UBCC221	CO-CURRICULAR	UC	0	0	0	0	0	0	1	0	0	100	100	
8	22UBEC221	EXTRA- CURRICULAR	UC	0	0	0	4	0	0	1	0	0	100	100	
9	22UBES201R	ENVIRONMENTAL SCIENCE (EVS)	UC	2	0	0	0	0	0	2	40	60	00	100	
10	22UBPD221R	ENHANCED PROFESSIONAL SKILLS	UC	0	0	2	0	0	0	1	0	0	100	100	
11	22UUFL223R	PERSONAL FINANCIAL PLANNING	UC	0	0	2	0	0	0	1	0	0	100	100	
12	22UULS222R	BASIC LIFE SAVING SKILLS	UC	0	0	2	0	0	0	1	0	0	100	100	
				<b>13</b>	<b>0</b>	<b>12</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>160</b>	<b>440</b>	<b>700</b>	<b>1300</b>	
S. N.	Course Code	Course Title	Course Category	Engagement							C	Maximum Marks for			
				L	T	P	S	R	O	IA*		SEE*	PE*	Total	

Semester V	1.	22BOTT311R	Introduction To OT I	PC	3	0	4	0	0	0	5	40	60	00	200
	2	22BOTT312R	OT technology - Clinical I	PC	3	0	4	0	0	0	5	40	60	100	200
	3	22BOTT313R	OT technology - Applied I	PC	3	0	4	0	0	0	5	40	60	00	200
	4	22BOTT314R	OT technology - Advanced I	PC	3	0	4	0	0	0	5	00	00	100	200
	5	22BOTT315R	Techno professional skill	PC	0	0	2	0	0	0	1	00	00	100	100
	6	22BOTT316R	Bio Medical Waste	DE	1	0	0	0	0	0	1	00	100	00	100
	7	22UBCC311	CO-Curricular	UC	0	0	0	4	0	0	1	0	0	100	100
	8	22BOTTMO31	MOOCs	FE	1	0	0	0	0	0	1	0	0	100	100
<b>Total</b>					<b>14</b>	<b>0</b>	<b>18</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>24</b>				<b>1200</b>

S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
1.	22BOTT321R	INTRODUCTION FO OT II	PC	3	0	4	0	0	0	5	40	60	100	200
2	22BOTT322R	OT TECHNOLOGY - CLINICAL II	PC	3	0	4	0	0	0	5	40	60	100	200
3.	22BOTT323R	OT TECHNOLOGY - APPLIED II	PC	3	0	4	0	0	0	5	40	60	100	200
4	22BOTT324R	OT TECHNOLOGY - ADVANCED II	PC	3	0	4	0	0	0	5	40	60	100	200
5	22BOTT325R	FIELD/LAB based RESEARCH PROJECT	PC	0	0	0	0	24	0	2	0	0	100	100
6	22BOTTMO32	MOOCs	FE	1	0	0	0	0	0	1	0	0	100	100
<b>Total</b>				<b>13</b>	<b>0</b>	<b>16</b>	<b>0</b>	<b>24</b>	<b>0</b>	<b>23</b>	<b>160</b>	<b>240</b>	<b>600</b>	<b>1000</b>

\*IA: Internal Assessment, SEE: Semester End Examination,  
PE: Practical Examination

SEMESTER – I									
Course Title	ANATOMY I								
Course code	22BOTT111R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives (Minimum 3)	1. To learn about the anatomical position, gross and microscopic structure of the organs and skeleton in the human body. 2. To provide a strong anatomical foundation about the human body 3. To assist students in developing a better grasp of the anatomical structure and relationships in various body regions								
CO1	Understand basic anatomical terms and positions.								
CO2	Develop fundamental knowledge on the musculoskeletal system.								
CO3	Discuss the components and functions of organs in the thoracic cavity.								
CO4	Explain the different structures and components of the digestive system.								
CO5	Understand and classify the human body tissues.								
UnitNo.	Content	Contact Hour	Learning Outcome				KL		
I	<b>INTRODUCTION TO ANATOMICAL TERMS</b> Organization of human body, Anatomical positions,axis and plans, common anatomical terminology	4	Describe, illustrate and explain the different anatomical positions and terms				1,2		

<b>II</b>	<b>MUSCULO – SKELETAL SYSTEM:</b> <ul style="list-style-type: none"> <li>• Bones: Classification &amp; types according to morphology &amp; development structure and functions, description of bones of human body, blood supply of bones.</li> <li>• Cartilage: Description.</li> <li>• Joints: Definition, classification, structure and movements.</li> <li>• Muscles: Types and structure of Muscles, name of the muscles of the body with some important muscles attachments.</li> </ul>	<b>15</b>	Describe, illustrate and classify the musculoskeletal system along with their functions.	1,2
<b>III</b>	<b>THORAX:</b> <ul style="list-style-type: none"> <li>• Mediastinum – division and contents. Structure of heart and blood vessels</li> <li>• Full description of Respiratory tract and lungs. Para nasal sinuses.</li> </ul>	<b>14</b>	Describe, illustrate and explain the structure of organs inside the thoracic cavity.	1,2
<b>IV</b>	<b>DIGESTIVE SYSTEM:</b> Structure of Gastro Intestinal tract and accessory organs of digestion	<b>10</b>	Describe, illustrate and explain the structure and composition of the digestive system.	1,2
<b>V</b>	<b>TISSUE:</b> <ul style="list-style-type: none"> <li>• Classification and description of the basic tissues of the body.</li> <li>• Histology: Epithelium, compact bone muscles, connective tissue, nervous tissue artery, vein and lymphatic tissue</li> </ul>	<b>5</b>	Describe, classify and explain the tissues of the body.	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Study of anatomical planes and positions.</li> <li><input type="checkbox"/> Study of Skeleton and bones of human body. (Skull, Vertebrae, Ribs and bone of upper limb)</li> </ul>	<b>60</b>	Describe, illustrate , explain and apply different anatomical planes and position. And describe and illustrate about skeleton and bones of human body.	1,2, 3,4, 5

**TEXT BOOKS:**

1. Manipal Manual of Anatomy for Allied Health Sciences courses: Madhyastha S
2. G.J. Tortora & N.P Anagnostakos: Principles of Anatomy and Physiology
3. B.D. Chaurasia: Handbook of General Anatomy

**REFERENCE BOOKS:**

- R1 BD CHAURASIAS., 'HUMAN ANATOMY' CBS publisher, New Delhi, 8 th Edition (2017)..
- R2 Inderbir Singh. 'Anatomy and Physiology' CBS Publisher, Newdelhi 2 nd Edition (2004)
- R3 Frederic Martini, Judi Nath, Robert Tallitsch, 'Human Anatomy', pearson Publisher, □ USA, 1 st edition( 2017).

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand basic anatomical terms and positions.	<b>1,8</b>
<b>2</b>	Develop fundamental knowledge on the musculoskeletal system	<b>1,8</b>
<b>3</b>	Discuss the components and functions of organs in the thoracic cavity.	<b>1,2,8</b>
<b>4</b>	Explain the different structures and components of the digestive system.	<b>1,8</b>
<b>5</b>	Understand and classify the human body tissues.	<b>1,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT111R</b>	<b>ANATOMY I</b>	3	1						2

SEMESTER – I									
Course Title	PHYSIOLOGY I								
Course code	22BOTT112R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives (Minimum 3)	1. To comprehend how tissues, organelles, cells, and the organ system are put together and function 2. To provide a thorough understanding of all physiological systems in the human body 3. To teach basic physiological concepts related to General physiology, Haematology, Nerve-Muscle physiology, Cardiovascular, Digestive & Respiratory physiology								
CO1	Develop fundamental knowledge on the components of cells and tissue structure.								
CO2	Describe the different composition and functions of the blood.								
CO3	Understand the process of the digestive system along with the organs involved and their significance.								
CO4	Explain the mechanism of the respiratory system.								
CO5	Understand the cardiovascular system along with the human circulatory system.								
UnitNo.	Content	Contact Hour	Learning Outcome				KL		
I	<b>GENERAL PHYSIOLOGY:</b>  <input type="checkbox"/> Organization of human body, cell structure and organelle, Tissues and functions.	5	Describe, illustrate and explain the functions of cells and tissues in the human body.				1,2		
II	<b>BLOOD:</b> <ul style="list-style-type: none"> <li>• Blood volume and body fluids.</li> <li>• Composition and functions of blood.</li> <li>• Structure and formation and function of RBC, WBC and platelets.</li> <li>• Haemoglobin.</li> <li>• Plasma, blood coagulation</li> <li>• Blood groups</li> </ul>	15	Describe, illustrate and explain the composition of body fluids and blood along with their functions.				1,2		

<b>III</b>	<b>DIGESTIVE SYSTEM:</b> <ul style="list-style-type: none"> <li>• General introduction, organizational plan of digestive system.</li> <li>• Movement of G.I. Tract and functions of various components.</li> <li>• Composition, functions and regulation of salivary, gastric, pancreatic, intestinal and biliary secretion.</li> <li>• Functions of liver, gallbladder and pancreas.</li> <li>• Digestion and absorption of carbohydrate, protein and fat.</li> </ul>	<b>10</b>	Describe, illustrate and explain the functions and mechanism of the digestive system.	1,2  28
<b>IV</b>	<b>RESPIRATORY SYSTEM:</b> <ul style="list-style-type: none"> <li>• General organization.</li> <li>• Mechanics of respiration.</li> <li>• Regulation of respiration.</li> <li>• Gaseous exchange in lunge and tissues.</li> <li>• Pulmonary ventilation, volumes and capacities.Effect of exercise on respiration, hypoxia.</li> </ul>	<b>8</b>	Describe, illustrate and explain the mechanism of the human respiratory system.	1,2
<b>V</b>	<b>CARDIOVASCULAR SYSTEM:</b> <ul style="list-style-type: none"> <li>• General organization, structure and properties of cardiac muscles.</li> <li>• Cardiac output, cardiac cycle, conducting system of heart.</li> <li>• Heart sounds, regulation of H.R., pulse, blood pressure and its regulation.</li> <li>• Systemic circulation, pulmonary circulation and coronary circulation.</li> <li>• ECG, cardio respiratory changes during exercise.</li> </ul>	<b>10</b>	Describe, illustrate and explain the functions and mechanism of the cardiovascular system.	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Study of compound Microscope.</li> <li>• Arterial pulse</li> <li>• Measurement of blood pressure</li> <li>• Hemoglobin</li> <li>• Blood group</li> </ul>	<b>60</b>	Describe, illustrate , explain about the component of microscope,arterial pulse and apply the techniques to measure blood pressure and haemoglobin.	1,2, 3,4, 5

**TEXT BOOKS:**

1. Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.
2. Principles of Physiology – DevasisPramanik, 5th edition.
3. Human Physiology for BDS –Dr A.K. Jain, 5th edition.
4. Textbook of human Physiology for dental students-Indukhurana 2nd edition.
5. Essentials of medical Physiology for dental students –Sembulingum.

**REFERENCE BOOKS:**

- R1 Inderbir Singh, A text book of Anatomy and Physiology
- R2 Gyton, A text Book of Physiology

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
1	Develop fundamental knowledge on the components of cells and tissue structure.	1,8
2	Describe the different composition and functions of the blood.	1,2,8
3	Understand the process of the digestive system along with the organs involved and their significance.	1,8
4	Explain the mechanism of the respiratory system.	1,8
5	Understand the cardiovascular system along with the human circulatory system.	1,2,8

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BSBT112R</b>	<b>PHYSIOLOGY I</b>	3	1						2



SEMESTER – I									
Course Title	Biochemistry I								
Course code	22BOTT113R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 45T+30P	3	0	2	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives (Minimum 3)	<ul style="list-style-type: none"> <li>To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites</li> <li>To understand the energy flow in the form on ATP in the human body and cells.</li> <li>To give a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids</li> </ul>								
CO1	Explain the sources, functions and metabolism process of Carbohydrates.								
CO2	Identify various classification of amino-acids and recognize the significance of Protein.								
CO3	Describe the significance, classification and functions of lipids.								
CO4	Comprehend the structure and functions of Nucleic Acids.								
CO5	Explain the fundamentals and importance of acid, base and buffers.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	CARBOHYDRATES		10	Define, classify and describe the sources and types of carbohydrates along with their functions in the body.				1,2	
<ul style="list-style-type: none"> <li>Definition and classification of carbohydrates</li> <li>Common carbohydrates(Glucose, Fructose,Starch, Glycogen, Starch) and their sources</li> <li>Biological significance of Carbohydrate</li> </ul>									
II	PROTEINS		10	Define, classify and explain the mechanism of proteins along with their functions in the body.				1,2	
<ul style="list-style-type: none"> <li>Definition of Proteins along with the Biological Significance</li> <li>Amino acids and its classification</li> <li>Essential and Non-essential amino acids</li> </ul>									
III	LIPIDS		10	Define and classify types of lipids along with their functions in the body.				1,2	
<ul style="list-style-type: none"> <li>Definition and classification of lipids.</li> <li>Classification of Fatty Acids</li> <li>Examples and functions of some common lipids(Phospholipids, Glycolipids, Steroids).</li> </ul>									

<b>IV</b>	<b>NICLEIC ACIDS</b> <ul style="list-style-type: none"> <li>• Basic idea of the structure of DNA and RNA</li> <li>• Function of DNA and RNA</li> </ul>	<b>9</b>	Describe, illustrate and explain the basic structure and functions of nucleic acids in the body	1,2
<b>V</b>	<b>ACID-BASE BUFFERS</b> <ul style="list-style-type: none"> <li>□ Basic idea of acids, bases, Ph, buffer.</li> <li>□ Acid base balance</li> </ul>	<b>9</b>	Define, explain and describe acidbase buffers.	1,2
<b>Practical</b>	1.To identification and demonstration of biochemistry laboratory glassware's and apparatus.	<b>6</b>	Define, illustrate, explain and apply different laboratory test like Fehling test, Benedict's test and molest text.	1,2, 3,4
	2.To identification and demonstration of biochemistry laboratory instruments (Principle and Applications)	<b>4</b>		
	3.To perform Fehling's test for determination of reducing and non-reducing sugar in an unknown sample.	<b>4</b>		
	4.To perform Benedict's test for determination of reducing and non-reducing sugar in an unknown sample.	<b>4</b>		
	5.To perform Molisch's test for determination of sugar in an unknown sample.	<b>4</b>		

#### TEXT BOOKS:

- "Biochemistry" by U Satyanaryana and U Chakrapani
- "Text book of Biochemistry for medical students" by DM Vasudevan(Author), Sreekumari S(Author), KannanVaidyanathan(Author), 7<sup>th</sup> Edition

#### REFERENCE BOOKS:

"Lehninger Principles of Biochemistry" by David L Nelson and Michael M Cox, Eighth Edition| ©2021 David L.

"Biochemistry" by Lubert Stryer, Jeremy M Berg, WH Freeman, 9th ed. 2019

"An Introduction to Practical Biochemistry" by David E Metzler. McGraw Hill Education, 3<sup>rd</sup> Ed

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain the sources, functions and metabolism process of Carbohydrates.	<b>1,2,8</b>
<b>2</b>	Identify various classification of amino-acids and recognize the significance of Protein.	<b>1,2,3,8</b>
<b>3</b>	Describe the significance, classification and functions of lipids	<b>1,2,3,8</b>
<b>4</b>	Comprehend the structure and functions of Nucleic Acids.	<b>1,8</b>
<b>5</b>	Explain the fundamentals and importance of acid, base and buffers.	<b>1,2,3,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT113R</b>	<b>Biochemistry I</b>	3	1	2					2

SEMESTER – I									
Course Title	Hospital Duty & Patients Care(HD&PC)-I								
Course code	22BOTT114R	Total credits: 2 Total hours: 25T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives (Minimum 3)	<ul style="list-style-type: none"> <li>To impart the knowledge in patient in a holistic approach for the overall wellbeing of the patient.</li> <li>To impart a comprehensive knowledge on medical ethics and the quality and functions of medical professionals.</li> <li>To provide a gross knowledge on the legal hazardous of medical profession.</li> </ul>								
CO1	Discuss different functions, process of record keeping, reporting and essential components of hospital management.								
CO2	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.								
CO3	Understand and implement safety measures and hygiene in patient care.								
CO4	Describe different body positions and the mechanism and management of fever.								
CO5	Identify various sites to measure pulse, blood pressure and assess respiration.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Hospital &amp; Records &amp; Reports:</b> <ul style="list-style-type: none"> <li>Introduction</li> <li>Functions of Hospitals</li> <li>Classification of Hospitals</li> <li>Organization of Hospitals</li> <li>Department of Hospitals</li> <li>Management of Hospitals</li> <li>Different services in a Hospital</li> <li>Definition</li> <li>Different types of records</li> <li>Values &amp; Objectives</li> <li>Maintenance of records</li> <li>Principle of good record writing</li> <li>Difference of records &amp; reports</li> </ul>	10	Describe, illustrate and explain the different types of record and reports maintained in the hospital.					1,2	

<p><b>II</b></p>	<p><b>First Aid &amp; Safety in the Laboratory :</b></p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Aims &amp; objectives of first aid</li> <li>• Priorities of first aid</li> <li>• Golden rules of first aid</li> <li>• Qualities &amp; responsibilities of first aider</li> <li>• Simple first aid measures in selected conditions like –</li>   <li>- Food poisoning</li> <li>- Snake bite</li> <li>- Scorpion bite</li> <li>- Dog bite</li> <li>- Foreign bodies in various organs</li> <li>- Burns &amp; scalda</li> <li>- Haemorrhage</li>   <li>• Common laboratory accidents from</li> <li>• Physical injuries</li> <li>• Electrical shock</li> <li>• Chemical injury</li> <li>• Bleeding</li> <li>• Burn</li> <li>• Eye accidents</li> <li>• Biological hazards.</li> </ul>	<p style="text-align: center;"><b>10</b></p>	<p>Explain the objectives of first aid and demonstrate the management of various medical emergencies.</p>	<p style="text-align: center;">1,2</p>
<p><b>III</b></p>	<p><b>Artificial respiration &amp; Hygiene, Care of Patient, Basic care needs of patients:</b></p> <p>Different methods</p> <ul style="list-style-type: none"> <li>• Personal Hygiene</li> <li>• Maintenance of Hygiene</li> <li>• Maintaining therapeutic environment</li> <li>• Safety factors for patients such as</li> <li>• Safety from mechanical injury</li> <li>• Safety from thermal &amp; chemical injury</li> <li>• Safety from radiation &amp; bacteriological injury</li> <li>• Safety from allergens.</li> </ul>	<p style="text-align: center;"><b>10</b></p>	<p>Describe, illustrate and explain the significance of maintaining safety and hygiene in patient care.</p>	<p style="text-align: center;">1,2</p>

<b>IV</b>	<b>Body temperature &amp; Comfort measures for patients:</b> <ul style="list-style-type: none"> <li>• Supine position</li> <li>• Prone Position</li> <li>• Cardiac position</li> <li>• Lateral Position</li> </ul>	<b>9</b>	Describe, define and explain the different positions of the body along with the management of temperature for patients.	1,2
	<ul style="list-style-type: none"> <li>• Fowlers position</li> <li>• Maintenance of body temperature</li> <li>• Factors influencing body temperature</li> <li>• Different types of fever</li> <li>• Stages of rigor</li> <li>• Management of pyrexia</li> <li>• Maintenance of body temperature</li> <li>• Factors influencing body temperature</li> <li>• Different types of fever</li> <li>• Stages of rigor</li> <li>• Management of pyrexia</li> </ul>			
<b>V</b>	<b>Pulse &amp; Blood Pressure &amp; Respiration:</b> <ul style="list-style-type: none"> <li>• Common pulse sites</li> <li>• Factors influencing pulse rate</li> <li>• Characteristics of Pulse</li> <li>• Abnormal pulses</li> <li>• Reading of pulse</li> <li>• Definition</li> <li>• Factors influencing B.P.</li> <li>• Abnormalities of B.P.</li> <li>• Recording of B.P.</li> <li>• Regulation of respiration</li> <li>• Factors causing variations in respiration</li> <li>• Abnormal respirations</li> <li>• Reading of respiratory rate.</li> </ul>	<b>9</b>	Describe, explain and demonstrate the assessment of pulse and respiration along with the factors affecting them.	1,2

**TEXT BOOKS:**

1. National Health Programs Of India National Policies and Legislations Related to Health: 1 J. Kishore (Author)
2. A Dictionary of Public Health Paperback by J Kishor
3. Health System in India: Crisis & Alternatives , National Coordination Committee, Jan Swasthya Abhiyan

**REFERENCE BOOKS:**

1. In search In Search of the Perfect Health System
2. Central Bureau of Health Intelligence (1998). Health Information of India, Ministry of Health and Family Welfare, New Delhi.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss different functions, process of record keeping, reporting and essential components of hospital management.	<b>6,7</b>
<b>2</b>	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	<b>1,2,3,4</b>
<b>3</b>	Understand and implement safety measures and hygiene in patient care.	<b>2,3</b>
<b>4</b>	Describe different body positions and the mechanism and management of fever.	<b>1,2,6</b>
<b>5</b>	Identify various sites to measure pulse, blood pressure and assess respiration.	<b>1,2,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT114R</b>	<b>Hospital Duty &amp; Patients Care(HD&amp;PC)-I</b>	2	3	2			2		

SEMESTER – I									
Course Title	Basic English								
Course code	22UBPD111R	Total credits: 2 Total hours: 60P	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives (Minimum 3)	1. To introduce the students to the basics of English grammar and their application. 2. To enhance communication skills through listening and speaking exercises. 3. To learn and understand the importance of pronunciation of words.								
CO1	Apply grammatical rules to construct grammatically correct sentences and paragraphs.								
CO2	Apply grammatical rules, types of sentences and determiners.								
CO3	Expand their vocabulary and use synonyms and antonyms appropriately.								
CO4	Speak confidently and articulate ideas clearly with correct pronunciation.								
CO5	Identify different types of communication and strategies to overcome communication barriers.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Grammar</b> <ul style="list-style-type: none"> <li>Parts of Speech</li> <li>Articles</li> <li>Affirmative and Negative Sentences</li> </ul>	10	Describe , illustrate and explain about the grammar needed in every sentences					1,2	
II	<b>Grammar</b> <ul style="list-style-type: none"> <li>Determiners</li> <li>Sentence Construction from jumbled words</li> <li>Types of Sentences(Assertive, Imperative etc.</li> </ul>	10	Describe ,illustrate and explain about the grammar needed in every sentences					1,2	
III	<b>Building vocabulary</b> <ul style="list-style-type: none"> <li>☐ Synonyms</li> <li>☐ Antonyms</li> </ul>	10	Describe and explain about the vocabulary					1,2	
IV	<b>Speaking skills</b> <ul style="list-style-type: none"> <li>Introduction and greetings</li> <li>Pronunciation</li> <li>Asking and offering information</li> <li>Video Recording for self-analysis</li> </ul>	9	Describe ,illustrate and explain about the speaking skills and pronunciation.					1,2	



<b>V</b>	<b>Communication skills</b> <input type="checkbox"/> Introduction to Communication, <input type="checkbox"/> Importance of Communication Skills, <input type="checkbox"/> Purpose of Communication, <input type="checkbox"/> Types of Communication, <input type="checkbox"/> Barriers to Communication, <input type="checkbox"/> How to improve/tips to improve Communication skills	<b>9</b>	Describe ,illustrate and explain the types of communication and communication skills.	1,2
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**TEXT BOOKS:**

1. Wren&Martin.(2017).*HighSchoolEnglishGrammarandComposition*.S.ChandPublishing.
2. Pal, Rajendra.Suri, Premlata(2022).*English Grammar& Composition*. Sultan Chand and Sons Publishing.

**REFERENCE BOOKS:**

1. Debnath,Adhir.(2018).*ATextbookofEnglishGrammarandComposition*.BinaLibrary.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply grammatical rules to construct grammatically correct sentences and paragraphs.	7,8
2	Apply grammatical rules, types of sentences and determiners.	7,8
3	Expand their vocabulary and use synonyms and antonyms appropriately.	7,8
4	Speak confidently and articulate ideas clearly with correct pronunciation.	7,8
5	Identify different types of communication and strategies to overcome communication barriers.	7,8

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBPD111R</b>	<b>BASIC ENGLISH</b>							3	3

SEMESTER – I									
Course Title	Extra Curricular								
Course code	22UBEC111	Total credits: 1 Total hours:	L 0	T 0	P 0	S 4	R 0	O/F 0	C 1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives (Minimum 3)	<p>To develop skills and interests through participation in diverse extracurricular and co-curricular activities.</p> <p>To learn about teamwork and leadership abilities by engaging students in club-led events and competitions.</p> <p>To provide opportunities for personal growth and practical learning beyond the academic curriculum.</p>								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<input type="checkbox"/> ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.	60	Develop skills and confidence to participate in different activities organized by the institution					1,2,3,4	
	<input type="checkbox"/> These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.								
	<input type="checkbox"/> Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.								

	<input type="checkbox"/> The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.			
	<input type="checkbox"/> The student members of the club are trained represent AdtU in various inter University student and national level competitions			
	<input type="checkbox"/> Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.			

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy	5,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests	5,7,8
3	Apply knowledge and skills to represent ADTU in interuniversity, state, and national level competitions.	5,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,7,8
5	Evaluate overall growth alongside academic development.	5,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UBEC111	<b>EXTRA CURRICULAR</b>					3		3	3

SEMESTER – II									
Course Title	ANATOMY II								
Course code	22BOTT121R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 45T, 60P	3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	1. To study the basic anatomical structure of human body 2. To provide a comprehensive concept of all the anatomical systems of the human body 3. To give a illustrative overview about the human bones and its anatomical significance								
CO1	Explain the components and significance of organs in the pelvis.								
CO2	Understand the anatomical structure of the urinary system.								
CO3	Develop fundamental knowledge on the human reproductive organs.								
CO4	Classify the nervous system of the human body.								
CO5	Describe the sensory organs and the composition of the lymphatic system.								
UnitNo.	Content	Contact Hour	Learning Outcome				KL		
I	<b>PELVIS:</b> <input type="checkbox"/> General description of pelvic organs	4	Describe, define and explain the different structure of organs in the pelvis.				1,2		
II	<b>URINARY SYSTEM:</b> <input type="checkbox"/> Structure of kidney, ureter, urinary bladder, male and female urethra.	8	Explain, define and classify the structure of organs involved in the urinary system.				1,2		
III	<b>REPRODUCTIVE SYSTEM:</b> <ul style="list-style-type: none"> <li>• Structure of male and female reproductive organs.</li> <li>• Structure of breast.</li> </ul>	9	Describe, illustrate and explain the different parts of the human reproductive system.				1,2		

<b>IV</b>	<b>NERVOUS SYSTEM:</b> <ul style="list-style-type: none"> <li>• Classification of Nervous system.</li> <li>• Central Nervous system – Brain and Spinal cord, blood supply of brain.</li> </ul>	<b>17</b>	Describe, classify and explain the nervous system of the human body.	1,2
	□ Spinal nerves and Cranial nerves. □ Autonomic nervous System.			
<b>V</b>	<b>SENSORY ORGAN &amp; LYMPHATIC SYSTEM:</b> <ul style="list-style-type: none"> <li>• Skin</li> <li>• Eye</li> <li>• Ear</li> <li>• Nose</li> <li>• Tongue</li> </ul> Lymphatic vessels and lymph, lymph nodes, spleen	<b>10</b>	Classify, differentiate and explain various sensory organs along with the lymphatic system of the body.	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Study of bones of human body.</li> <li>• Study of organs: Brain, heart, lung, liver, kidney, spleen.</li> </ul>	<b>60</b>	Describe, illustrate and explain about bones and organs of human body.	1,2, 3,4, 5

**TEXT BOOKS:**

- Manipal Manual of Anatomy for Allied Health Sciences courses: Madhyastha S.
- G.J. Tortora & N.P. Anagnostakos: Principles of Anatomy and Physiology

**REFERENCE BOOKS:**

- B.D. Chaurasia: Handbook of General Anatomy

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain the components and significance of organs in the pelvis.	<b>1,8</b>
<b>2</b>	Understand the anatomical structure of the urinary system.	<b>1,8</b>
<b>3</b>	Develop fundamental knowledge on the human reproductive organs.	<b>1,8</b>
<b>4</b>	Classify the nervous system of the human body.	<b>1,8</b>
<b>5</b>	Describe the sensory organs and the composition of the lymphatic system.	<b>1,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT121R</b>	<b>ANATOMY II</b>	3							2

SEMESTER – II									
Course Title	PHYSIOLOGY II								
Course code	22BOTT122R	Total credits: 5 Total hours: 45T, 60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	1. To understand the underlined mechanism that work to keep the human body alive and functioning 2. To provide a comprehensive concept of all physiological systems of the human body 3. To understand how different organs system work together to perform a normal physiological function								
CO1	Develop fundamental knowledge on the endocrine system along with the hormones they secrete								
CO2	Understand the human excretory system and their functions.								
CO3	Explain the structure and functions of male and female reproductive system.								
CO4	Describe the muscle and nervous system along with their functions.								
CO5	Classify the different types of lymph and immune cells in the body and their function.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	ENDOCRINE SYSTEM:		10	Describe, explain and define the different endocrine glands along with the hormones secreted in the human body.				1,2	
	<ul style="list-style-type: none"> <li>Structure and hormones of endocrine glands, pituitary, thyroid, parathyroid, Pancreas, Adrenal, testes and ovary.</li> <li>Functions and regulation of secretion of hormones.</li> </ul>								
II	EXCRETORY SYSTEM:		8	Describe, explain and define the various structures of organs in the excretory system along with their functions.				1,2	
	<ul style="list-style-type: none"> <li>Structure and functions of kidneys, nephron, ureter, urinary bladder and urethra.</li> <li>Urine formation.</li> <li>Renal function tests.</li> </ul>								
III	REPRODUCTIVE SYSTEM:		8	Describe, illustrate and explain the different parts of the human reproductive system along with the changes that occurs during puberty and pregnancy.				1,2	
	<ul style="list-style-type: none"> <li>Male and female reproductive organs and changes during puberty.</li> <li>Menstrual cycle, ovulation.</li> <li>Physiological changes during pregnancy, Placenta and placental circulation.</li> </ul>								

<b>IV</b>	<b>NERVOUS SYSTEM AND MUSCLE:</b> <ul style="list-style-type: none"> <li>• Organization of nervous system.</li> <li>• Structure and function of muscle and nerve cells.</li> <li>• Functions of brain, Spinal cord,</li> </ul>	<b>17</b>	Classify and explain the different structures of the nervous system along with the functions and structures involved in the	1,2
	cranial and spinal nerves <ul style="list-style-type: none"> <li>• Motor system.</li> <li>• Sensory system.</li> <li>• ANS</li> <li>• Synapse, neuromuscular transmission reflex arc, reflex action and reflexes</li> <li>• Cerebro spinal fluid</li> </ul>		muscular system.	
<b>V</b>	<b>LYMPHATIC AND IMMUNOLOGICAL SYSTEM, SPECIAL SENSES:</b> <ul style="list-style-type: none"> <li>• Lymph glands and circulation of lymph</li> <li>• Spleen structure and function</li> <li>• Immunity – Formation of T- cells and B-cells, Antigen, Antibody and Immune response.</li> <li>• Functions of skin, eye, ear, nose, tongue.</li> </ul>	<b>5</b>	Classify, differentiate and explain various mechanism of the lymphatic system and the immune system of the human body.	1,2
<b>Practical</b>	□			

**TEXT BOOKS:**

1 Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.

**REFERENCE BOOKS:**

1.Principles of Physiology – DevasisPramanik, 5th edition.



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop fundamental knowledge on the endocrine system along with the hormones they secrete	<b>1,8</b>
<b>2</b>	Understand the human excretory system and their functions.	<b>1,8</b>
<b>3</b>	Explain the structure and functions of male and female reproductive system.	<b>1,8</b>
<b>4</b>	Describe the muscle and nervous system along with their functions.	<b>1,8</b>
<b>5</b>	Classify the different types of lymph and immune cells in the body and their function.	<b>1,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT122R</b>	<b>PHYSIOLOGY II</b>	3							2

SEMESTER – II									
Course Title	Biochemistry-II								
Course code	22BOTT123R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 45T,30P	3	0	2	0	0	0	4
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites</li> <li>To understand the energy flow in the form of ATP in the human body and cells.</li> <li>To give a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids</li> </ol>								
CO1	Describe classification, mechanism of enzymes, and factors affecting enzyme actions.								
CO2	Define the mechanism of carbohydrate metabolism in the body.								
CO3	Explain the metabolism of protein and its significant effects on different organs of body.								
CO4	Describe the process of Lipids metabolism and associated clinical conditions.								
CO5	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body								
UnitNo.	Content		Contact Hour	Learning Outcome				KL	
I	<b>ENZYMES :</b> <ul style="list-style-type: none"> <li>Definition and classification of enzyme.</li> <li>Basic idea of co-enzyme, iso-enzyme.</li> <li>Mechanism of enzyme Action.</li> </ul> Factors affecting enzyme action		8	Describe, classify and explain the types of enzymes along with the factors affecting their actions.				1,2	
II	<b>CARBOHYDRATES METABOLISM</b> <ul style="list-style-type: none"> <li>Glycolysis</li> <li>Kreb's Cycle</li> <li>Glyconeogenesis</li> <li>Glcogenesis</li> <li>Glcogenolysis</li> </ul>		8	Describe and explain the mechanism of carbohydrates in the body.				1,2	
III	<b>PROTEIN METABOLISM</b> <ul style="list-style-type: none"> <li>Transamination</li> <li>Deamination</li> <li>Urea Cycle and its Significance</li> </ul>		8	Describe, illustrate and explain the metabolism of protein and their significance.				1,2	

<b>IV</b>	<b>LIPID METABOLISM, CLINICAL BIOCHEMISTRY</b> <ul style="list-style-type: none"> <li>• <math>\beta</math> oxidation of Fatty Acids.</li> <li>• Ketone bodies</li> <li>• Ketosis and ketoacidosis <input type="checkbox"/> Liver function test.</li> <li>• Renal function test</li> </ul>	<b>14</b>	Define and explain the metabolism of lipids along with the clinical diagnostic tests and their significance.	1,2
<b>V</b>	<b>VITAMINS AND MINERALS :</b> <ul style="list-style-type: none"> <li>• Definition and classification of vitamins according to solubility.</li> <li>• Sources and functions of individual vitamins.</li> <li>• Deficiency.</li> <li>• Individual minerals (calcium, phosphorus, iron, magnesium fluoride, copper, selenium, molybdenum etc) – their sources, function and properties.</li> </ul>	<b>10</b>	Describe, explain and classify the different types of vitamins and minerals along with their sources and functions.	1,2
<b>Practical</b>	<input type="checkbox"/> IDENTIFICATION TEST FOR MONO AND DI- SACCHARIDES	<b>60</b>	Describe, illustrate and explain about different test and apply the technique of test for mono and DI-saccharides and test for proteins and lipids.	1,2, 3,4, 5
	<ul style="list-style-type: none"> <li>• IDENTIFICATION TEST FOR PROTEINS</li> <li>• Precipitation Reaction</li> <li>• Heller's Test</li> <li>• Heat and Acidic Test</li> <li>• IDENTIFICATION TEST FOR LIPIDS (Solubility Test)</li> </ul>			

**TEXT BOOKS:**

- T1 "Biochemistry" by U Satyanaryana and U Chakrapani

**REFERENCE BOOKS:**

- R1 Biochemistry by David L. Nelson and Michael M. Cox

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe classification, mechanism of enzymes, and factors affecting enzyme actions.	<b>1,2,8</b>
<b>2</b>	Define the mechanism of carbohydrate metabolism in the body.	<b>1,8</b>
<b>3</b>	Explain the metabolism of protein and its significant effects on different organs of body.	<b>1,8</b>
<b>4</b>	Describe the process of Lipids metabolism and associated clinical conditions.	<b>1,2,8</b>
<b>5</b>	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body	<b>1,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT123R</b>	<b>BIOCHEMISTRY II</b>	3	1						2

SEMESTER – II									
Course Title	Hospital Duty & Patients Care(HD&PC)-II								
Course code	22BOTT124R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To impart the knowledge in patient in a holistic approach for the overall wellbeing of the patient.</li> <li>To impart a comprehensive knowledge on medical ethics and the quality and functions of medical professionals.</li> <li>To provide a gross knowledge on the legal hazardous of medical profession.</li> </ol>								
CO1	Describe signs and symptoms of common poisonings and its immediate management								
CO2	Explain the medical ethics and its importance on the healthcare system								
CO3	Identify the different types of shock along with the management.								
CO4	Classify the different types of emergency drugs along with the dosage and effects.								
CO5	Proficient in performing quality laboratory investigation process and laboratory management								
UnitNo.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Poisoning:</b> <ul style="list-style-type: none"> <li>Definition</li> <li>Causes of poisoning</li> <li>Sources of Poisoning</li> <li>Symptoms of poisoning</li> <li>First aid &amp; Management</li> <li>Antidotes</li> <li>Common drugs poisoning □ Carbon monoxide poisoning <b>Legal Responsibility:</b> <ul style="list-style-type: none"> <li>Act of commission</li> <li>Act of omission</li> <li>Act of rashness, negligence &amp; damage</li> <li>Legal liabilities of medical profession</li> <li>Advantage &amp; disadvantage of the act.</li> </ul> </li> </ul>		8	Define, describe and explain the different types of poisons along with their sources and management including the classification of various legal liabilities of medical professions.				1,2	
II	<b>Malpractice</b> <ul style="list-style-type: none"> <li>Civil negligence</li> <li>Clinical negligence</li> <li>Corporate negligence</li> <li>Preparation of patients</li> <li>Preparation of equipments</li> </ul>		8	Describe, illustrate and explain various ethical and legal responsibilities of medical professionals along with the techniques of specimen collection.				1,2	

	<ul style="list-style-type: none"> <li>□ Collection of specimen of urine, stool, sputum, blood, CSF, Pericardial fluid, Peritoneal fluid, Pleural fluid, etc</li> </ul>			
<b>III</b>	<p><b>Definition</b></p> <ul style="list-style-type: none"> <li>• Types of shock</li> <li>• General Features of shock</li> <li>• Investigations of shock</li> <li>• Initial management &amp; first aid of shock <ul style="list-style-type: none"> <li>□ Definition</li> </ul> </li> <li>• Clinical features</li> <li>• Diabetes laboratory tests for diabetes</li> <li>• Different types of glycosuria</li> <li>• Ketone bodies</li> <li>• Glucose tolerance test.</li> <li>• Definition</li> <li>• Etiology &amp; Clinical Features</li> <li>• Investigations for hypoglycemia</li> </ul>	<b>8</b>	Describe, classify and explain shock along with their clinical manifestations, management including the diagnostic tests for diabetes.	1,2
<b>IV</b>	<p><b>Definition</b></p> <ul style="list-style-type: none"> <li>• Names &amp; classification of drugs</li> <li>• Different preparations of drugs</li> <li>• Effects of drugs</li> <li>• Adverse effects of drugs</li> <li>• Tolerance, Abuse, addiction of druge</li> <li>• Different routes of drug administration</li> <li>• Storing of medicine</li> <li>• Units of standard measurement</li> </ul>	<b>14</b>	Describe, classify and explain the different types of emergency drugs along with their mechanism, routes of administration, indications and adverse effects.	1,2
<b>V</b>	<p><b>Function of medical Professional</b></p> <ul style="list-style-type: none"> <li>• Qualities of good professional</li> <li>• Ethics of Medical Profession</li> <li>• Laboratory designing</li> <li>• Laboratory management</li> <li>• Different laboratory</li> <li>• Functions of receptionist, Head of section, laboratory specialist, business manager, quality officer, safety officer</li> <li>• Disposal of eoastes</li> <li>• Reporting of tests of laboratory</li> <li>• Quality control and accreditation</li> <li>• Control of fire, infection, corrosive chenicals, toxic fumes, broken glasses, carcinogen.</li> </ul> <p>Legal and ethical regulation</p>	<b>10</b>	Describe, illustrate and explain medical ethics along with the guidelines and management of different laboratories in the hospital.	1,2

**TEXT BOOKS:**

- National Health Programs Of India National Policies and Legislations Related to Health: 1 J. Kishore (Author)
- A Dictionary of Public Health Paperback by J Kishor
- Health System in India: Crisis & Alternatives , National Coordination Committee, Jan Swasthya Abhiyan

**REFERENCE BOOKS:**

- In search In Search of the Perfect Health System
- Central Bureau of Health Intelligence (1998). Health Information of India, Ministry of Health and Family Welfare, New Delhi.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe signs and symptoms of common poisonings and its immediate management	<b>1,2,8</b>
<b>2</b>	Explain the medical ethics and its importance on the healthcare system	<b>6,8</b>
<b>3</b>	Identify the different types of shock along with the management.	<b>1,2,3,4</b>
<b>4</b>	Classify the different types of emergency drugs along with the dosage and effects.	<b>1,2,8</b>
<b>5</b>	Proficient in performing quality laboratory investigation process and laboratory management	<b>1,2,3,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT124R</b>	<b>Hospital Duty &amp; Patients Care(HD&amp;PC)-II</b>	2	3	2			3		2

SEMESTER – II									
Course Title	BASIC CLINICAL EXAMINATION								
Course code	22BOTT125R	Total credits: 1 Total hours: 15P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	1.To develop proficiency in vital signs and history taking. 2.To Learn and apply various techniques for conducting comprehensive physical examinations. 3. To expertise in examination of shock and positioning techniques								
CO1	Understand accurately measure and interpret vital signs								
CO2	Identify purpose and components of history taking, eliciting chief complaints, and conducting comprehensive patient interviews.								
CO3	Demonstrate proficiency in various examination techniques, conduct thorough head-to-toe examinations								
CO4	Identify different types of shock and apply appropriate management strategies to stabilize patients.								
CO5	Understand indications and contraindications for different positions, and apply appropriate positioning techniques in clinical settings.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Vitals sign</b> <ul style="list-style-type: none"> <li>Blood pressure</li> <li>Pulse rate</li> <li>Heart rate</li> <li>Oxygen saturation</li> <li>Respiratory rate</li> </ul>		Describe, explain ,apply knowledge and skill about the vital sign.					1,2,3	
II	<b>History Taking</b> <ul style="list-style-type: none"> <li>Purpose of history taking</li> <li>Components of history taking</li> <li>Chief complaint</li> </ul>		Describe, explain ,apply knowledge and skill about the purpose and components of history taking.					1,2,3	
III	<b>Physical Examination</b> <ul style="list-style-type: none"> <li>Techniques of examination</li> <li>General observation</li> <li>Head to toe examination</li> </ul>		Describe, explain ,apply knowledge and skill to perform head to toe physical examination .					1,2	



<b>IV</b>	<b>Examination of Shock</b> <ul style="list-style-type: none"> <li>• Types of shock</li> <li>• Identification of shock</li> <li>• Assessment and management</li> </ul>		Describe, explain , apply knowledge and skill to identify different type of shock and management strategies.	1,2
<b>V</b>	<b>Positioning</b> <ul style="list-style-type: none"> <li>• Types of positions</li> <li>• Importance of positioning</li> <li>• Indication/contra-indication for different positions</li> </ul>		Describe, explain , apply knowledge and skill to assessment and management of different type of positioning .	1,2

**TEXT BOOKS:**

- Nancy caroline Emergency care in the street 7<sup>th</sup> edition

**REFERENCE BOOKS:**

- **Seidel's Guide to Physical Examination** by Jane W. Ball, Joyce E. Dains, John A. Flynn, Barry S. Solomon, and Rosalyn W. Stewart

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand accurately measure and interpret vital signs	<b>1,2,3</b>
<b>2</b>	Identify purpose and components of history taking, eliciting chief complaints, and conducting comprehensive patient interviews.	<b>1,2,7</b>
<b>3</b>	Demonstrate proficiency in various examination techniques, conduct thorough head-to-toe examinations	<b>1,2,3,7</b>
<b>4</b>	Identify different types of shock and apply appropriate management strategies to stabilize patients.	<b>1,2,3,4</b>
<b>5</b>	Understand indications and contraindications for different positions, and apply appropriate positioning techniques in clinical settings.	<b>1,2,6,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT125R</b>	<b>BASIC CLINICAL EXAMINATION</b>	2	2	3	2		2	2	

SEMESTER – II									
Course Title	EFFECTIVE ENGLISH								
Course code	22UBPD121R	Total credits: 2 Total hours: 60P	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To enable students to learn and understand the different types of sentences.</li> <li>To strengthen the vocabulary of the students which will help in their writing and speaking.</li> <li>To introduce them with the Time Management technique.</li> </ol>								
CO1	Utilize various tenses appropriately in verbal and written communication, distinguishing their differences.								
CO2	Demonstrate proficiency in recognizing and using homonyms and homophones accurately in language contexts.								
CO3	Summarize paragraphs, stories, or articles effectively, refining pronunciation skills for clearer communication.								
CO4	Implement time management strategies to organize daily tasks, categorize them using the Time Management Matrix, and solve problems efficiently.								
CO5	Develop a professional resume and understand the dos and don'ts of resume writing, along with creating and managing a profile on LinkedIn to build professional networks.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Module1-Grammar</b> <ul style="list-style-type: none"> <li>Interchange Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences</li> <li>Types of Tenses</li> <li>Common Errors</li> </ul>	10	Differentiate between interrogative, assertive, and exclamatory sentence types to enhance communication clarity.					1,2	
II	<b>Module2-Vocabulary</b> <ul style="list-style-type: none"> <li>Homonyms</li> <li>Homophones</li> </ul>	10	Identify and classify homonyms in context to demonstrate understanding of word meanings.					1,2	
III	<b>Module3-ReadingSkills</b> <ul style="list-style-type: none"> <li>Techniques of Effective Reading</li> <li>Gathering ideas and information from a text</li> </ul>	10	Explain the importance of effective reading techniques in improving comprehension and information retention.					1,2	

<b>IV</b>	<b>Module4 –Conflict Management</b> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Type of Conflict Management</li> <li>• Effects of conflict Management</li> </ul>	<b>9</b>	Discuss the effects of different conflict management styles on relationships and team dynamics.	1,2
<b>V</b>	<b>Module5-Time-ManagementSkills</b> <input type="checkbox"/> Introduction To Time Management,	<b>9</b>	Demonstrate effective planning and scheduling techniques to	1,2
	<input type="checkbox"/> Importance of Time Management, Basic <input type="checkbox"/> Tips to Maintain Time.		optimize personal and professional productivity.	

**TEXT BOOKS:**

- Wren, P.Cand Martin, H.1995.HighSchool English Grammar and Composition, SCh and Publishing.

**REFERENCE BOOKS:**

- Barrett, Grant. 2016.Perfect English Grammar: The Indispensible Guide to Excellent Writing and Speaking, Zephyros Press.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Utilize various tenses appropriately in verbal and written communication, distinguishing their differences.	7,8
2	Demonstrate proficiency in recognizing and using homonyms and homophones accurately in language contexts.	7,8
3	Summarize paragraphs, stories, or articles effectively, refining pronunciation skills for clearer communication.	7,8
4	Implement time management strategies to organize daily tasks, categorize them using the Time Management Matrix, and solve problems efficiently.	7,8
5	Develop a professional resume and understand the dos and don'ts of resume writing, along with creating and managing a profile on LinkedIn to build professional networks.	7,8

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBPD121R</b>	<b>Effective English</b>							3	3

SEMESTER – II									
Course Title	UHV+ Professional Ethics								
Course code	22UUHV104R	Total credits: 2 Total hours: 15T,30P	L	T	P	S	R	O/F	C
			1	0	2	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To understand the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings</li> <li>To understand the development of a Holistic perspective towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence.</li> <li>To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.</li> </ol>								
CO1	Demonstrate the ability to verify truths based on personal acceptance and experiential validation								
CO2	Develop skills and habits that help them cultivate a greater sense of harmony within themselves and with others, leading to personal growth and development								
CO3	Identify and evaluate the role of harmony in family, society and universal order.								
CO4	Understand and associate the holistic perception of harmony at all levels of existence.								
CO5	Develop appropriate technologies and management patterns to create harmony in professional and personal live								
UnitNo.	Content		Contact Hour	Learning Outcome					KL
I	<b>Need, Basic Guidelines, Content and Process for Value Education</b> <ul style="list-style-type: none"> <li>Understanding the need, basic guidelines, content and process for Value Education</li> <li>Self Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential</li> <li>Validation- as the mechanism for self exploration</li> <li>Continuous Happiness and Prosperity- A look at basic</li> </ul>		7	Explain the importance of value education and apply guidelines for integrating values into daily life.					1,2,3,4,5

	<p>Human Aspirations</p> <ul style="list-style-type: none"> <li>• Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority</li> <li>• Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario</li> <li>• Method to fulfil the above human aspirations: understanding and living in harmony at various levels</li> </ul>			
<b>II</b>	<p><b>Understanding Harmony in the Human Being - Harmony in Myself!</b></p> <ul style="list-style-type: none"> <li>• Understanding human being as a co- existence of the sentient 'I' and the material 'Body'</li> <li>• Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha</li> <li>• Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)</li> <li>• Understanding the characteristics and activities of 'I' and harmony in 'I'</li> <li>• Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail</li> <li>• Programs to ensure Sanyam and Swasthya-Practice Exercises and Case Studies will be taken up in Practice Sessions.</li> </ul>	<b>10</b>	Discuss the personal values which require achieving internal harmony and emotional balance.	1,2, 3,4, 5

<p><b>II</b></p>	<p><b>Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship</b></p> <ul style="list-style-type: none"> <li>• Understanding values in human-human relationship; meaning of Nyaya and program for its fulfilment to ensure Ubhay-tripti;</li> <li>• Trust (Vishwas) and Respect (Samman) as the foundational values of relationship</li> <li>• Understanding the meaning of Vishwas; Difference between intention and competence</li> <li>• Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship</li> <li>• Understanding the harmony in the society (society being an extension of family):</li> <li>• Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals</li> <li>• Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!-Practice Exercises and Case Studies will be taken up in Practice Sessions</li> </ul>	<p><b>10</b></p>	<p>Discuss the interpersonal dynamics to enhance harmonious relationships within families and communities.</p>	<p>1,2, 3,4, 5</p>
<p><b>IV</b></p>	<p><b>Understanding Harmony in the Nature and Existence - Whole existence as Co-existence</b></p> <ul style="list-style-type: none"> <li>• Understanding the harmony in the Nature</li> <li>• Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature</li> <li>• Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space</li> <li>• 4. Holistic perception of harmony at all levels of existence-Practice Exercises and Case Studies will be taken up in Practice Sessions.</li> </ul>	<p><b>8</b></p>	<p>Explain the interconnectedness of humans with nature and identify sustainable practices for coexistence.</p>	<p>1,2, 3,4, 5</p>

V	<p><b>Implications of the above Holistic Understanding of Harmony on Professional Ethics</b></p> <ol style="list-style-type: none"> <li>1. Natural acceptance of human values</li> <li>2. Definitiveness of Ethical Human Conduct</li> <li>3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order</li> <li>4. Competence in professional ethics: <ol style="list-style-type: none"> <li>a) Ability to utilize the professional competence for augmenting universal human order</li> <li>b) Ability to identify the scope and characteristics of people-friendly and eco- friendly production systems,</li> <li>c) Ability to identify and develop appropriate technologies and management patterns for above production systems.</li> </ol> </li> <li>5. Case studies of typical holistic technologies, management models and production systems</li> <li>6. Strategy for transition from the present state to Universal Human Order: <ol style="list-style-type: none"> <li>a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers</li> <li>b) At the level of society: as mutually enriching institutions and organizations</li> </ol> </li> </ol>	10	Discuss how a holistic understanding of harmony influences ethical decisionmaking in professional contexts and propose strategies for promoting ethical behaviour.	1,2, 3,4, 5
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**TEXT BOOKS:**

R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

**REFERENCE BOOKS:**

**Professional Ethics and Human Values** by M. Govindarajan, S. Natarajan, and V.S. Senthil Kumar



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate the ability to verify truths based on personal acceptance and experiential validation	<b>6,7,8</b>
<b>2</b>	Develop skills and habits that help them cultivate a greater sense of harmony within themselves and with others, leading to personal growth and development	<b>6,7,8</b>
<b>3</b>	Identify and evaluate the role of harmony in family, society and universal order.	<b>6,7,8</b>
<b>4</b>	Understand and associate the holistic perception of harmony at all levels of existence.	<b>6,7,8</b>
<b>5</b>	Develop appropriate technologies and management patterns to create harmony in professional and personal live	<b>6,7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UUHV104R</b>	<b>UHV+ Professional Ethics</b>						3	3	2

SEMESTER – II									
Course Title	EXTRA CURRICULAR ACTIVITIES								
Course code	22UBEC121	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours:	0	0	0	4	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To develop skills and interests through participation in diverse extracurricular and co-curricular activities.</li> <li>To learn about teamwork and leadership abilities by engaging students in club-led events and competitions.</li> <li>To provide opportunities for personal growth and practical learning beyond the academic curriculum.</li> </ol>								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
UnitNo.	Content		Contact Hour	Learning Outcome				KL	
I	<input type="checkbox"/> ADTU encourages a range of activities outside the regular curriculum intended to meet learner’s interest.		60	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2, 3,4, 5	
	<input type="checkbox"/> These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.								

	<input type="checkbox"/> Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.			
	<input type="checkbox"/> The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.			
	<input type="checkbox"/> The student members of the club are trained represent AdtU in various inter University student and national level competitions			
	<input type="checkbox"/> Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.			

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy	5,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests	5,7,8
3	Apply knowledge and skills to represent ADTU in interuniversity, state, and national level competitions.	5,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,7,8
5	Evaluate overall growth alongside academic development.	5,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UBEC111	<b>EXTRA CURRICULAR ACTIVITIES</b>					3		3	3

SEMESTER – II									
Course Title	BASIC DIGITAL LITERACY								
Course code	22UCDL101R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. Understanding on identifying and analyse computer hardware, software and their uses.</li> <li>2. Improved ability to use MS-Office suite for various purposes.</li> <li>3. Equipped with the skills to use the Internet efficiently for required information as well as for digital financial transactions.</li> </ol>								
CO1	Develop fundamental knowledge of different computer systems and their functions.								
CO2	Knowledge on efficient use of MS- Office tools.								
CO3	Understanding on internet uses, types and cyber world.								
CO4	Knowledge on different uses of social media and its benefits & loses.								
CO5	Apply skills of digital payment systems.								
UnitNo.	Content		Contact Hour	Learning Outcome				KL	
I	Fundamentals of Computer Systems		7	Explain the fundamental of computer systems.				1,2	
	<ul style="list-style-type: none"> <li>• Components of a Computer and their functions.</li> <li>• Different Types of Computers and their Applications.</li> </ul>								
II	Introduction to MS-Office		10	Describe the functions on different tools of Microsoft Office like MS-Excel, MS-Word, etc.				1,2	
	<ul style="list-style-type: none"> <li>• Components of the MS-Office suite.</li> <li>• Creating documents with MS-Word.</li> <li>• Creating Presentations with MSPower Point.</li> <li>• Creating Spreadsheets with MExcel.</li> </ul>								

<b>III</b>	<b>Introduction to Internet &amp; Cyber World</b> <ul style="list-style-type: none"> <li>• Introduction to Computer Networks and Internet.</li> <li>• World Wide Web, Websites and Web portals, Web browsing.</li> <li>• Web Searching, Search engines, Introduction to Google Search Engine; How to search using Keywords, topics of Interest, etc.</li> <li>• Creation and use of Email Accounts.</li> <li>• Cyber Crimes.</li> </ul>	<b>10</b>	Explain the importance and use of internet along with its adverse side.	1,2
<b>IV</b>	<b>Introduction to Social Media</b> <ul style="list-style-type: none"> <li>• The Power of Social Media, Relevance of Social Media in present scenario.</li> <li>• Creating accounts and using some popular Social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, and LinkedIn.</li> <li>• Social Media Etiquettes.</li> </ul>	<b>8</b>	Explain the power of social media their relevance and adverse effects to over using it.	1,2
<b>V</b>	<b>Digital Payments</b> <ul style="list-style-type: none"> <li>• Introduction to Digital Payment Systems.</li> <li>• Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, and UPI.</li> </ul>	<b>10</b>	Illustrate the types of digital payment and their risks.	1,2

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge of different computer systems and their functions.	3,8
2	Knowledge on efficient use of MS- Office tools.	3,8
3	Understanding on internet uses, types and cyber world.	3,7,8
4	Knowledge on different uses of social media and its benefits & loses.	3,7,8
5	Apply skills of digital payment systems.	3,7,8

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UCDL101R</b>	<b>BASIC DIGITAL LITARACY</b>			2				2	3

SEMESTER – II									
Course Title	MOOCS								
Course code	MOBOTTCR122	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	1.Equip students with a thorough understanding of the course material through engaging online content. 2.Provide hands-on experience through interactive exercises and real-world projects. 3.Promote effective communication and teamwork through online discussions and group activities.								
CO1	Demonstrate a strong grasp of key principles and theories covered in the course.								
CO2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7,8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7,8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7,8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	7,8

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
MOBOTTCR122	MOOCS							3	2

SEMESTER – III									
Course Title	PATIENT ASSESSMENT, VENOUS ACCESS & DRUG ADMINISTRATION								
Course code	22BOTT211R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 60T,60P	4	0	4	0	0	0	6
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	1.The curriculum of the course has been designed to emphasize both rehabilitation and preventive approaches. 2.It educates the students on how to deal with their physical, emotional and mental health issues and offer a remedy that works for everyone. 3. To develop the knowledge about data interpretation & different types of situations.								
CO1	Explain and apply the techniques of assessment for medical and trauma patients.								
CO2	Discuss the technique of history taking and demonstrate the process to perform head-to-toe examination.								
CO3	Apply principles for critical thinking and implement skills on techniques of documentation and communication								
CO4	Identify the different composition of fluid in the body, different types of IV Fluids, gain IV sites and access								
CO5	Describe the routes of drug administration and utilize skills to perform correct techniques.								
UnitNo.	Content		Contact Hour	Learning Outcome				KL	
I	Patient assessment		15	Identify and differentiate between medical and trauma patient along with their assessment.				1,2	
	<ul style="list-style-type: none"> <li>• Medical patient assessment</li> <li>• Trauma patient assessment</li> </ul>								
II	History taking		15	Describe, demonstrate and explain the different techniques of history taking including full body examination.				1,2	
	<ul style="list-style-type: none"> <li>• Techniques of history taking</li> <li>• Special assessment challenges</li> <li>• Vital signs</li> <li>• Head to toe physical examination</li> <li>• Limits of physical exam</li> </ul>								



<b>III</b>	<b>Data Interpretation &amp; Special Situations</b> <ul style="list-style-type: none"> <li>• Concept formation</li> <li>• Data interpretation □</li> <li>• Application of principle □</li> <li>• Reflection in and on action.</li> <li>• Various communication matters.</li> <li>• Documentation techniques □</li> <li>• Verbal and nonverbal skills</li> <li>• Special interview situations.</li> </ul>	<b>15</b>	Describe, demonstrate and explain the different techniques of history taking including full body examination.	1,2
<b>IV</b>	<b>Venous access</b> <ul style="list-style-type: none"> <li>• Fluid composition &amp; distribution in the body</li> <li>• I.V. fluid composition</li> <li>• Techniques of I. V access.</li> </ul>	<b>15</b>	Describe and explain the fluid composition in the body along with the different types of IV fluids and IV access.	1,2
<b>V</b>	<b>Medication administration</b> <ul style="list-style-type: none"> <li>• Routes of medication administration</li> <li>• Calculating fluid infusion rates.</li> </ul>	<b>10</b>	Describe, illustrate and explain the various routes of medication administration including the calculation of drug doses.	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Obtaining Vascular Access</li> <li>• Performing a rapid exam</li> <li>• Performing full body exam</li> <li>• Drawing Medication</li> <li>• Administering Medication via nebulizer</li> </ul>	<b>60</b>		1,2, 3,4, 5

**TEXT BOOKS:**

- Nancy caroline Emergency care in the street 7<sup>th</sup> edition

**REFERENCE BOOKS:**

- **Seidel's Guide to Physical Examination** by Jane W. Ball, Joyce E. Dains, John A. Flynn, Barry S. Solomon, and Rosalyn W. Stewart

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain and apply the techniques of assessment for medical and trauma patients.	1,2,3
2	Discuss the technique of history taking and demonstrate the process to perform head-to-toe examination.	1,2,3,6,7
3	Apply principles for critical thinking and implement skills on techniques of documentation and communication	2,3,7
4	Identify the different composition of fluid in the body, different types of IV Fluids, gain IV sites and access	1,2,3
5	Describe the routes of drug administration and utilize skills to perform correct techniques.	1,2,3

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BOTT211R	<b>PATIENT ASSESSMENT, VENOUS ACCESS &amp; DRUG ADMINISTRATION</b>	2	3	3			2	3	

SEMESTER – III									
Course Title	AIRWAY MANAGEMENT & RESPIRATORY EMERGENCIES								
Course code	22BOTT212R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 60T,60P	4	0	4	0	0	0	6
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. To recognize and assess patients with airway compromise, including those with respiratory distress, airway obstruction, and respiratory failure.</li> <li>2. To perform basic airway management techniques, including airway positioning, suctioning, and use of airway adjuncts such as oral or nasopharyngeal airways.</li> <li>3. Understand the indications, contraindications, and techniques for advanced airway management</li> </ol>								
CO1	Describe anatomy and physiology of the airway and understand the basic airway adjuncts and functions								
CO2	Explain advanced airway management techniques and develop the skills necessary for their effective application.								
CO3	Classify surgical & non-surgical airways.								
CO4	Identify the symptoms of airway and breathing conditions.								
CO5	Demonstrate the assessment and management of various respiratory disorders								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Airway Management</b> <ul style="list-style-type: none"> <li>• Review of Anatomy and Physiology</li> <li>• Basic Airway Management</li> <li>• Manual airway maneuvers</li> <li>• Airway Adjuncts</li> <li>• Continuous Positive Airway Pressure (CPAP)</li> <li>• Supplemental O2 therapy and delivery devices</li> <li>• Suctioning</li> <li>• Assisted and artificial ventilation</li> </ul>	20	Describe and explain the anatomy and physiology of the respiratory system including the basic airway adjuncts.					1,2	
II	<b>Advanced airway management</b> <ul style="list-style-type: none"> <li>• Endo tracheal intubations</li> <li>• Kings It Airway</li> <li>• Digital intubations</li> <li>• Laryngeal mask airways and Combitube intubations</li> <li>• Rapid sequence intubations</li> </ul>	20	Describe, explain and demonstrate advance airway manoeuvres along with basic airway adjuncts and procedure of suctioning.					1,2	

<b>III</b>	<b>Surgical Airway</b> <ul style="list-style-type: none"> <li>• Surgical and non surgical airways</li> <li>• Special patient consideration</li> </ul>	<b>15</b>	Classify and explain different airways along with their indications, contraindications and procedure.	1,2
<b>IV</b>	<b>Respiratory emergencies – I</b> <ul style="list-style-type: none"> <li>□ Airway problems versus breathing problems.</li> </ul>	<b>15</b>	Classify and differentiate between airway and breathing problems.	1,2
<b>V</b>	<b>Respiratory emergencies - II</b> <ul style="list-style-type: none"> <li>□ Obstructive airway diseases.</li> <li>□ Assessment and management of various respiratory problems.</li> </ul>	<b>10</b>	Describe, identify and manage various respiratory disorders.	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Airway Maneuver- □ Head-tilt-chin-lift</li> <li>• Jaw thrust</li> <li>• Suctioning, inserting a oral airway</li> <li>• ET tube intubation</li> <li>• Non-invasive mask</li> <li>• Tracheotomy</li> <li>• Removal of ET tube</li> </ul>	<b>60</b>		1,2,3,4,5

**TEXT BOOKS:**

*Nancy Caroline (2017). Emergency care in the street. Jones and Barlett Publishers*

**REFERENCE BOOKS:**

Seidel's Guide to Physical Examination by Jane W. Ball, Joyce E. Dains, John A. Flynn, Barry S. Solomon, and Rosalyn W. Stewart

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe anatomy and physiology of the airway and understand the basic airway adjuncts and functions	<b>1,2,3</b>
<b>2</b>	Explain advanced airway management techniques and develop the skills necessary for their effective application.	<b>1,2,3,4</b>
<b>3</b>	Classify surgical & non-surgical airways.	<b>1,2,3</b>
<b>4</b>	Identify the symptoms of airway and breathing conditions.	<b>1,2,3</b>
<b>5</b>	Demonstrate the assessment and management of various respiratory disorders	<b>1,2,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT212R</b>	<b>AIRWAY MANAGEMENT &amp; RESPIRATORY EMERGENCIES</b>	2	3	3	2				2

SEMESTER – III									
Course Title	MICROBIOLOGY I								
Course code	22BOTT213R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	1.Introduce the students to the concepts related to the microorganisms and some important disease caused by microorganisms. 2.Understand the staining process to identify the microbes. 3. Understand the immune system.								
CO1	Ability to gain the knowledge about the concept of microbiology.								
CO2	Demonstrate about various staining process and its interpretation.								
CO3	Get the knowledge about the general introduction of disease-causing agent.								
CO4	Get the knowledge about serological test.								
CO5	Ability to gain the knowledge about the structure and function of the immune system.								
UnitNo.				Learning Outcome				KL	
I	<b>Introduction to Microbiology</b> <input type="checkbox"/> The history and classification of characterization, microorganisms.			5	Describe and explain about the history and classification of microbiology.				1,2
II	<b>Microscopy:</b> <ul style="list-style-type: none"> <li>• Bright-field Microscopy.</li> <li>• Dark field Microscopy.</li> <li>• Phase contrast Microscopy. <input type="checkbox"/></li> <li>Fluorescence <input type="checkbox"/> Microscopy.</li> <li>• Electron Microscopy</li> <li>• Transmission electron Microscopy</li> <li>• Scanning electron</li> <li>• Microscopy</li> </ul>			10	Describe ,illustrate and explain about the bright field, dark field and phase contrast of microscopy.				1,2

<b>III</b>	<b>Stains in microbiology</b> <ul style="list-style-type: none"> <li>• Preparation of smear, simple staining,</li> <li>• Classification of stains</li> <li>• Gram staining</li> <li>• Acid fast staining</li> <li>• Negative staining</li> </ul>	<b>10</b>	Describe , illustrate and classify about the stains in microbiology.	1,2
<b>IV</b>	<b>Shapes and structure of bacteria</b> <b>Bacterial cell- structure and function,</b> <ul style="list-style-type: none"> <li>• Capsule</li> <li>• Spores</li> <li>• Flagella</li> <li>• Virulence factor of Bacteria</li> </ul>	<b>7</b>	Describe and explain about the shapes and structure of bacteria , bacterial cell-structure and function.	1,2
<b>V</b>	Microbial Nutrition, Growth and control Nutritional requirements (C,N,H,O,S,P)\ Nutritional types of Micro-organisms, Growth factors Bacteriological medias:- <ul style="list-style-type: none"> <li>• Simple Media</li> <li>• Differential Media</li> <li>• Special; media</li> <li>• Enrichment media</li> </ul> Sterilisation and disinfection <ul style="list-style-type: none"> <li>• Definition</li> <li>• Classification</li> <li>• Antisepsis</li> <li>• Autoclave</li> </ul>	<b>13</b>	Describe , illustrate and explain about the microbial nutrition, growth and control nutritional requirements and types of microorganisms.	1,2

**TEXT BOOKS:**

- *Nd Medical Parasitology book by S Arora*

**REFERENCE BOOKS:**

- Microbiology: An Introduction by Gerard J. Tortora, Berdell R. Funke, and Christine L. Case

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Ability to gain the knowledge about the concept of microbiology.	<b>1,2,3</b>
<b>2</b>	Demonstrate about various staining process and its interpretation.	<b>1,2,3</b>
<b>3</b>	Get the knowledge about the general introduction of diseasecausing agent.	<b>1,2,3</b>
<b>4</b>	Get the knowledge about serological test.	<b>1,2,3</b>
<b>5</b>	Ability to gain the knowledge about the structure and function of the immune system.	<b>1,2,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT213R</b>	<b>MICROBIOLOGY I</b>	3	1	1					1



SEMESTER – III									
Course Title	PHARMACOLOGY I								
Course code	22BOTT214R	Total credits: 2 Total hours: 30P	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	1.Explain the mechanism of drug action, side effects, adverse effects, dose and therapeutic uses of the drugs used to treat various disorders. 2.To explain about the emergency drugs.								
CO1	Explain the concept of Pharmacology including Emergency Medicines and the routes of administration.								
CO2	Recognize different drugs that affect the Autonomic Nervous System.								
CO3	Classify sedative and antiepileptic drugs along with their mechanism of action.								
CO4	Discuss different drugs used to treat cardiovascular and respiratory conditions								
CO5	Identify different types of IV fluids and their preparations as well as antidiabetic drugs.								
UnitNo.	Content	Contact Hour	Learning Outcome				KL		
<b>I</b>	<b>General Pharmacology</b> <ul style="list-style-type: none"> <li>• Introduction, definition and classification of drugs</li> <li>• Routes of drug administration</li> <li>• Pharmacokinetics</li> <li>• Pharmacodynamics</li> <li>• Factors modifying drug response</li> <li>• Adverse effects</li> </ul>	<b>6</b>	Define, explain and classify various drugs and the routes of drug administration.				1,2		
<b>II</b>	<b>Autonomic Nervous System:</b> <ul style="list-style-type: none"> <li>• General Considerations</li> <li>• Cholinergic and Anti – Cholinergic drugs</li> <li>• Adrenergic and Adrenergic blocking drugs</li> <li>• Skeletal muscle relaxants</li> </ul>	<b>5</b>	Describe, classify and explain the drugs used to manage disorders in the nervous system				1,2		
<b>III</b>	<b>Neuro pharmacology:</b> <ul style="list-style-type: none"> <li>• Sedative – Hypnotic Drugs: Barbiturates, Benzodiazepines</li> <li>• Antiepileptic drugs, narcotic analgesics.</li> </ul>	<b>4</b>	Describe, classify and explain the drugs used for sedation and pain management.				1,2		

<b>IV</b>	<b>Cardiovascular and Respiratory Pharmacology:</b> <input type="checkbox"/> Drugs used in heart failure – Digitalis, Diuretics, vasodilators.	<b>10</b>	Describe, classify and explain the drugs used to treat cardiovascular and respiratory disorders.	1,2
	<ul style="list-style-type: none"> <li>• Antihypertensive Drugs – ACE inhibitors.</li> <li>• Drugs for ischemic Heart Disease – Nitrates, Beta blockers, Calcium channel blockers.</li> <li>• Vasopressors, Inotropic agents</li> <li>• Anticoagulants and Thrombolytics</li> <li>• Bronchodilators and Mucokinetic agents.</li> </ul>			
<b>V</b>	<b>Others:</b> <ul style="list-style-type: none"> <li>• IV Fluids with different preparation.</li> <li>• Anti Diabetic drugs – Insulin, Steroids</li> </ul>	<b>5</b>	Describe, classify and explain the different types of IV fluids including antidiabetic drugs.	1,2

**TEXT BOOKS:**

- *Essentials of Medical Pharmacology - Dr KD Tripathi*

**REFERENCE BOOKS:**

"Pharmacology for Medical Graduates" by -Tara V. Shanbhag and Smita Shenoy.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain the concept of Pharmacology including Emergency Medicines and the routes of administration.	<b>1,2,3,4</b>
<b>2</b>	Recognize different drugs that affect the Autonomic Nervous System.	<b>1,2,3</b>
<b>3</b>	Classify sedative and antiepileptic drugs along with their mechanism of action.	<b>2,3</b>
<b>4</b>	Discuss different drugs used to treat cardiovascular and respiratory conditions	<b>1,2,3</b>
<b>5</b>	Identify different types of IV fluids and their preparations as well as antidiabetic drugs.	<b>1,2,4</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT214R</b>	<b>PHARMACOLOGY I</b>	3	3	2	1				1

SEMESTER – III									
Course Title	Systemic Examination Of The Patient (TPS)								
Course code	22BOTT215R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30p	0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	<p>1.To gather information about the patient's medical history, including any pre-existing medical conditions, allergies, and medications.</p> <p>2.To obtain a comprehensive understanding of the patient's overall health status, identify any existing or potential health problems, and develop an appropriate treatment plan.</p> <p>3.Students will gain a foundational understanding of the methods and importance of systemic examination, enabling them to integrate cardiovascular, respiratory, musculoskeletal, and neurological assessments into comprehensive patient evaluations.</p>								
CO1	Understanding of the methods and importance of systemic examination,								
CO2	Identify heart sounds, interpret ECG results, and take comprehensive medical histories to assess cardiovascular health.								
CO3	Proficient in inspecting, palpating, and percussing the chest, as well as auscultating lung sounds to evaluate respiratory function and identify abnormal								
CO4	Apply the DCAP-BTLS mnemonic for trauma assessment and determine musculoskeletal health and function.								
CO5	Understand Glasgow Coma Scale for assessing consciousness levels and conduct thorough motor and sensory examinations to diagnose neurological conditions.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to systemic examination	2	Describe, explain and apply knowledge, skills, and attitudes necessary to conduct a thorough and effective health assessment, and provide high-quality patient care.					1,2,3	
II	Cardiovascular system <ul style="list-style-type: none"> <li>• Auscultating heart sound</li> <li>• ECG</li> </ul> Medical history	3	Describe, explain and apply the basic knowledge, skills necessary to assess and manage cardiovascular disease.					1,2,3	

<b>III</b>	Respiratory system <ul style="list-style-type: none"> <li>• Inspection of the chest</li> <li>• Palpation of the chest</li> <li>• Percussion of the chest Auscultating lungs sound</li> </ul>	<b>4</b>	Describe, explain and apply clinical skills for assessing the respiratory system, including identifying and interpret respiratory	1,2, 3
<b>IV</b>	Musculoskeletal system <ul style="list-style-type: none"> <li>• DCAPBTLS</li> <li>• Assessment of range of motion</li> </ul> Assessment of muscle strength	<b>3</b>	Describe, explain and apply skill how to identify and interpret musculoskeletal abnormalities, including joint deformities,	1,2, 3
<b>V</b>	Neurological system <ul style="list-style-type: none"> <li>• Glasgow coma scale</li> <li>• Cranial nerves</li> </ul> Motor and sensory examination	<b>3</b>	Describe, explain and apply clinical skills for assessing the neurological system, and identifying neurological abnormalities, including abnormal reflexes, weakness, sensory deficits, and changes in mental status.	1,2, 3

**TEXT BOOKS:**

*Nancy Caroline (2017). Emergency care in the street. Jones and Barlett Publishers*

**REFERENCE BOOKS:**

Advanced Health Assessment & Clinical Diagnosis in Primary Care by Joyce E. Dains, Linda Ciofu Baumann, and Pamela Scheibel

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding of the methods and importance of systemic examination,	<b>1,2,3,7</b>
<b>2</b>	Identify heart sounds, interpret ECG results, and take comprehensive medical histories to assess cardiovascular health.	<b>1,2,3</b>
<b>3</b>	Proficient in inspecting, palpating, and percussing the chest, as well as auscultating lung sounds to evaluate respiratory function and identify abnormal	<b>1,2,3,</b>
<b>4</b>	Apply the DCAP-BTLS mnemonic for trauma assessment and determine musculoskeletal health and function.	<b>1,2,3</b>
<b>5</b>	Understand Glasgow Coma Scale for assessing consciousness levels and conduct thorough motor and sensory examinations to diagnose neurological conditions.	<b>1,2,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT215R</b>	<b>Systemic Examination of The Patient (TPS)</b>	3	3	3				2	2

SEMESTER – III									
Course Title	GENERIC ELECTIVE								
Course code	22BOTTGE01	Total credits: 2 Total hours: 30P	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	1. Equip students with a thorough understanding of the course material through engaging online content. 2. Provide hands-on experience through interactive exercises and real-world projects. 3. Promote effective communication and teamwork through online discussions and group activities.								
CO1	Demonstrate strong grasp of key principles and theories covered in the course.								
CO2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7,8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7,8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7,8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	7,8

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BOTTGE01	GENERIC ELECTIVE					3		3	3

SEMESTER – III									
Course Title	MOOCS								
Course code	22BOTTM001	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	1. Equip students with a thorough understanding of the course material through engaging online content. 2. Provide hands-on experience through interactive exercises and real-world projects. 3. Promote effective communication and teamwork through online discussions and group activities.								
CO1	Demonstrate strong grasp of key principles and theories covered in the course.								
CO2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate a strong grasp of key principles and theories covered in the course.	7,8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7,8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7,8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7,8
5	Demonstrating strong collaboration and teamwork skills..	7,8

#### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BOTTM001	MOOCS							3	3



SEMESTER – III									
Course Title	CO-CURRICULAR/EXTRA CURRICULAR ACTIVITIES								
Course code	22UBCC211/22UBEC211	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours:	0	0	0	4	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To develop skills and interests through participation in diverse extracurricular and co-curricular activities.</li> <li>To learn about teamwork and leadership abilities by engaging students in club-led events and competitions.</li> <li>To provide opportunities for personal growth and practical learning beyond the academic curriculum.</li> </ol>								
CO1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
CO2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
CO3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO4	Explore new platform to learn from invited experts in their respective fields.								
CO5	Evaluate overall growth alongside academic development.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<ul style="list-style-type: none"> <li>ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.</li> <li>These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.</li> <li>Keeping in mind the 360 degree learning methodology the students are engaged in different activities headed under different clubs viz. Dance, music, photography, drama, literary etc.</li> </ul> <p>The students are encouraged to</p>	60	Describe, illustrate explain and apply The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.					1,2,3,4,5	

	<ul style="list-style-type: none"> <li>participate in regular club activities, workshops, competitions as per their interest and hobbies.</li> <li>The student members of the club are trained represent AdtU in various inter University student and national level competitions</li> <li>Renewed personalities are invited to conduct workshops that benefit the members and students by giving them the platform to learn from experts in the respective fields.</li> </ul>			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy	5,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests	5,7,8
3	Apply knowledge and skills to represent ADTU in interuniversity, state, and national level competitions.	5,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,7,8
5	Evaluate overall growth alongside academic development.	5,7,8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22UBCC211/22UBEC211	<b>EXTRA CURRICULAR ACTIVITIES</b>					3		3	3

SEMESTER – III									
Course Title	EXECUTIVE ENGLISH								
Course code	22UBPD211R	Total credits: 1 Total hours: 30p	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	1. To enable students to learn and comprehend about the proficiency of the English language. 2. To improve the writing skill of the learners and enable them to prepare CV and cover letter for professional development. 3. To evaluate certain attributes in a candidate that can be otherwise difficult or time consuming to ascertain.								
CO1	Demonstrate proficiency in writing structured paragraphs and formal applications.								
CO2	Learn the use of prepositions and convert sentences between active and passive voice.								
CO3	Identify and interpret various types of body language and their meanings.								
CO4	Initiate, participate in, and summarize group discussions effectively.								
CO5	Apply writing, grammar, non-verbal communication, and group discussion skills in real-world contexts.								
UnitNo.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Grammar</b> <ul style="list-style-type: none"> <li>Use of Prepositions</li> <li>Tag questions</li> </ul>	5	Describe and explain about the preposition.				1,2		
II	<b>Grammar</b> <ul style="list-style-type: none"> <li>.Active and Passive Voice</li> <li>Direct and Indirect Speech</li> </ul>	5	Describe ,illustrate and explain about the active and passive voice and direct and indirect speech.				1,2		
III	<b>Writing Skills</b> <ul style="list-style-type: none"> <li>The Basics of Writing; avoid ambiguity and vagueness</li> <li>Paragraph Writing</li> <li>Resume, CV and Cover Letter</li> </ul>	5	Describe , illustrate and apply the basic writing skills like paragraph writing , resume, CV.				1,2		

<b>IV</b>	<b>Self-Management Skills</b> <ul style="list-style-type: none"> <li>• SWOT Analysis</li> <li>• Goal Setting</li> <li>• Personal Hygiene</li> </ul>	<b>5</b>	Describe and analyse about self management skills.	1,2
<b>V</b>	<b>Non-Verbal Communication-Sciences of</b>	<b>10</b>	Describe , illustrate , explain about non-verbal communication	1,2
	<b>Body Language</b> <ul style="list-style-type: none"> <li>• What is Non-Verbal Communication &amp; Body Language,</li> <li>• Types of Body Language,</li> <li>• Importance and Impact of Body Language,</li> <li>• Types of Communication through Body Language,</li> <li>• Body Language Do's and Don'ts, Doubt Clearing Session.</li> </ul> <b>Group Discussion (Theory)</b> <ul style="list-style-type: none"> <li>• Importance,</li> <li>• Planning, Elements, and Skills assessed;</li> <li>• Effectively disagreeing,</li> </ul>		,types of body language ,importance and impact of body language and apply planning element and skills assessed.	

**TEXT BOOKS:**

- Lata, P., Kumar, S. (2015). Communication Skills, Second Edition. India: Oxford University Press.
- Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.
- McDowell, Gayle Laakmann. 2008. Cracking the Coding Interview (Indian Edition).

**REFERENCE BOOKS:**

- Zinsser, William. (2006)On Writing Well: The Classic Guide to Writing Nonfiction ,Harper Perennial
- Lacinai, Antonio. (2016)Understanding Body Language: 51 gestures and what they signal,
- Other Learning Resources:
  - <https://learning.shine.com/talenteconomy/career-help/top-group-discussion-skills/>
  - <https://www.thoughtco.com/what-is-nonverbal-communication-1691351>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate proficiency in writing structured paragraphs and formal applications.	<b>7,8</b>
<b>2</b>	Learn the use of prepositions and convert sentences between active and passive voice.	<b>7,8</b>
<b>3</b>	Identify and interpret various types of body language and their meanings.	<b>7,8</b>
<b>4</b>	Initiate, participate in, and summarize group discussions effectively.	<b>5,7,8</b>
<b>5</b>	Apply writing, grammar, non-verbal communication, and group discussion skills in real-world contexts.	<b>5,7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBPD211R</b>	<b>EXECUTIVE ENGLISH</b>					3		3	2

SEMESTER – III									
Course Title	BASIC ACCLIMATIZING SKILLS								
Course code	22UULS211R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of 2 <sup>nd</sup> year of the programme								
Course Objectives (Minimum 3)	1.To impart knowledge of the fundamentals of Hospitality industry and its applications. 2.Students will be able to familiarize with the cooking equipment's & Utensils. 3.Students will be able to handle different modes of reservations.								
CO1	Students will have basic knowledge of cooking methods.								
CO2	Students will gain the knowledge of organizing & Cleaning of Rooms.								
CO3	Students will be able to gain the travel management concept.								
CO4	Students will be able to acquire the knowledge of basic households amenities for day- to-day use.								
CO5	Students will have basic knowledge of cooking methods.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Introduction to Accommodation Management</b> <ul style="list-style-type: none"> <li>Telephone handling technique</li> <li>Organizing of Rooms.</li> <li>Cleaning agents.</li> <li>Cleaning equipment's and uses. □ Bed making Process</li> </ul>	7	Describe , understand and apply knowledge about techniques, efficiently organize rooms, understand the use of various cleaning agents and equipment, and demonstrate the bed-making process.					1,2,3	
II	<b>Fundamentals of Cooking</b> <ul style="list-style-type: none"> <li>-Definition of cookery –Aim &amp; Objectives of cooking.</li> <li>-Use of basic Cooking equipment's</li> <li>-Personal Hygiene and Safety</li> <li>-Use of Fire &amp; Fuels</li> </ul>	10	Describe , understand and apply knowledge of cooking, proficiently use basic cooking equipment, and maintain personal hygiene and safety standards, including the proper use of fire and fuels.					1,2,3	

<b>III</b>	<b>Methods of Cooking</b> <ul style="list-style-type: none"> <li>• Different Cuts.</li> <li>• Use of Herbs and Spices.</li> <li>• Basic Food and Beverage Preparation.</li> <li>• Regional food Habits</li> </ul>	<b>10</b>	Describe , understand and apply knowledge of herbs and spices, basic food and beverage preparation, and will gain an understanding of regional food habits	1,2, 3
<b>IV</b>	<b>Forms &amp; Format's</b> <ul style="list-style-type: none"> <li>• C –form</li> <li>• Reservation form</li> <li>• Registration form</li> <li>• Passport Application form</li> <li>• Legal Rent Agreement</li> </ul>		Describe , understand and apply knowledge to understand the purpose of various forms, including C-forms, reservation forms, registration forms, passport application forms, and legal rent agreements.	1,2, 3

**TEXT BOOKS:**

- Arora K (2011). Theory of cookery, Frank brothers & company (pub) pvt ltd-New Delhi.

**REFERENCE BOOKS:**

- BruceH.Axler,CarolA.Litrides(2010) Food and Beverage ServiceVolume I ofWileyProfessionalRestaurateur,Guides.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Students will have basic knowledge of cooking methods.	<b>7,8</b>
<b>2</b>	Students will gain the knowledge of organizing & Cleaning of Rooms.	<b>7,8</b>
<b>3</b>	Students will be able to gain the travel management concept.	<b>7,8</b>
<b>4</b>	Students will be able to acquire the knowledge of basic households amenities for day- to-day use.	<b>7,8</b>
<b>5</b>	Students will have basic knowledge of cooking methods.	<b>7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBPD211R</b>	<b>EXECUTIVE ENGLISH</b>							2	2



SEMESTER – IV									
Course Title	Cardiovascular and Neurological Emergency Management								
Course code	22BOTT221R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To develop the ability to recognize and assess common cardiovascular emergencies, such as myocardial infarction, arrhythmias, and heart failure.</li> <li>To acquire skills in the assessment and management of neurological emergencies including stroke, seizures, and head trauma.</li> <li>To apply appropriate immediate interventions for cardiovascular emergencies to stabilize patients and minimize complication</li> </ol>								
CO1	Develop fundamental knowledge of the human heart and the circulatory system								
CO2	Demonstrate skills and techniques to assess and manage any cardiac emergencies								
CO3	Apply acquired skills to perform ECG and identify abnormalities								
CO4	Develop comprehensive knowledge on the nervous system								
CO5	Illustrate the ability to evaluate and treat a variety of neurologic emergencies, including seizures, strokes, and other condition								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Cardiovascular System</b> - Review of anatomy and physiology	5	Demonstrate an understanding of the anatomical structures and physiological functions of the cardiovascular system, including the heart, blood vessels, and cardiac circulation.					1,2,	
II	<b>Cardiovascular System</b> - Assessment and management of <ul style="list-style-type: none"> <li>• <i>Coronary artery disease and angina</i></li> <li>• <i>Acute myocardial infarct</i></li> <li>• <i>Congestive heart failure</i></li> <li>• <i>Cardiac tamponade</i></li> <li>• <i>Cardiogenic shock</i></li> <li>• <i>Aortic aneurysm</i></li> <li>• <i>Hypertensive emergencies</i></li> </ul>	10	Assess and manage cardiovascular emergencies including coronary artery disease, acute myocardial infarction, congestive heart failure, cardiac tamponade, Cardiogenic shock, aortic aneurysm, and hypertensive emergencies, applying appropriate clinical interventions and treatment protocols.					1,2, 3,4	

<b>III</b>	<b>ECG</b> <ul style="list-style-type: none"> <li>- ECG and arrhythmias</li> <li>- 12 lead ECGs</li> <li>- Basic and advanced cardiac life support</li> <li>- Cardio pulmonary resuscitation (CPR)</li> <li>- Defibrillation</li> <li>- Cardio version</li> <li>- Transcutaneous cardiac pacing</li> <li>- Review of pharmacology</li> </ul>	<b>15</b>	Classify various types of cardiac arrhythmias on an ECG tracing and differentiate between benign and life-threatening arrhythmias to initiate appropriate initial management strategies.	1,2,3,4
<b>IV</b>	<b>Nervous system</b> <ul style="list-style-type: none"> <li>- Review of anatomy and physiology</li> </ul>	<b>5</b>	Explain the anatomical structures and physiological functions of the nervous system, including the central and peripheral components, and their roles in sensory, motor, and autonomic functions.	1,2,
<b>V</b>	<b>Neurological emergencies</b> <ul style="list-style-type: none"> <li>- Assessment and management of <ul style="list-style-type: none"> <li>• <i>Stroke</i></li> <li>• <i>TIA</i></li> <li>• <i>Altered Mental Status</i></li> <li>• <i>Coma, etc</i></li> </ul> </li> </ul>	<b>10</b>	Demonstrate proficiency in assessing and managing neurological emergencies, including stroke, transient ischemic attack (TIA), altered mental status, coma, and other critical conditions, applying timely interventions to optimize patient outcomes	1,2,3,4
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Cardiac monitoring procedure</li> <li>2. 12-Lead ECG Placement</li> <li>3. ECG Interpretation</li> <li>4. CPR Skills Training</li> <li>5. AED Operation Simulation</li> <li>6. Cardiac Arrest Scenario Simulation</li> <li>7. Basic Arrhythmia Recognition</li> <li>8. Hands-On Defibrillator Practice</li> <li>9. Team-Based BLS Scenario Drill</li> <li>10. Team-Based ACLS Scenario Drills</li> <li>11. Transcutaneous Pacing Simulation</li> <li>12. Cardioversion Techniques</li> <li>13. FAST (Face, Arms, Speech, Time) Assessment Drill</li> <li>14. Glasgow Coma Scale (GCS) Application Practice</li> <li>15. Emergency Response to Seizure Scenario</li> <li>16. Brain Injury Assessment</li> </ol>	<b>60</b>	Demonstrate proficiency in applying theoretical knowledge to effectively manage both cardiac and neurological emergencies, including ECG interpretation, CPR skills, AED operation, arrhythmia recognition, ACLS protocols, neurological assessments, and emergency responses to seizures and brain injuries	3,4, 5

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop fundamental knowledge of the human heart and the circulatory	<b>1,6,8</b>
<b>2</b>	Demonstrate skills and techniques to assess and manage any cardiac emergencies	<b>2,3,4,5,7</b>
<b>3</b>	Apply acquired skills to perform ECG and identify abnormalities	<b>2,3,4,</b>
<b>4</b>	Develop comprehensive knowledge on the nervous system	<b>1,6,8</b>
<b>5</b>	Illustrate the ability to evaluate and treat a variety of neurologic emergencies, including seizures, strokes, and other condition	<b>2,3,4,5,7</b>

**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
<b>22BEDM221R</b>	Cardiovascular and Neurological Emergency Management	3	3	3	2	2	2	1	2

SEMESTER – IV									
Course Title	MICROBIOLOGY II								
Course code	22BOTT222R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1.To develop knowledge about microbes and help to understand our world and our place within it 2.To learn insights into the complexity of nature and society, which in turn 3.To provide many different health, environmental, social, cultural, industrial and economic benefits								
CO1	Identify different cell organelles of microorganisms and their detailed functions.								
CO2	Understand about various bacteriological tests and its interpretation.								
CO3	Describe growth and control of microbes as well as different bacteriological techniques involved in microbiology								
CO4	Understand about general introduction and parasitological studies of parasite								
CO5	Identify the different type of infections and the ways to prevent it from transmission								
UnitNo.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Immunology</b> • Introduction to immunology, immunity and its types and classification. • Antigen and Antibodies, Ag-Ab reactions hypersensitivity and complement fixation		<b>10</b>	Describe the the different cell organelles of microorganisms and their detailed functions				1,2,	
II	<b>Serological tests</b> • (WIDAL, VDRL, ASO, CRP, RIA, R F & ELISA) • Rapid test for HIV and Hbs Ag		<b>8</b>	Describe and apply knowledge about various bacteriological tests and its interpretation.				1,2, 3	
III	General Bacteriology – Introduction Morphology, cultural characteristics, diagnosis and diseases caused by • Staphylococcus • Streptococcus • Pneumococcus Introduction to Entero bactericeae • coli • Salmonella • Shigella • Klebsiella		<b>10</b>	Describe, illustrate and explain the growth and control of microbes as well as different bacteriological techniques involved in microbiology				1,2	

<b>IV</b>	Parasitology <ul style="list-style-type: none"> <li>• Introduction and Classification of parasites</li> </ul> histolytica <ul style="list-style-type: none"> <li>• Plasmodium vivax &amp; falciparum</li> <li>• G. lamblia</li> <li>• Balantidium coli</li> <li>• Leishmania</li> </ul>	<b>10</b>	Describe, illustrate and explain about general introduction and parasitological studies of parasite	1,2
<b>V</b>	Nosocomial infections- <ul style="list-style-type: none"> <li>• Causative agents, transmission methods, prevention and control hospital born infection</li> <li>• Biomedical waste Disposal</li> </ul>	<b>7</b>	Describe and apply knowledge about the infections and the ways to prevent it from transmission	1,2,3

**TEXT BOOKS:**

- Nd Medical Parasitology book by S Arora

**REFERENCE BOOKS:**

- Microbiology: An Introduction by Gerard J. Tortora, Berdell R. Funke, and Christine L. Case

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Identify different cell organelles of microorganisms and their detailed functions.	<b>1,2,3</b>
<b>2</b>	Understand about various bacteriological tests and its interpretation.	<b>1,2,3</b>
<b>3</b>	Describe growth and control of microbes as well as different bacteriological techniques involved in microbiology	<b>1,2,3</b>
<b>4</b>	Understand about general introduction and parasitological studies of parasite	<b>1,2,3</b>
<b>5</b>	Identify the different type of infections and the ways to prevent it from transmission	<b>1,2,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT222R</b>	<b>MICROBIO LOGY II</b>	3	2	1					

SEMESTER – IV									
Course Title	Pharmacology II								
Course code	22BOTT223R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To describe how sedative-hypnotic drugs (barbiturates, benzodiazepines) and antianxiety drugs (benzodiazepines) work and differentiate their clinical uses based on how they are processed in the body.</li> <li>To develop a treatment plan for heart failure using digitalis, diuretics, vasodilators, and ACE inhibitors, considering their mechanisms and possible interactions.</li> <li>To assess the effectiveness and safety of antihypertensive and justify their selection based on patient-specific factors and conditions.</li> </ol>								
CO1	Differentiate between the mechanisms of action of barbiturates and benzodiazepines.								
CO2	Evaluate the appropriate use of antiepileptic drugs in managing anxiety disorders.								
CO3	Apply pharmacological principles in the use of drugs for heart failure (digitalis, diuretics, vasodilators) and ACE inhibitors.								
CO4	Evaluate the efficacy and safety of antihypertensive drugs such as calcium channel blockers, central acting alpha agonists, peripheral alpha antagonists, and direct acting vasodilators.								
CO5	Integrate pharmacological treatments for vascular disease and ischemic heart disease.								
UnitNo.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Neuro pharmacology:</b> - Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines - Antianxiety Drugs: Benzodiazepines,		5	Explain the differences in the mechanism of action between barbiturates and benzodiazepines.				1,2,3	
II	<b>Other Anxiolytics</b> - Antiepileptic drugs, Narcotic analgesics		5	Assess the effectiveness of antiepileptic drugs in treating anxiety disorders compared to benzodiazepines.				2,3,4,5	
III	<b>Cardiovascular pharmacology:</b> -Drugs used in the treatment of Heart Failure(Digitalis, Diuretics, Vasodilators) - ACE inhibitors		5	Develop a treatment plan for heart failure using digitalis, diuretics, vasodilators, and ACE inhibitors, considering their mechanisms and potential interactions.				2,3,4,5	

<b>IV</b>	<b>Antihypertensive drugs</b> <ul style="list-style-type: none"> <li>- Calcium channel Blockers</li> <li>- Central acting Alpha agonists</li> <li>- Peripheral Alpha Antagonists</li> <li>- Direct acting vasodilators</li> </ul>	6	Critically assess the advantages and disadvantages of different antihypertensive drug classes, and justify drug selection based on patient characteristics and comorbidities and central acting alpha agonists.	2,3,4,5
<b>V</b>	<b>Drugs used in the treatment of vascular disease and tissue Ischemia</b> <ul style="list-style-type: none"> <li>- Vascular Disease</li> <li>- Lipid lowering agents</li> <li>- Antithrombotic</li> <li>- Anticoagulants and Thrombolytics</li> <li>- Ischemic Heart Disease</li> <li>- Nitrates, Beta Blockers, Calcium channel Blockers</li> </ul>	9	Design a comprehensive treatment plan for vascular disease and ischemic heart disease using lipid lowering agents, antithrombotic agents, anticoagulants, thrombolytics, nitrates, beta blockers, and calcium channel blockers, tailored to patient-specific factors and guidelines.	3,4,5,6

**TEXT BOOKS:**

T1: Dr. K. D. Tripathi: *Essentials of Medical Pharmacology* 8th edition, New Delhi, India; (2019)

**REFERENCE BOOKS:**

R1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: *Emergency Care in the Streets* 8th edition, Burlington, Massachusetts, USA; 2018.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Differentiate between the mechanisms of action of barbiturates and benzodiazepines.	<b>1,2,8</b>
<b>2</b>	Evaluate the appropriate use of antiepileptic drugs in managing anxiety disorders.	<b>1,2,8</b>
<b>3</b>	Apply pharmacological principles in the use of drugs for heart failure (digitalis, diuretics, vasodilators) and ACE inhibitors.	<b>1,2,8</b>
<b>4</b>	Evaluate the efficacy and safety of antihypertensive drugs such as calcium channel blockers, central acting alpha agonists, peripheral alpha antagonists, and direct acting vasodilators.	<b>1,2,8</b>
<b>5</b>	Integrate pharmacological treatments for vascular disease and ischemic heart disease.	<b>1,2,8</b>



**MAPPING TABLE**

<b>Course code</b>	<b>Course Name</b>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BEDM223R</b>	Pharmacology II	2	3		2				2

SEMESTER – IV																	
Course Title	Trauma Emergencies																
Course code	22BOTT225R	Total credits:	1	L	0	T	0	P	2	S	0	R	0	O/F	0	C	1
Prerequisite	NIL	Co-requisite	NIL														
Programme	Bachelor Of Trauma, Emergency and Disaster Management																
Semester	IV semester of second year of the programme																
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. To analyze the patient's condition using the ABCDE approach during the initial assessment.</li> <li>2. To understand the principles of triage and their application in mass casualty incidents and multiple casualty situations.</li> <li>3. To apply critical thinking and problem-solving skills to provide immediate and appropriate emergency care</li> </ol>																
CO1	Apply the knowledge to stabilize and manage fractures using appropriate techniques and materials.																
CO2	Apply the general rules for applying dressings and bandages to provide effective emergency care for fractures and wounds.																
CO3	Classify types of haemorrhage and special forms of bleeding. and implement appropriate control measures to manage bleeding effectively																
CO4	Assess and provide immediate care for various injuries (head, chest, abdominal, blast, crush, burns, scalds, electrical injuries)																
CO5	Demonstrate the appropriate use of dressings and bandages for wound management.																
UnitNo.	Content	Contact Hour	Learning Outcome				KL										
I	<b>Fracture:</b> <ul style="list-style-type: none"> <li>- Cause of Fracture</li> <li>- Types of fracture</li> <li>- Classification of fractures</li> <li>- Skull fractures</li> <li>- Jaw and Facial fractures - Upper Trunk and Limbs</li> <li>- Lower Trunk and Limbs</li> </ul>	10	Analyze the causes, types, and classifications of fractures, including skull, jaw, facial, upper trunk and limbs, and lower trunk and limbs fractures.				2,3,4,5										
II	<b>Dressings &amp; Bandages</b> <ul style="list-style-type: none"> <li>- Types of dressing</li> <li>- General rules for applying dressings</li> <li>- General Rules for applying Bandages</li> <li>- Types of bandages</li> <li>- Slings</li> </ul>	7	Understand and apply the general rules for applying dressings and bandages, including the types of dressings and bandages and the use of slings.				2,3,4,5										

<b>III</b>	Hemorrhage or Bleeding: - Types of hemorrhage - Special forms of Bleeding	<b>5</b>	Identify and classify types of haemorrhage and special forms of bleeding.	2,3, 4,5
<b>IV</b>	<b>Injuries:</b> - Head injuries - Chest injuries - Abdominal wounds - Blast injuries - Crush injuries - Burns and Scalds - Electrical Injuries Wounds and - Soft Tissue Injuries	<b>10</b>	Evaluate and manage head, chest, abdominal, blast, crush, burns, scalds, and electrical injuries.	2,3, 4,5
<b>V</b>	Wounds: - Definition - Emergency care for open wounds - Wound with foreign body - Special wounds	<b>8</b>	Discuss various types of wounds and provide emergency care for open wounds, wounds with foreign bodies, and special wounds.	2,3, 4,5

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Apply the knowledge to stabilize and manage fractures using appropriate techniques and materials.	<b>1,2,3,4,6,8</b>
<b>2</b>	Apply the general rules for applying dressings and bandages to provide effective emergency care for fractures and wounds.	<b>2,3,4,6,8</b>
<b>3</b>	Classify types of haemorrhage and special forms of bleeding. and implement appropriate control measures to manage bleeding effectively	<b>1,2,3,4,6,8</b>
<b>4</b>	Assess and provide immediate care for various injuries (head, chest, abdominal, blast, crush, burns, scalds, electrical injuries)	<b>1,2,3,4,6,8</b>
<b>5</b>	Demonstrate the appropriate use of dressings and bandages for wound management.	<b>2,3,4,6,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BEDM225 R</b>	Trauma Emergencies	2	3	3	3	2	2	1	1

SEMESTER – IV									
Course Title	BASIC LIFE SAVING SKILLS								
Course code	22UULS222R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To learn and demonstrate essential Basic Life Support (BLS) techniques for assisting in medical emergencies before professional help arrives.</li> <li>To enhance communication, teamwork, and conflict resolution skills to improve personal and professional interactions.</li> <li>To Understand the Triage system, recognize different levels of triage, and classify common medical emergencies to prioritize patient care effectively.</li> </ol>								
CO1	Demonstrate knowledge and skill to perform CPR use an AED, and respond to choking in adults and children.								
CO2	Understand the significance of communication and teamwork in various situations								
CO3	Apply knowledge and skill about pre-hospital care and management of trauma emergencies								
CO4	Understand the principles and purpose of the Triage system in healthcare settings.								
CO5	Identify and manage common medical emergency conditions								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	<b>Basic Life Support ( BLS)</b> - Introduction of BLS - Chain of survival - ABCs Assessment - CPR and Ventilation Technique - AED - Choking for adult and children	5	Apply the principles of Basic Life Support (BLS) to perform CPR, ventilation, and use an AED correctly in emergency scenarios.					1,2,	
<b>II</b>	<b>Soft skills</b> - Introduction - Communications Skills - Situational Skills - Team Work - Other Soft Skills	5	Demonstrate the effective communication and teamwork skills in emergency situations, ensuring clear and concise information exchange and coordinated efforts.					1,2,3,4	

<b>III</b>	<b>Trauma emergencies</b> - Introduction - Priorities of Initial approach in pre-hospital care a) Scene safety b) Primary assessment c) Bleeding control d) Helmet removal e) Care of amputated body part f) Extrication of victims and safe transfer g) Cervical spine stabilization h) Cervical collar application - Splinting of broken Limbs	<b>10</b>	Analyze the priorities of initial trauma care to conduct scene safety, primary assessment, bleeding control, and proper handling of injured patients in pre-hospital settings.	1,2,3,4
<b>IV</b>	<b>Triage system</b> - Introduction - Flow chart approach of Triage - Triage of Multiple Casualties in Pre-Hospital setting - Triage of Single casualty	<b>5</b>	Evaluate different triage methods to prioritize care for single and multiple casualties efficiently in a pre-hospital setting.	1,2,3,4,5
<b>V</b>	<b>Medical emergencies</b> - Introduction - Victim centred approach in medical emergency - Management of :- a)seizures b)heart attack c)asthma d)diabetic emergencies e)emergency childbirth f)stroke recovery position	<b>5</b>	Develop a comprehensive care plan for managing specific conditions such as seizures, heart attacks, and asthma, ensuring a victim-centered approach in simulated scenarios.	2,3,4,5

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate knowledge and skill to perform CPR use an AED, and respond to choking in adults and children.	<b>1,2,3,4,5,6,7,8</b>
<b>2</b>	Understand the significance of communication and teamwork in various situations	<b>1,2,3,4,5,6,7,8</b>
<b>3</b>	Apply knowledge and skill about pre-hospital care and management of trauma emergencies	<b>1,2,3,4,5,6,7,8</b>
<b>4</b>	Understand the principles and purpose of the Triage system in healthcare settings.	<b>1,2,3,4,5,6,7,8</b>
<b>5</b>	Identify and manage common medical emergency conditions	<b>1,2,3,4,5,6,7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UULS222R</b>	Basic Life Saving Skills	2	3	3	3	2	2	3	2

SEMESTER – IV									
Course Title	EVS								
Course code	22UBES201R	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor Of Trauma, Emergency and Disaster Management								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. To understand and address complex environmental issues from a problem-oriented, inter-disciplinary perspective</li> <li>2. To develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, Skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and prevention of new ones.</li> <li>3. To explore strategies for sustainable development and living, including conservation, renewable energy, waste reduction, and responsible consumption</li> </ol>								
CO 1	Discuss the importance of Environment Studies and the need for public awareness.								
CO 2	Identify natural resource, its importance, and its impacts on the environment								
CO 3	Explore in-depth knowledge on concept of ecosystem								
CO 4	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.								
CO 5	Explain various environmental pollution and its impact on human and ecosystem								
UnitNo.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Multidisciplinary nature of environmental studies:</b> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Scope and importance</li> <li>• Need for public awareness</li> </ul>	5	Explain the definition, scope, and importance of environmental studies and discuss the need for public awareness.				1,2,		
II	<b>Natural Resources:</b> <b>Renewable and non-renewable resources:</b> <ul style="list-style-type: none"> <li>• Forest resources</li> <li>• Water resources</li> <li>• Mineral resources</li> <li>• Food resources</li> <li>• Energy resources</li> <li>• Land resources</li> </ul>	10	Describe different types of natural resources (renewable and nonrenewable) and explain their uses and environmental impacts.				1,2, 3,4		



<b>III</b>	<b>Ecosystems</b> <b>Concept of an ecosystem:</b> <ul style="list-style-type: none"> <li>• Structure and function-Producers, consumers, and decomposers.</li> <li>• Energy flow</li> <li>• Ecological succession</li> <li>• Food chains, food webs and ecological pyramids</li> <li>• Introduction- types, characteristic features, structure, and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems</li> </ul>	<b>15</b>	Describe the components of an ecosystem, explain energy flow and ecological succession, and compare different types of ecosystems.	1,2,3,4
<b>IV</b>	<b>Biodiversity and its conservation</b> <ul style="list-style-type: none"> <li>• Introduction – □ Definition</li> <li>• Value of biodiversity</li> <li>□Threats to biodiversity</li> <li>• Conservation of biodiversity</li> </ul>	<b>5</b>	<b>Discuss</b> , explain biodiversity’s value and threats, and describe methods for its conservation.	1,2,
<b>V</b>	<b>Environmental Pollution</b> <ul style="list-style-type: none"> <li>• Definition Cause, effects, and control measures of: -Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards</li> <li>• solid waste management</li> <li>• Disaster management</li> </ul>	<b>10</b>		1,2,3,4

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss the importance of Environment Studies and the need for public awareness.	<b>8</b>
<b>2</b>	Identify natural resource, its importance, and its impacts on the environment	<b>8</b>
<b>3</b>	Explore in-depth knowledge on concept of ecosystem	<b>8</b>
<b>4</b>	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.	<b>8</b>
<b>5</b>	Explain various environmental pollution and its impact on human and ecosystem	<b>8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBEES201R</b>	EVS	1	1	1	1	1	1	1	3

SEMESTER – IV										
Course Title	ENHANCED PROFESSIONAL SKILLS									
Course code	22UBPD221R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C	
			0	0	2	0	0	0	1	
Prerequisite	22UBPD121R	Co-requisite	NIL							
Programme	Bachelor Of Trauma, Emergency and Disaster Management									
Semester	IV semester of second year of the programme									
Course Objective (Minimum 3)	1. To enhance the writing skills in different areas including Paragraph writing and letter writing. 2. To understand and enhance the Self-management skills. 3. To familiarize students with the use of Contextual vocabulary and Use of phrasal verbs and idioms in a conversation 4. To understand the dress code ethics and interview skills 5. To enhance the analytical skill and problem-solving skill of the students.									
CO1	Develop proficiency in paragraph writing and letter writing									
CO2	Develop student's self-management skills to plan their goals.									
CO3	Develop writing skills in different areas including Paragraph writing and letter writing.									
CO4	Enhance their capacity in understanding dress code ethics and develop interview skills									
CO5	Enhance comprehend sentences accurately and quickly and controlling the emphasis in writing									
UnitNo.	Content				Contact Hour	Learning Outcome				KL
I	<b>Writing Skills</b> - Paragraph Writing & Narratives - Letter Writing - Technical Writing <b>Pipe and cistern</b> - Introduction of pipes and cistern - Solving different types of questions				7	Write a technical document that introduces the principles of pipes and cisterns, while explaining the concept clearly and illustrating its application through solving different types of questions.				1,2,
II	<b>Self- Management Skills</b> - SWOT Analysis - Goal Setting and Personal Hygiene <b>Mixture allegation and Clock</b> - Introduction of basics - Solving questions on mixture - mixture				7	Explain the importance of conducting a SWOT analysis for personal development and setting SMART goals, as well as the significance of personal hygiene in professional and personal settings.				1,2, 3,4

<b>III</b>	<b>Vocabulary Development</b> <ul style="list-style-type: none"> <li>- Understanding different aspects of a word (such as the use of say, tell, speak)</li> <li>- Learning strategies to develop vocabulary Contextual vocabulary learning</li> <li>- Use of phrasal verbs and idioms in a conversation</li> <li>- Effectively using dictionary, thesaurus</li> </ul> <b>Statement and Course of action</b> <ul style="list-style-type: none"> <li>- Revision of syllogism</li> <li>- Statement and conclusion</li> <li>- Course of action based on statement</li> </ul>	<b>7</b>	Explain various strategies for developing vocabulary, including contextual learning and the use of phrasal verbs and idioms in conversation.	1,2,3,4
<b>IV</b>	<b>Interview Skills &amp; Dress Code Ethics</b> <ul style="list-style-type: none"> <li>- Types of interview- telephonic, virtual &amp; face to face online interview, personal interview, Panel interview, Group interview</li> <li>- Common interview questions and answering strategies</li> <li>- Dress Code Ethics during Interviews</li> <li>- Mock Interview Session</li> </ul> <b>Sitting arrangement (puzzle)</b> <ul style="list-style-type: none"> <li>- Linear arrangement puzzle</li> <li>- Circular arrangement puzzle</li> <li>- Matrix</li> </ul>	<b>11</b>	Explain common interview questions and effective answering strategies, as well as the importance of dress code ethics during interviews.	1,2,
<b>V</b>	<b>Grammar (Flipped Classroom)</b> <ul style="list-style-type: none"> <li>- Word-stress, Syllables Practice Session: Common Errors (testing the students 'grammar already learnt)</li> </ul> <b>Profit loss and discount</b> <ul style="list-style-type: none"> <li>- Introduction to basics</li> <li>- Introduction to discount</li> <li>- Problems related on the topic</li> </ul>	<b>4</b>	Identify common grammar errors related to word stress and syllable division.	1,2,3,4

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop proficiency in paragraph writing and letter writing	<b>6,7,8</b>
<b>2</b>	Develop student's self-management skills to plan their goals.	<b>6,7,8</b>
<b>3</b>	Develop writing skills in different areas including Paragraph writing and letter writing.	<b>6,7,8</b>
<b>4</b>	Enhance their capacity in understanding dress code ethics and develop interview skills	<b>6,7,8</b>
<b>5</b>	Enhance comprehend sentences accurately and quickly and controlling the emphasis in writing	<b>6,7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBPD221R</b>	Enhance Professional Skills	1	1	1	1	1	2	3	2

SEMESTER – IV									
Course Title	PERSONAL FINANCIAL PLANNING								
Course code	22UUFLL223R	Total credits: 1 Total hours: 30P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. To understand the relevant concept of money, borrowing, lending, taxes and their application to financial planning. 2. To assess the personal financial planning process, the life cycle of financial plans and methods of goal achievement 3. To formulate a budget, record keeping system and tax planning strategy based on current financial goals.								
CO1	Understand the relevant concept of money, borrowing, lending, taxes and their application to financial planning.								
CO2	Assess the personal financial planning process, the life cycle of financial plans and methods of goal achievement.								
CO3	Formulate a budget, record-keeping system and tax planning strategy based on current financial goal								
CO4	Gain insights into tax planning for different financial scenarios, such as individual taxpayers, businesses, and investments								
CO5	Learn strategies to manage and reduce debt efficiently								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Fundamentals of Financial Planning:</b> i.Functions of Money, ii. Inflation-Meaning ,causes, how it can be controlled, iii. Process official planning, iv.Time value of money-simple and compound interest v.net present value and Future Value vi.Power of Compounding, vii.Doubling period and Rule of 72	5						1	
II	<b>Income Tax Planning:</b> i.Meaning of Income, ii.Direct and Indirect taxes, Taxable Income, Various heads of Income for Tax Calculation, iii.Non-taxable income, iv.Tax evasion and tax avoidance, v.GST and tax planning strategies	10						1,2,	

<p><b>III</b></p>	<p><b>Entrepreneurial Planning:</b>  i. Meaning of Entrepreneurship, prerequisite of becoming an entrepreneur,  ii. Entrepreneurship support system in India, iii.Institutional support systems for entrepreneurship,  iv. financial support system for entrepreneurship,  v. venture capital, business Angels,  vi.Assistant of Government,  vii.Commercial bank Loans and Overdraft.</p>	<p><b>15</b></p>		<p>3,4</p>
<p><b>IV</b></p>	<p><b>Planning for investing in securities market:</b> i.Investment avenues offered by Securities Markets, Primary market and secondary market  ii.Stock market- Meaning, features, functions of NSE, BSE, DEMAT trading account  iii.Security Repository, stock brokers, Operational aspect of securities markets: placement of orders, contract note, pay-in and pay-out, trading and settlement cycle  iv.Various Risk Involved in investing in securities markets; Role of Financial Intermediaries; stock indices.  v. Mutual Funds- Meaning, concept, definition, types, importance and drawback of Mutual Funds, Mutual Funds in India, Investing in Mutual Funds  vi. Systematic Investment Plan(SIP) and its advantages</p>	<p><b>5</b></p>		<p>4,5, 6</p>

V	<b>Planning for debts and Retirement:</b> i. Consumer credit- Introduction to consumer credit, choosing a source of credit, the cost of credit alternatives. ii. Consumer Legal Protection; iii. Housing decision: factors and finance; Vehicle decision iv.Retirement Planning- Meaning of Cost of cost of living, Retirement need analysis; development of retirement plan, various retirement schemes iv. Estate Planning; Pension and Medicare Planning; wills	10		5,6
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**TEXT BOOKS:**

T1: Personal Finance and Planning by Dr. Rajni. Date of Publication 1st January,2020, Publisher : JSR PUBLISHING HOUSE LLP (1 January 2020)

T2: Personal Finance 8<sup>th</sup> Edition by Arthur J. Keown, Pearson Education, Publisher: Pearson Education; Eighth edition (30 July 2019)

**REFERENCE BOOKS:**

R1: The Dumb Things Smart People Do with their Money: Thirteen Ways to Right your Financial Wrongs Kindle Edition by Jill Schlesinger, Publisher: Ballantine Books (5 February (2019)

R2 : Peaceful Personal Finance: A short read on the Basics of Personal Finance and Planning Kindle Edition by Hema singh



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the relevant concept of money, borrowing, lending, taxes and their application to financial planning.	<b>8</b>
<b>2</b>	Assess the personal financial planning process, the life cycle of financial plans and methods of goal achievement.	<b>8</b>
<b>3</b>	Formulate a budget, record-keeping system and tax planning strategy based on current financial goal	<b>8</b>
<b>4</b>	Gain insights into tax planning for different financial scenarios, such as individual taxpayers, businesses, and investments	<b>8</b>
<b>5</b>	Learn strategies to manage and reduce debt efficiently	<b>8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UUFLL223R</b>	Personal Financial Planning	1	1	1	1	1	1	1	1

<b>SEMESTER – IV</b>									
<b>Course Title</b>	<b>Extra-Curricular</b>								
<b>Course code</b>	<b>22UBEC221</b>	<b>Total credits: 1</b> <b>Total hours:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Prerequisite</b>	<b>NIL</b>	<b>Co-requisite</b>	<b>NIL</b>						
<b>Programme</b>	<b>Bachelor of Operation Theatre Technology</b>								
<b>Semester</b>	<b>IV semester of second year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	<ol style="list-style-type: none"> <li>1. To develop writing abilities through various exercises and assignments.</li> <li>2. To develop innovative thinking and creative ideas.</li> <li>3. To develop skill and knowledge to explore different activities.</li> </ol>								
<b>CO 1</b>	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
<b>CO 2</b>	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
<b>CO 3</b>	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
<b>CO 4</b>	Explore new platform to learn from invited experts in their respective fields.								
<b>CO 5</b>	Evaluate overall growth alongside academic development.								

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy	<b>5,7,8</b>
<b>2</b>	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests	<b>5,7,8</b>
<b>3</b>	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	<b>5,7,8</b>
<b>4</b>	Explore new platform to learn from invited experts in their respective fields.	<b>5,7,8</b>
<b>5</b>	Evaluate overall growth alongside academic development.	<b>5,7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBEC221</b>	<b>Extra-Curricular</b>					2		3	3

SEMESTER – IV									
Course Title	CO-CURRICULAR								
Course code	22UBCC221	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1. To develop writing abilities through various exercises and assignments. 2. To develop innovative thinking and creative ideas. To develop skill and knowledge to explore different activities.								
CO 1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
CO 2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
CO 3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO 4	Explore new platform to learn from invited experts in their respective fields.								
CO 5	Evaluate overall growth alongside academic development.								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy	5,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests	5,7,8
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	5,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,7,8
5	Evaluate overall growth alongside academic development.	5,7,8

## MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBCC221</b>	<b>CO-CURRICULAR</b>					3		2	3

SEMESTER – IV									
Course Title	MOOCS								
Course code	22BOTTMO21	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1.Equip students with a thorough understanding of the course material through engaging online content. 2.Provide hands-on experience through interactive exercises and real-world projects. 3.Promote effective communication and teamwork through online discussions and group activities.								
CO 1	Demonstrate strong grasp of key principles and theories covered in the course.								
CO 2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO 3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO 4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO 5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate strong grasp of key principles and theories covered in the course.	7.8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7.8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7.8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7.8
5	Demonstrating strong collaboration and teamwork skills..	7.8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTTMO2 1</b>	<b>MOOCS</b>							3	3

SEMESTER – IV									
Course Title	GENERIC ELECTIVE								
Course code	22BOTTGE21	Total credits: 2 Total hours: 30T	L	T	P	S	R	O/F	C
			2	0	0	0	0	0	2
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1.Equip students with a thorough understanding of the course material through engaging online content. 2.Provide hands-on experience through interactive exercises and real-world projects. 3.Promote effective communication and teamwork through online discussions and group activities.								
CO 1	Demonstrate strong grasp of key principles and theories covered in the course.								
CO 2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO 3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO 4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO 5	Demonstrating strong collaboration and teamwork skills..								



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	Demonstrate strong grasp of key principles and theories covered in the course.	<b>Mapped Program Outcome</b>
<b>1</b>	Apply learned concepts to solve real-world problems through practical projects and exercises.	<b>7,8</b>
<b>2</b>	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	<b>7,8</b>
<b>3</b>	Develop their ideas clearly and effectively in both written and verbal forms.	<b>7,8</b>
<b>4</b>	Demonstrating strong collaboration and teamwork skills..	<b>7,8</b>
<b>5</b>	Demonstrate strong grasp of key principles and theories covered in the course.	<b>7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTTGE21</b>	<b>GENERIC ELECTIVE</b>							3	3

SEMESTER – V									
Course Title	INTRODUCTION TO OT I								
Course code	22BOTT311R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To development the knowledge of the general history and evolution of the OT profession.</li> <li>To develop an understanding of the basic principles, frameworks, and paradigms that guide OT practice.</li> <li>To develop the knowledge and skill about the various fields where OT is applied and what OT professionals do in each area.</li> </ol>								
CO1	Understand the fundamental structure, role and responsibility of operation theatre (OT).								
CO2	Classify the importance of maintaining a clean and dust-free environment.								
CO3	Apply the knowledge and skill about the different procedure and maintenance of IV system and administering medication.								
CO4	Understanding the basic principles and Knowledge of different sterilization methods.								
CO5	Identify the classification and the uses and handling of instruments.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	<b>PRINCIPLES OF OPERATION THEATRE</b> <ul style="list-style-type: none"> <li>Description of operation theatre including laminar airflow.</li> <li>Essentials of operation theatre</li> <li>Operation theatre routine</li> <li>General care and comfort of patients in operation theatre</li> <li>Informed Consent</li> </ul>	<b>10</b>	Describe, illustrate and explain basic principle and structure of operation theatre.					1,2	
<b>II</b>	<b>CLEANINGANDDUSTING</b> <ul style="list-style-type: none"> <li>Concept and rules of cleaning</li> <li>Principles of cleaning</li> <li>Methods of cleaning</li> <li>Procedure for dusting and cleaning of operation theatre</li> <li>Fumigation of operation theatre.</li> </ul>	<b>10</b>	Describe, illustrate and explain the importance of maintaining a clean and dust-free environment.					1,2	
<b>III</b>	<b>OPERATIONTHEATREPROCEDURES</b> <ul style="list-style-type: none"> <li>BLOOD TRANSFUSION</li> <li>Counting procedures</li> <li>Sponge and sharp counts</li> <li>Maintenance of IV system</li> <li>Administering medications by heparin</li> </ul>	<b>15</b>	Describe, illustrate and explain the different procedures and maintenance of IV system and administering medication.					1,2	

<b>IV</b>	<b>CSSD SERVICES</b> <ul style="list-style-type: none"> <li>• CSSD Function and layout</li> <li>• CSSD health and safety</li> <li>• Cleaning of CSSD</li> <li>• CSSD procedures</li> <li>• Biomedical waste</li> </ul>	<b>15</b>	Describe, illustrate and explain the principles of sterilization, and Knowledge of sterilization methods.	1,2
<b>V</b>	<b>SURGICAL INSTRUMENTATION</b> <ul style="list-style-type: none"> <li>• Classification of instruments</li> <li>• General care testing and cleaning of instruments</li> <li>• Fabrication of metal instruments</li> <li>• Use and Handling of instruments</li> <li>• Sterilization of equipments such as Arthroscope , Gastroscope, Endoscope etc</li> </ul>	<b>10</b>	Describe, illustrate and explain the classification and the uses and handling of instruments.	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Identify and handle essential OT equipment.</li> <li>• Document daily OT routines.</li> <li>• Practice patient positioning and draping.</li> <li>• Practice obtaining consent.</li> <li>• Practice different cleaning methods and Practice OT cleaning steps.</li> <li>• Practice blood transfusion setup.</li> <li>• Set up and maintain IV systems.</li> <li>• Observe and practice CSSD procedures.</li> <li>• Handle and dispose of biomedical waste.</li> <li>• Practice handling surgical instruments.</li> </ul>	<b>60</b>	Describe, illustrate , explain different practical procedure and apply their knowledge and skilled in handling OT equipment, documenting routines, positioning patients, obtaining consent, cleaning, setting up blood transfusions, maintaining IV systems, performing CSSD procedures, managing biomedical waste, and handling surgical instruments.	1,2,3,4

**TEXT BOOKS:**

- Berry & Kohn's Operating room technique 12<sup>th</sup> edition

**REFERENCE BOOKS:**

- Textbook on operation Theatre Technology 1<sup>st</sup> edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the fundamental structure, role and responsibility of operation theatre (OT).	<b>2,3,6</b>
<b>2</b>	Classify the importance of maintaining a clean and dustfree environment.	<b>2,3,5</b>
<b>3</b>	Apply the knowledge and skill about the different procedure and maintenance of IV system and administering medication.	<b>1,2,3,</b>
<b>4</b>	Understanding the basic principles and Knowledge of different sterilization methods.	<b>2,3,8</b>
<b>5</b>	Identify the classification and the uses and handling of instruments.	<b>2,3,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT311R</b>	<b>INTRODUCTION TO OT I</b>	2	3	3			2		2

SEMESTER – V									
Course Title	OT Technology - Clinical I								
Course code	22BOTT312R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives (Minimum 3)	1. To gain knowledge of different surgical procedures and their specific requirements. 2. To learn about the uses of various surgical instruments. 3. To learn how to maintain and sterilize surgical instruments.								
CO1	Understand the Physical layout layout of the Operation theatre room								
CO2	Identify the importance and application of sterilization technique								
CO3	Describe the knowledge on the Operating room attire								
CO4	Identify the classification of hazards and the safety measures in OT.								
CO5	Understand the principles of decontamination, sterilization and disinfectant								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>PHYSICAL FACILITY</b> <ul style="list-style-type: none"> <li>Physical layout of the surgical suite</li> <li>Transition zones</li> <li>Operating room</li> <li>Peripheral support areas</li> <li>Special procedure rooms</li> </ul>	10	Describe, illustrate and explain the Physical layout layout of the Operation theatre room					1,2	
II	<b>SURGICAL ASEPSIS</b> <ul style="list-style-type: none"> <li>Concept and need of surgical asepsis</li> <li>Principles of aseptic and sterile technique</li> <li>Principles of basic aseptic technique in operating room</li> <li>Application of sterile technique</li> <li>Surgical aseptic procedures</li> </ul>	10	Describe, illustrate and explain the importance and application of sterilization technique					1,2	
III	<b>OPERATION THEATRE ATTIRE</b> <ul style="list-style-type: none"> <li>Concept and purpose of operating room attire □ Components of attire</li> <li>Surgical scrub</li> <li>Gowning and Gloving</li> <li>Distribution of sterile goods</li> </ul>	15	Describe, illustrate and explain the insight knowledge on the Operating room attire.					1,2	

<b>IV</b>	<b>HAZARDS AND SAFETY IN OT</b> <ul style="list-style-type: none"> <li>• Classification and regulation of hazards</li> <li>• Environmental hazards</li> <li>• Catastrophic events in OT</li> <li>• Safety measures for OT personnel</li> <li>• Emergency and disaster preparedness plan</li> </ul>	<b>15</b>	Describe, illustrate and explain the classification of hazards and the safety measures.	1,2
<b>V</b>	<b>STERILIZATION AND DISINFECTION</b> <ul style="list-style-type: none"> <li>• Principles of decontamination, sterilization and disinfection</li> <li>• Classification of sterilization and disinfection</li> <li>• Methods of monitoring the sterilization process</li> <li>• Assembly, packaging of instruments and other items for sterilization</li> <li>• Autoclave</li> </ul>	<b>10</b>	Describe, illustrate and explain the principles of decontamination, sterilization and disinfectant	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Identify and differentiate clean, sterile, and contaminated zones within the surgical suite.</li> <li>• Assist in setting up an OT for a surgical procedure.</li> <li>• practice of aseptic techniques to prevent infections.</li> <li>• surgical aseptic procedures, including patient draping and maintaining a sterile field.</li> <li>• Donning and doffing of OT attire, including masks, caps, gowns, and gloves.</li> <li>• Perform surgical scrub techniques, gowning and gloving in a sterile environment.</li> <li>• Implement safety protocols to protect OR personnel from physical and chemical hazards.</li> <li>• Assemble and package instruments correctly for sterilization.</li> </ul>	<b>60</b>	Describe, illustrate and explain and apply skill & techniques for all practical procedure.	1,2,3,4

**TEXT BOOKS:**

1. Berry & Kohn's Operating room technique 12<sup>th</sup> edition

**REFERENCE BOOKS:**

1. Textbook on operation Theatre Technology 1<sup>st</sup> edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) And PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the Physical layout layout of the Operation theatre room	<b>1,2,3</b>
<b>2</b>	Identify the importance and application of sterilization technique	<b>2,3,8</b>
<b>3</b>	Describe the knowledge on the Operating room attire	<b>1,2,8</b>
<b>4</b>	Identify the classification of hazards and the safety measures in OT	<b>2,3,8</b>
<b>5</b>	Understand the principles of decontamination, sterilization and disinfectant	<b>2,5,7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT312R</b>	<b>OT Technology - Clinical I</b>	1	3	3		2		2	2

SEMESTER – V									
Course Title	OT Technology - Applied I								
Course code	22BOTT313R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives (Minimum 3)	1.To development the knowledge of general history of anaesthesia. 2. To development the fundamental knowledge aesthesia monitoring. 3. To learn about different type of equipment and different types of anaesthesia.								
CO1	Describe the principle, history and types of anaesthesia.								
CO2	Understand the physiological monitoring and the methods of anaesthesia.								
CO3	Identify the different equipment's used while patient is in anaesthesia.								
CO4	Understanding the basics of general anesthesia along with different stages and complications.								
CO5	Identify different diagnostic procedures understand the basics of in operation theatre room.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	<b>BASICS OF ANESTHESIA</b> <ul style="list-style-type: none"> <li>Historical background</li> <li>Choice of anesthesia</li> <li>Types of anesthesia</li> <li>Premedication</li> <li>Pre and post anesthetic assessment</li> </ul>	<b>8</b>	Describe, illustrate and explain the the historical background and the basics of anaesthesia					1,2	
<b>II</b>	<b>ANESTHESIA AND PHYSIOLOGICAL MONITORING</b> <ul style="list-style-type: none"> <li>Methods of anesthesia</li> <li>Monitoring and recording the physiological status.</li> <li>Maintenance from anesthesia</li> <li>Emergence from anesthesia</li> <li>Criteria of extubating</li> </ul>	<b>9</b>	Describe, illustrate and explain the physiological monitoring and the methods of anaesthesia					1,2	
<b>III</b>	<b>EQUIPMENTINANESTHESIA</b> <ul style="list-style-type: none"> <li>Equipment for airway management such as airway, facemasks, laryngoscope</li> <li>Other equipment such as humidification devices, oxygen delivery systems in non intubated patient soon.</li> </ul>	<b>10</b>	Describe, illustrate and explain the equipment's used while patient is in anaesthesia					1,2	



<b>IV</b>	<b>INTRODUCTION TO GENERAL ANESTHESIA</b>  <input type="checkbox"/> Components of GA	<b>10</b>	Describe, illustrate and explain the basics of general anaesthesia along with different stages and complications	1,2
	<ul style="list-style-type: none"> <li>• GA protocol (for abnormal healthy patient)</li> <li>• Stages of anesthesia</li> <li>• Risk and complication associated with GA</li> <li>• Indication and advantages of GA</li> </ul>			
<b>V</b>	<b>Diagnostic procedure</b>  <input type="checkbox"/> Endoscopy <input type="checkbox"/> Biopsy	<b>8</b>	Describe, illustrate and explain the basics of in operation theatre room	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Administration of Local and Regional Anesthesia.</li> <li>• Preparation and Administration of Premedication Drugs.</li> <li>• Administering Inhalational and Intravenous Anesthesia.</li> <li>• Monitoring and Recording Physiological Status Using ECG, BP Monitors, and Pulse Oximeters.</li> <li>• Extubation Procedures and Criteria Evaluation.</li> <li>• Usage of Airway Management Tools (e.g., Laryngoscopes).</li> <li>• Operation of Humidification Devices and Oxygen Delivery Systems.</li> <li>• Developing and Implementing GA Protocols.</li> <li>• Identifying and Responding to Stages of Anaesthesia.</li> <li>• Managing Anesthesia Related Emergencies.</li> <li>• Performing and Assisting in Endoscopic Procedures and Biopsy Procedures.</li> </ul>	<b>60</b>	Describe, illustrate and explain and apply skill & techniques for all practical procedure.	1,2,3,4

**TEXT BOOKS:**

1. Berry & Kohn's Operating room technique 12<sup>th</sup> edition

**REFERENCE BOOKS:**

1. Textbook on operation Theatre Technology 1<sup>st</sup> edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe the principle, history and types of anaesthesia.	<b>1,2,3</b>
<b>2</b>	Understand the physiological monitoring and the methods of anaesthesia.	<b>2,3,8</b>
<b>3</b>	Identify the different equipment's used while patient is in anaesthesia.	<b>2,3,8</b>
<b>4</b>	Understanding the basics of general anesthesia along with different stages and complications.	<b>2,3,8</b>
<b>5</b>	Identify different diagnostic procedures understand the basics of in operation theatre room.	<b>2,3,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT313R</b>	<b>OT Technology - Applied I</b>	1	3	3					2

SEMESTER – V									
Course Title	OT Technology – Advanced I								
Course code	22BOTT314R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives (Minimum 3)	1.To Develop competence in suture materials and suture removal procedures. 2.Apply comprehensive knowledge in orthopaedic and neurosurgical procedures. 3.To develop competence in urological and gynaecological/obstetric surgeries								
CO1	Demonstrate proficiency in identifying and classifying suture materials								
CO2	Apply knowledge of the surgical anatomy of the musculoskeletal system to assist and manage orthopaedic surgery procedure.								
CO3	Demonstrate proficiency with instruments used in neurosurgery, and identify and manage complications in neurosurgical cases.								
CO4	Identify common urological procedures such and effectively handle postoperative complications in urologic surgery.								
CO5	Demonstrate proficiency with instruments used in gynecological and obstetric surgeries.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Suture Materials</b> <ul style="list-style-type: none"> <li>• Classification of suture material</li> <li>• Methods of suturing</li> <li>• Common suture techniques</li> <li>• Suture sizing and packaging</li> <li>• Suture removal</li> </ul>	8	Describe, illustrate and explain the the historical background and the basics of anaesthesia					1,2	
II	<b>Orthopedics surgery</b> <ul style="list-style-type: none"> <li>• Surgical Anatomy of Musculoskeletal system</li> <li>• General consideration of fracture and dislocations</li> <li>• Joint procedures such as total hip replacement, total joint replacement, Arthroscopic surgery</li> <li>• Cast application</li> <li>• Complications after Orthopaedic surgery</li> </ul>	10	Describe, illustrate and explain the physiological monitoring and the methods of anaesthesia					1,2	

<b>III</b>	<b>Neurosurgery</b> <ul style="list-style-type: none"> <li>• Cerebral anatomy and physiology</li> <li>• Surgical procedures of the cranium</li> <li>• Neurological pain management</li> <li>• Instruments used for neurosurgery</li> <li>• Complications</li> </ul>	<b>7</b>	Describe, illustrate and explain the equipment's used while patient is in anaesthesia	1,2
<b>IV</b>	<b>Urologic surgery</b> <ul style="list-style-type: none"> <li>• Surgical anatomy of the urinary system</li> <li>• Common urological procedures such as Nephrectomy, PCNL, ESWL</li> </ul>	<b>10</b>	Describe, illustrate and explain the basics of general anaesthesia along with different stages and complications	1,2
	<ul style="list-style-type: none"> <li>• Surgery for renal stones</li> <li>• Postoperative complications of Urologic surgery</li> </ul>			
<b>V</b>	<b>Gynecological/obstetric surgery</b> <ul style="list-style-type: none"> <li>• Differences between a pregnant and abnormal lady</li> <li>• Physiological changes in pregnancy</li> <li>• Normal delivery, LSCS,</li> <li>• Resuscitation of the new born, Agar score</li> <li>• Instruments used for Gynecological/obstetric surgery</li> </ul>	<b>10</b>	Describe, illustrate and explain the basics of in operation theatre room	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Perform common suture techniques □ Practice removing sutures methods □ Assist in arthroscopic procedures.</li> <li>• Familiarize with and handle neurosurgical instruments during surgery.</li> <li>• Assist Urologic Procedure and performed Postoperative Management.</li> <li>• Learn and assist delivery techniques and LSCS.</li> <li>• Assess newborns using the Apgar score.</li> <li>• Familiarize with and handle instruments used in gynecological and obstetric surgeries.</li> </ul>	<b>60</b>	Describe, illustrate and explain and apply skill & techniques for all practical procedure.	1,2, 3,4

**TEXT BOOKS:**

1. Berry & Kohn's Operating room technique 12<sup>th</sup> edition

**REFERENCE BOOKS:**

1. Textbook on operation Theatre Technology 1<sup>st</sup> edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate proficiency in identifying and classifying suture materials	<b>1,2,3,</b>
<b>2</b>	Apply knowledge of the surgical anatomy of the musculoskeletal system to assist and manage orthopaedic surgery procedure.	<b>1,2,3,5</b>
<b>3</b>	Demonstrate proficiency with instruments used in neurosurgery, and identify and manage complications in neurosurgical cases.	<b>1,2,3,5</b>
<b>4</b>	Identify common urological procedures such and effectively handle postoperative complications in urologic surgery.	<b>1,2,3</b>
<b>5</b>	Demonstrate proficiency with instruments used in gynecological and obstetric surgeries.	<b>1,2,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT314R</b>	<b>OT Technology –Advanced I</b>	2	3	2		2			

SEMESTER – V									
Course Title	Techno-professional skill (Basic Care Of Patient)								
Course code	22BOTT315R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Program me	Bachelor of Operation Theatre Technology								
Semester	V semester of third year of the programme								
Course Objective s (Minimum 3)	1. To provide knowledge and skills on monitoring the patients in ICU. 2. To give an insight knowledge and skills on different positioning and mobilization of patients. 3. To provide knowledge and skills on the control of infection in ICU								
CO1	Develop fundamental knowledge on the techniques of monitoring ICU patients.								
CO2	Understand various body positioning and mobility techniques including preventive measures of pressure injury.								
CO3	Apply skills and technique to maintain the airway along with the pharmacological management.								
CO4	Explain the different routes of medication administration and calculation of drug doses.								
CO5	Understand the importance of hygiene and personal protective equipment in infection control.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Monitoring of patients in ICU</b> <ul style="list-style-type: none"> <li>Vital signs monitoring</li> <li>ECG monitoring</li> <li>Pain and sedation monitoring</li> </ul>	10	Explain and illustrate knowledge on techniques of monitoring patients in the ICU.					3,4,5	
II	<b>Positioning and Mobilization</b> Positioning techniques <ul style="list-style-type: none"> <li>Mobility techniques</li> <li>Pressure injuries and prevention in ICU patients</li> </ul>	15	Describe, illustrate and explain various techniques of patient positioning and mobility including preventive measures of pressure injuries.					3,4,5	

<b>III</b>	<b>Airway maintenance</b> <ul style="list-style-type: none"> <li>• Positioning</li> <li>• Airway maneuvers</li> <li>• Airway adjuncts</li> <li>• Advanced airway equipments</li> <li>• Pharmacological interventions <ul style="list-style-type: none"> <li>➤ Bronchodilators</li> <li>➤ Anti inflammatory</li> <li>➤ Mucolytic agents</li> </ul> </li> </ul>	<b>12</b>	Explain, illustrate and demonstrate various airway management techniques along with the different drugs used in the procedure.	3,4,5
<b>IV</b>	<b>Medication administration</b> <ul style="list-style-type: none"> <li>• Routes of administration</li> <li>• Dose calculation</li> </ul>	<b>13</b>	Explain and illustrate the various routes of drug administration and dosage calculation.	3,4,5
<b>V</b>	<b>Infection Control</b> <ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Personal protective equipments</li> <li>• Isolation precautions</li> </ul>	<b>10</b>	Describe, illustrate and explain the important measures such as hand hygiene and PPE for infection control in the ICU.	3,4,5

**TEXT BOOKS:**

T1: Nancy L. Caroline, Bob Elling, Kirsten M. Elling, and Michael Colleran: Emergency Care in the Streets 8th edition, Burlington, Massachusetts, USA; 2018.

**REFERENCE BOOKS:**

R1: American Academy of Orthopaedic Surgeons (AAOS): Emergency Care and Transportation of the Sick and Injured 12<sup>th</sup> edition, Burlington, Massachusetts, USA; 2021.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop fundamental knowledge on the techniques of monitoring ICU patients.	<b>2,3,4,6,8</b>
<b>2</b>	Understand various body positioning and mobility techniques including preventive measures of pressure injury.	<b>1,2,3,4,6,8</b>
<b>3</b>	Apply skills and technique to maintain the airway along with the pharmacological management.	<b>1,2,3,4,8</b>
<b>4</b>	Explain the different routes of medication administration and calculation of drug doses.	<b>2,3,,6,7,</b>
<b>5</b>	Understand the importance of hygiene and personal protective equipment in infection control.	<b>2,3,4,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT315R</b>	Techno-professional skill (Basic Care Of Patient)	1	3	3	3	2	2	2	1



SEMESTER – V									
Course Title	BIOMEDICAL WASTE								
Course code	22BOTT316R	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To comprehend the types of biomedical waste and their color-coded disposal methods.</li> <li>To differentiate between biomedical waste types and understand their associated hazards.</li> <li>To illustrate the disposal process for human waste and contaminated sharps.</li> </ol>								
CO1	Understand the different types of Biomedical waste and disposal of medical waste using color coding.								
CO2	Differentiate biomedical waste and understanding the hazards of each waste.								
CO3	Illustrate the types of human waste, contaminated sharps and its process of disposal.								
CO4	Develop fundamental knowledge on modern technology and protective devices for handling biomedical wastes.								
CO5	Identify the principles of bioethics and handling of waste management								
UnitNo.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction & Waste Segregation		10	Describe, illustrate and explain the Knowledge about waste segregation				1,2	
	<ul style="list-style-type: none"> <li>Definition of Biomedical Waste, General and Hazardous health care waste.</li> <li>Color Coding and types of containers for disposal of medical waste, Segregation, Collection &amp; Disposal</li> </ul>								
II	Types of Biomedical Waste		7	Describe, illustrate and explain the different type of biomedical waste .				1,2,3	
	<ul style="list-style-type: none"> <li>Infectious waste, Genotoxic waste, Waste Sharps Categories, Categorization, and composition of Biomedical waste.</li> <li>Liquid Biomedical Waste - Radioactive wastes, Metals, Chemicals &amp; drugs</li> </ul>								
III	Hospital Generated Waste		10	Describe, illustrate and explain the Knowledge and skill to identify hospital generated waste				1,2,3	
	Human Blood and Blood Products, pathological wastes, Contaminated sharps.								

<b>IV</b>	<b>Types of Waste Disposal</b> <ul style="list-style-type: none"> <li>• Disinfections unit container for Autoclaving.</li> <li>• Sharp waste containers for storage &amp; transportation,</li> </ul>	<b>10</b>	Describe, illustrate and explain and apply knowledge and skill the different typrs of waste disposable	1,2,3
	□Autoclaving, Incineration, Plasma Pyrolysis /Gasification systems, Composting			
<b>V</b>	<b>Recent Trends and Bioethics</b> <ul style="list-style-type: none"> <li>• Protective Devices</li> <li>• Bioethics and Handling of Waste Management.</li> </ul>	<b>10</b>	Describe, illustrate and explain the basics knowledge about bioethics	1,2

**TEXTBOOKS:**

1. Shyam Divan, Environmental law and policy in India, Oxford India Press, 2004.
2. C.charles A Wentz, Hazardous Waste Management, McGraw Hill Inc, Newyork, 1995

**REFERENCEBOOKS:**

1. V. J. Landrum, Medical Waste Management and disposal, Elsevier, 1991, ISBN: 978-0-8155-1264-6
2. S A Tabish, Principles of Hospital Management, OUP, Jaypee Publishers.6th Edition 2000.
3. S L Goel, Dr. R. Kumar, Encyclopedia of Hospital Management - Text and Case Studies Hospitals in Community Health Care, ISBN(Hardbound): 8184502273, 9788184502275. 2010.

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the different types of Biomedical waste and disposal of medical waste using color coding.	<b>2,3,8</b>
<b>2</b>	Differentiate biomedical waste and understanding the hazards of each waste.	<b>2,3,8</b>
<b>3</b>	Illustrate the types of human waste, contaminated sharps and its process of disposal.	<b>2,3,8</b>
<b>4</b>	Develop fundamental knowledge on modern technology and protective devices for handling biomedical wastes.	<b>2,3,8</b>
<b>5</b>	Identify the principles of bioethics and handling of waste management	<b>2,3,6,8</b>

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT316R</b>	<b>BIOMEDICAL WASTE</b>		3	2			3		2

SEMESTER – V									
Course Title	CO-CURRICULAR								
Course code	22UBCC311	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	IV semester of 3 <sup>RD</sup> year of the programme								
Course Objectives (Minimum 3)	1. To develop writing abilities through various exercises and assignments. 2. To develop innovative thinking and creative ideas. 3. To develop skill and knowledge to explore different activities.								
CO 1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy								
CO 2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests								
CO 3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.								
CO 4	Explore new platform to learn from invited experts in their respective fields.								
CO 5	Evaluate overall growth alongside academic development.								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy	5,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests	5,7,8
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	5,7,8
4	Explore new platform to learn from invited experts in their respective fields.	5,7,8
5	Evaluate overall growth alongside academic development.	5,7,8

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22UBCC311</b>	<b>CO-CURRICULAR</b>					3		2	3

SEMESTER – V									
Course Title	MOOCS								
Course code	22BOTMO31	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	IV semester of 3 <sup>RD</sup> year of the programme								
Course Objectives (Minimum 3)	1.Equip students with a thorough understanding of the course material through engaging online content. 2.Provide hands-on experience through interactive exercises and real-world projects. 3.Promote effective communication and teamwork through online discussions and group activities.								
CO 1	Demonstrate strong grasp of key principles and theories covered in the course.								
CO 2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO 3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO 4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO 5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate strong grasp of key principles and theories covered in the course.	7.8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7.8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7.8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7.8
5	Demonstrating strong collaboration and teamwork skills..	7.8

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTTMO31</b>	<b>MOOCS</b>							3	3

SEMESTER – VI									
Course Title	INTRODUCTION TO OT II								
Course code	22BOTT321R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To learn about proper patient positioning, use of monitoring devices, and the importance of accurate documentation in the operating theatre.</li> <li>To develop knowledge to use various surgical instruments and apply essential OT techniques, including infection control and wound care.</li> <li>To learn about the legal and ethical responsibilities in OT, the importance of informed consent, and the critical role of teamwork in surgical settings.</li> </ol>								
CO1	Understanding and apply skill positioning used in different procedures for surgery and monitoring patents whenever required								
CO2	Apply knowledge and skill to use the instrument required in any kind of procedure								
CO3	Understanding and applying various techniques in the operating theatre ensures patient safety, precision, and successful outcomes.								
CO4	Identify the duty as an OT technicians and understanding the scope of practice in the OT room								
CO5	Classify the different ethics and rights of an OT personnel.								
UnitNo.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Positioning and Monitoring in the Operation theatre</b> <ul style="list-style-type: none"> <li>Meaning and general guidelines of patient positioning</li> <li>Surgical positions for various procedures and tests</li> <li>Equipment for positioning Patient monitoring devices</li> <li>Documentation</li> </ul>	6	Understand the general guideline of positioning and apply the skill used in different procedures for surgery and monitoring patents whenever required.				1,2,3		



<b>II</b>	<b>Instrument planning for various surgical procedure and Auxiliary instrumentation</b> <ul style="list-style-type: none"> <li>• Special instruments in general surgery</li> <li>• Orthopedic instruments</li> <li>• Laparoscopic instruments</li> <li>• Powered surgical instruments</li> <li>• Different staplers in surgical procedure</li> </ul>	<b>10</b>	Describe, illustrate and apply knowledge on how to use the instruments in different procedures.	1,2,3
<b>III</b>	<b>O.T Techniques</b>	<b>7</b>	Understanding the concept of several techniques and apply	1,2,3
	<ul style="list-style-type: none"> <li>• Infection control in OT</li> <li>• Care of wound</li> <li>• Catheterization of the urinary bladder</li> <li>• Surgical dressings and bandages</li> <li>• Enema</li> </ul>		their knowledge of those techniques in the operation theatre room	
<b>IV</b>	<b>Fundamentals of medical nursing</b> <ul style="list-style-type: none"> <li>• Assessment, prevention and replacement therapy for fluid and electrolyte imbalance</li> <li>• Medical and surgical management of unconscious patient and neurological disorders</li> <li>• Standards for pre-operative nursing practice</li> <li>• Duties of nurses and O.T technician</li> <li>• Importance of teamwork and anticipating the need for surgeon</li> </ul>	<b>15</b>	Describe, illustrate and explain about nursing care and rule & regulation of OT personnel.	1,2
<b>V</b>	<b>Legal , Regulatory and Ethical issues</b> <ul style="list-style-type: none"> <li>• Surgical ethics</li> <li>• Informed consent</li> <li>• Legal rights and issues in O.T</li> <li>• Legal aspects of surgery</li> <li>• Ethical and personnel responsibilities of OT personnel</li> </ul>	<b>17</b>	Describe, illustrate and explain legal things and different types of ethics .	1,2

<b>Practic al</b>	<ul style="list-style-type: none"> <li>• Practice positioning patients for different surgeries (e.g., supine, prone, lithotomy).</li> <li>• Practice setting up ECG, pulse oximeters, and blood pressure monitors.</li> <li>• Identify and handle instruments like forceps and scalpels.</li> <li>• Assist different surgical procedure.</li> <li>• Hands-on practice of sterilization , PPE use and apply surgical dressings and bandages.</li> <li>• Catheter insertion and giving enemas.</li> <li>• Managing fluid and electrolyte imbalances and care techniques for unconscious patients.</li> <li>• Discuss and analyze ethical scenarios.</li> <li>• Identify and address legal rights and issues.</li> </ul>		Describe, illustrate and explain and apply skill & techniques for all practical procedure.	1,2,3 ,4
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**TEXT BOOKS:**

- Berry & Kohn's Operating room technique 12<sup>th</sup> edition

**REFERENCE BOOKS:**

- Textbook on operation Theatre Technology 1<sup>st</sup> edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding and apply skill positioning used in different procedures for surgery and monitoring patents whenever required	<b>1,2,3,6</b>
<b>2</b>	Apply knowledge and skill to use the instrument required in any kind of procedure	<b>1,2,3</b>
<b>3</b>	Understanding and applying various techniques in the operating theatre ensures patient safety, precision, and successful outcomes.	<b>2,3,5,7</b>
<b>4</b>	Identify the duty as an OT technicians and understanding the scope of practice in the OT room	<b>5,6,7,8</b>
<b>5</b>	Classify the different ethics and rights of an OT personnel.	<b>6,7,8</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT321R</b>	<b>INTRODUCTION TO OT II</b>	2	3	3		3	2	2	2

SEMESTER – VI									
Course Title	OT Technology – Clinical II								
Course code	22BOTT322R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. Develop skills in the use of advanced surgical equipment including electrocautery, laser surgery, microsurgery, ultrasono surgery, and laparoscopic surgery.</li> <li>2. To expertise in the correct positioning ,prepping, and draping of surgical patients.</li> <li>3. Develop comprehensive knowledge to understanding of general and intensive care surgery.</li> </ol>								
CO1	Understand the fundamental principles and techniques for using specialized surgical equipment, covering aspects such as their design, operation, and maintenance.								
CO2	Apply the principles and techniques of proper prepping and draping to ensure patient privacy, prevent infection, and maintain a sterile surgical field.								
CO3	Comprehend the fundamental principles of surgical procedures, including their indications, contraindications, and surgical techniques.								
CO4	Apply the knowledge and skill on proficient in performing general surgery procedures, including breast, abdominal, liver, spleen, pancreatic, and esophageal surgeries.								
CO5	Apply the essential knowledge and skills to care for critical patients in the ICU, including managing patient care and applying evidence-based practices.								
UnitNo.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Specialized surgical equipment</b> <ul style="list-style-type: none"> <li>• Electrocautery</li> <li>• Laser surgery □ Microsurgery</li> <li>• Ultrasono surgery</li> <li>• Laparoscopic surgery</li> </ul>	5	Describe, illustrate and explain the basic principles and techniques of using specialized surgical equipment, including their design, operation, and maintenance.					1,2	
II	<b>Positioning prepping and draping the patient</b> <ul style="list-style-type: none"> <li>• Positioning and receiving the surgical patient</li> <li>• Physical preparation and draping the surgical site</li> <li>• Responsibilities of patient positioning and draping</li> <li>• Instruments for preparing and draping</li> </ul>	10	Describe, illustrate and explain the principles and techniques of proper prepping and draping, including ensuring patient privacy, preventing infection, and creating a sterile surgical field					1,2	

<b>III</b>	<b>Basics of surgery</b> <ul style="list-style-type: none"> <li>• Historical development and principles of surgery</li> <li>• Surgical terminology, types of incision and indications for the use of particular procedure.</li> <li>• Classification of surgical procedure and surgeries</li> <li>• Knowledge of skin preparation for invasive procedure.</li> </ul>	<b>10</b>	Describe, illustrate and explain to instill knowledge on the basic principles of surgical procedures, including indications, contraindications, and surgical techniques	1,2
	<input type="checkbox"/> Pre-operative and postoperative care of the surgical patient emergency procedures.			
<b>IV</b>	<b>General surgery</b> <ul style="list-style-type: none"> <li>• Breast procedures</li> <li>• Abdominal surgery</li> <li>• Liver Procedures</li> <li>• Splenic procedures</li> <li>• Pancreatic Procedures</li> <li>• Esophageal procedures</li> </ul>	<b>15</b>	Describe, illustrate and explain the basic principles and techniques of general surgery, including indications, contraindications, and surgical techniques.	1,2
<b>V</b>	<b>Basics of Intensive care</b> <ul style="list-style-type: none"> <li>• Monitoring and management of CPR</li> <li>• Training in basic life support (BCLS)</li> <li>• Training in advance life support (ACLS).</li> <li>• Trolley for difficult intubation</li> <li>• Insertion of Central line , position and care</li> </ul>	<b>5</b>	Describe, illustrate and explain the patient care in the intensive care unit, including managing critical patients and applying evidence-based practices to patient care.	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Practice using electrocautery devices for cutting and coagulating tissues.</li> <li>• Assist and manage delicate procedures using microsurgical instruments.</li> <li>• Assist laparoscopic surgeries using appropriate instruments.</li> <li>• Practice positioning patients for various types of surgeries.</li> <li>• Perform physical preparation and draping of the surgical site</li> <li>• Understand and practice the roles involved in patient positioning and draping.</li> <li>• Classify different surgical procedures and understand their indications.</li> </ul>	<b>60</b>	Describe, illustrate and explain and apply skill & techniques for all practical procedure.	1,2, 3,4

	<ul style="list-style-type: none"> <li>Practice proper skin preparation techniques for invasive procedures.</li> <li>Assist different surgical procedure.</li> <li>Practice CPR and monitor patients .</li> <li>Setup and use the trolley for difficult intubations.</li> <li>Practice inserting, positioning, and caring for central lines.</li> </ul>			
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**TEXT BOOKS:**

- Berry & Kohn’s Operating room technique 12<sup>th</sup> edition

**REFERENCE BOOKS:**

- Textbook on operation Theatre Technology 1<sup>st</sup> edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the fundamental principles and techniques for using specialized surgical equipment, covering aspects such as their design, operation, and maintenance.	2,3,8
2	Apply the principles and techniques of proper prepping and draping to ensure patient privacy, prevent infection, and maintain a sterile surgical field.	1,2,6
3	Comprehend the fundamental principles of surgical procedures, including their indications, contraindications, and surgical techniques.	2,3,8
4	Apply the knowledge and skill on proficient in performing general surgery procedures, including breast, abdominal, liver, spleen, pancreatic, and esophageal surgeries.	1,2,3
5	Apply the essential knowledge and skills to care for critical patients in the ICU, including managing patient care and applying evidence-based practices.	1,2,3

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
22BOTT322R	OT Technology – Clinical II	2	3	3			2		2

**SEMESTER – VI**

<b>SEMESTER – VI</b>									
<b>Course Title</b>	<b>OT Technology – Applied II</b>								
<b>Course code</b>	<b>22BOTT323R</b>	<b>Total credits: 5 Total hours: 45T+60P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Bachelor of Operation Theatre Technology</b>								
<b>Semester</b>	<b>Fall/ V semester of third year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	1.Develop the knowledge medical gas supply and anaesthesia machine systems. 2.Develop expertise in anaesthesia techniques and different anaesthetics agents. 3.To learn about anaesthesia delivery systems and breathing circuits.								
<b>CO1</b>	Understand and safely handle medical gas cylinders and identify different cylinder with all part.								
<b>CO2</b>	Demonstrate proficiency in the setup and operation anaesthesia machine .								
<b>CO3</b>	Understand the knowledge and skill to monitor intravenous and inhalation anaesthesia agents,								
<b>CO4</b>	Explain safely administer local anaesthetic agents, apply various types of regional anaesthesia techniques								
<b>CO5</b>	Identify and utilize common components of breathing circuit use in OT.								
<b>UnitNo.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Medical Gas Supply</b> <ul style="list-style-type: none"> <li>Compressed gas cylinders</li> <li>Color coding</li> <li>Cylinder valves ;pin index</li> <li>Gas piping system</li> <li>Pressure regulation in Anesthesia work station</li> </ul>	<b>8</b>	Describe, illustrate and explain about the principles and standards of medical gas supply, including the types of gases used in healthcare, their properties, and how they are supplied and distributed.					1,2	
<b>II</b>	<b>Anesthesia Machine</b> <ul style="list-style-type: none"> <li>Hanger and yoke system,</li> <li>Cylinder pressure gauge, Pressure regulator,</li> <li>Flowmeter assembly</li> <li>Vaporizers-types, hazards</li> <li>Maintenance, filling and draining.</li> </ul>	<b>10</b>	Describe, illustrate and explain the basic principles of anaesthesia, including the types of anaesthesia used in medical procedures and the physiological effects of anaesthesia on the body					1,2	
<b>III</b>	<b>General Anesthesia</b> <ul style="list-style-type: none"> <li>Intravenous anesthesia agents</li> <li>Inhalation anesthetic agents</li> <li>Muscle relaxants</li> <li>Recovery from Anesthesia</li> <li>Pain management</li> </ul>	<b>10</b>	Describe, illustrate and explain the knowledge on ensuring patient's safety and comfort during the surgical procedure and promoting a speedy and successful recovery					1,2	
<b>IV</b>	<b>Local &amp; regional anesthesia</b> <ul style="list-style-type: none"> <li>Local anesthetic agents</li> <li>Types of regional anesthesia</li> <li>Spinal anesthesia with its positioning</li> </ul>	<b>8</b>	Describe, illustrate and explain knowledge on ensuring patient's safety and comfort during the surgical procedure and promoting a speedy and successful recovery					1,2	

	□ Epidural anesthesia			
<b>V</b>	<b>Breathing system</b> <ul style="list-style-type: none"> <li>• Common components- connectors, adaptors, reservoir bags</li> <li>• Methods of humidification</li> <li>• Classification of breathing system and circuits– recognition, assembling and maintenance</li> <li>• Non rebreathing valves- Ambu valves, The circle system, Soda lime, Indicators</li> <li>• Safety features of Anesthesia delivery systems.</li> </ul>	<b>10</b>	Describe, illustrate and explain about the optimal respiratory function, promoting adequate oxygenation and carbon dioxide removal, and preventing complications such as respiratory failure or hypoxia.	1,2
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Handling and storage of compressed gas cylinders</li> <li>• Identification and significance of color codes for various medical gases</li> <li>• safety checks of cylinder valves and pin index safety system</li> <li>• Understand the layout and function of the gas piping system in hospitals.</li> <li>• Learn the parts of the hanger, yoke system and Practice attaching and detaching gas cylinders.</li> <li>• Monitor patients during different type of anesthesia.</li> <li>• Recognize and assemble different breathing circuits.</li> <li>• Learn to operate Ambu valves and function of soda lime.</li> <li>• Identify safety features in anesthesia systems and practice safety protocols to ensure patient safety.</li> </ul>		Describe, illustrate and explain and apply skill & techniques for all practical procedure.	1,2, 3,4

**TEXT BOOKS:**

- Berry & Kohn's Operating room technique 12<sup>th</sup> edition

**REFERENCE BOOKS:**

- Textbook on operation Theatre Technology 1<sup>st</sup> edition



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand and safely handle medical gas cylinders and identify different cylinder with all part.	
<b>2</b>	Demonstrate proficiency in the setup and operation anaesthesia machine .	
<b>3</b>	Understand the knowledge and skill to monitor intravenous and inhalation anaesthesia agents,	
<b>4</b>	Explain safely administer local anaesthetic agents, apply various types of regional anaesthesia techniques	
<b>5</b>	Identify and utilize common components of breathing circuit use in OT.	

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT323R</b>	<b>OT Technology – Applied II</b>	3		2	2				

SEMESTER – VI									
Course Title	OT Technology – Advanced II								
Course code	22BOTT324R	Total credits: 5 Total hours: 45T+60P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Prerequisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. Develop fundamental skills in plastic, reconstructive, cardiac, thoracic, and vascular surgeries.</li> <li>2. Learn to different surgical procedure and manage patient care before and after surgery.</li> <li>3. Learn the basics of organ donation, types of transplants, and ethical considerations in transplantation.</li> </ol>								
CO1	Understand and apply the basic principles of plastic and reconstructive surgery and perform basic surgical techniques.								
CO2	Understand preoperative assessments, managing surgical indications and complications, providing postoperative care,								
CO3	Demonstrate proficiency in performing common procedures in otorhinolaryngology and head and neck surgery.								
CO4	Understand the structure and function of the vascular & thyroid system, and assess and manage patients requiring vascular surgery.								
CO5	Explain the principles of organ donation and transplantation, including ethical, legal, and social considerations.								
UnitNo.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Plastic and reconstructive surgery</b> <ul style="list-style-type: none"> <li>• Techniques of plastic surgery□</li> <li>• Skin and tissue grafting□</li> <li>• Reconstructive surgeries□</li> <li>• Cosmetic procedures□</li> <li>• Burns□</li> </ul>		7	Describe, illustrate and explain about the basic principles of plastic and reconstructive surgery and be able to perform basic surgical techniques.				1,2	

<p><b>II</b></p>	<p><b>Cardiac surgery</b></p> <ul style="list-style-type: none"> <li>• Preoperative assessment and preparation of the cardiac patient□</li> <li>• Cardiac surgical procedures□</li> <li>• Indication and Complications of cardiac surgery□</li> <li>• Post operative care after cardiac surgery□</li> </ul> <p><b>Thoracic surgery</b></p> <ul style="list-style-type: none"> <li>• Anatomy and physiology of thorax□</li> <li>• Special features of thoracic surgery□</li> <li>• Thoracic surgical procedure such as thoracotomy, thoracoscopy, bronchoscopy□</li> <li>• Chest trauma□</li> <li>• Complications of thoracic surgery□</li> </ul>	<p><b>10</b></p>	<p>Describe, illustrate and explain the multidisciplinary nature of cardiac surgery along with the preparation and assessment of preoperative cardiac patient and about the structure and function of the thoracic cavity and be able to assess and manage patients who require thoracic surgery</p>	<p>1,2</p>
<p><b>III</b></p>	<p><b>Otorhino laryngology and head and neck surgery</b></p> <ul style="list-style-type: none"> <li>• General considerations in ear, nose and thyroid procedure□</li> <li>• Myringotomy, mastoidectomy□</li> <li>• Septoplasty□</li> <li>• Tonsillectomy and Adenoidectomy(TND)□</li> <li>• Foreign body removal□</li> </ul>	<p><b>10</b></p>	<p>Describe, illustrate and explain the common surgical procedures including the anatomical structures involved.</p>	<p>1,2</p>
<p><b>IV</b></p>	<p><b>Vascular surgery</b></p> <ul style="list-style-type: none"> <li>• General anatomy of the vascular system□</li> <li>• Features of peripheral vascular procedures□</li> <li>• Vascular surgical procedures□</li> <li>• Diagnostic procedures□</li> <li>• Complications□</li> </ul> <p><b>Thyroid Surgery</b></p> <ul style="list-style-type: none"> <li>• Thyroid physiology</li> <li>• Pathology of goiter</li> <li>• Clinical features and investigations of thyroid disease</li> <li>• Thyroidectomy and complication Thyroid tumor□</li> </ul>	<p><b>10</b></p>	<p>Describe, illustrate and explain the structure and function of the vascular system Students should be able to assess and manage patients who require vascular surgery and Thyroid surgery .</p>	<p>1,2</p>
<p><b>V</b></p>	<p><b>Organ procurement and transplantation</b></p> <ul style="list-style-type: none"> <li>• Types of transplant□</li> <li>• Organs and tissues transplanted□</li> <li>• Types of donor□</li> <li>• Immunology of organ transplantation□</li> </ul>	<p><b>8</b></p>	<p>Describe, illustrate and explain the principles of organ donation and transplantation, including the ethical, legal, and social considerations related to the field.</p>	<p>1,2</p>

<b>Practical</b>	<ul style="list-style-type: none"> <li>Practice suturing, wound closure, basic cosmetic surgery, skin and tissue grafting.</li> <li>Assist in common reconstructive surgeries and manage burn injuries.</li> <li>Assessments and prepare patients for cardiac surgery and learn about surgical indications and complications, and provide postoperative care.</li> <li>Assist surgical removal of tonsils and adenoids, including indications and postoperative care.</li> <li>Perform procedures for the safe removal of foreign bodies from the ear, nose, or throat.</li> <li>Perform common vascular and peripheral vascular surgeries and develop skills in identifying and managing surgical complications.</li> <li>Understand which organs and tissues are commonly transplanted and learn basic immunology related to organ transplantation.</li> </ul>	<b>60</b>	Describe, illustrate and explain and apply skill & techniques for all practical procedure.	1,2,3,4
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**TEXT BOOKS:**

- Berry & Kohn's Operating room technique 12<sup>th</sup> edition

**REFERENCE BOOKS:**

- Textbook on operation Theatre Technology 1<sup>st</sup> edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand and apply the basic principles of plastic and reconstructive surgery and perform basic surgical techniques.	<b>1,2,3</b>
<b>2</b>	Understand preoperative assessments, managing surgical indications and complications, providing postoperative care,	<b>1,2,3</b>
<b>3</b>	Demonstrate proficiency in performing common procedures in otorhinolaryngology and head and neck surgery.	<b>1,2,3</b>
<b>4</b>	Understand the structure and function of the vascular & thyroid system, and assess and manage patients requiring vascular surgery.	<b>1,2,3</b>
<b>5</b>	Explain the principles of organ donation and transplantation, including ethical, legal, and social considerations.	<b>1,2,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTT324R</b>	<b>OT Technology Advanced II</b>	2	3	3					2

SEMESTER – VI									
Course Title	MOOCS								
Course code	22BOTTMO32	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Prerequisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	IV semester of second year of the programme								
Course Objectives (Minimum 3)	1.Equip students with a thorough understanding of the course material through engaging online content. 2.Provide hands-on experience through interactive exercises and real-world projects. 3.Promote effective communication and teamwork through online discussions and group activities.								
CO 1	Demonstrate strong grasp of key principles and theories covered in the course.								
CO 2	Apply learned concepts to solve real-world problems through practical projects and exercises.								
CO 3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.								
CO 4	Develop their ideas clearly and effectively in both written and verbal forms.								
CO 5	Demonstrating strong collaboration and teamwork skills..								

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate strong grasp of key principles and theories covered in the course.	7.8
2	Apply learned concepts to solve real-world problems through practical projects and exercises.	7.8
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7.8
4	Develop their ideas clearly and effectively in both written and verbal forms.	7.8
5	Demonstrating strong collaboration and teamwork skills..	7.8

## MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
<b>22BOTTM031</b>	<b>MOOCS</b>							3	3



# Assam down town University

## Curriculum and Syllabus

### Master of Emergency and Critical Care



OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**

July, 2022




# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022

  
*Chairperson*  
*Board of Studies*

  
*Member Secretary*  
*Academic Council*



## ***Vision***

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## ***Missions***

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community

# Programme Details

## Programme Overview

Masters of Emergency & Critical Care programme aims to develop competencies, specifically in the area of intensive care, in order to guarantee high quality medical assistance. There is unprecedented demand for Critical Care services globally. The purpose of post-graduation in Critical Care Technology is to meet the specialized physiologic as well as psychological needs of patients with acute, critical or complex health conditions in various critical care settings

### I. Specific Features of the Curriculum

The M.Sc. Critical Care Technology program addresses the growing global demand for intensive medical and surgical care, focusing on managing severely ill patients at high risk for life-threatening conditions. It equips students with advanced skills in health assessment, diagnostic interpretation, and specialized procedures under intensive care supervision. Rooted in evidence-based practice and theoretical foundations, the program prepares graduates to meet the complex physiological and psychological needs of critically ill patients across diverse critical care environments, ensuring comprehensive care delivery and evaluation of interventions for optimal patient outcomes.

### II. Eligibility Criteria:

Minimum 50% in B.Sc. Nursing/BTEDM/OT/B.Sc. Emergency Medical Technology/B.Sc. In Ayurveda or Homeopathy.

### III. Program Educational Objectives (PEOs):

**PEO1** ADTU ECC postgraduates will be well prepared for successful career in emergency care, equipping them to make crucial decisions to save lives in critical situations.

**PEO2** ECC postgraduates will be academically prepared to excel in interdisciplinary collaboration, integrating with diverse healthcare teams to deliver optimal patient care.

**PEO3** ECC Postgraduates will be actively contributing to the development of critical care practices and maintaining a commitment to lifelong learning and professional growth

#### **IV. Program Specific Outcomes (PSOs):**

**PSO1 Research-In-Practice:** Exhibit expertise in handling emergency and trauma scenarios, incorporating up-to-date life-saving procedures and techniques ensuring the provision of care is rooted in the most recent research and clinical evidence.

**PSO2 Techno Professional Skills:** Apply comprehensive knowledge in handling emergency and critical health care situation developed through experience in simulated situations, clinical postings and industry intern.

**PSO3 Global Competency:** Develop global competency through external exposure to critical and emergency healthcare situations.

#### **V. Program Outcome:**

**PO1: Health Care Knowledge:** Apply knowledge of human anatomy and physiology, patient assessment, advanced airway management, cardiovascular and neurological emergencies, dialysis, drug intervention, mechanical ventilation in the professional domain

**PO2: Patient Care:** Demonstrate hospital practices in intensive care settings including critical care procedures and sterile practices for critically ill patients.

**PO3: Analytical Skills:** Demonstrate expertise in identifying and assessing patients in the early stages of acute disorders (Heart attack, Cardiac arrest, Respiratory arrest, Fracture) of all ages and physical condition both in hospital and pre-hospital settings

**PO4: Teamwork:** Apply skills to function & communicate effectively in multidisciplinary settings & multicultural population, both as an individual and as a team member, demonstrating leadership capabilities when required.

**PO5: Ethics and Professional practice:** Understand and manage patient information while adhering to ethical principles in the profession.

**PO6: Research:** Demonstrate adeptness in conducting research within the Emergency and Critical Care domain, while incorporating statistical principles acquired through a statistics course to achieve an advanced level of mastery in the field.

**PO7: Life-Long Learning:** Understand the importance of self-sustaining, lifelong learning and possess the skills necessary to pursue it in the most comprehensive way possible in order to benefit humanity and society.

**VI. Total Credits to be Earned:110**

**VII. Career Prospects:**

After the completion of this course, students can either go for clinical fields as an EMT or an ICU Technician as well as go for skill centers and National EMS system requisites.

Academically students can pursue their research in this field and work as an Associate or Assistant Prof

## EVALUATION METHODS

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 40% or as prescribed by the programme shall be added to the score of the end-semester examination.

### A. INTERNAL ASSESSMENT:

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

SN	Components/ Examinations	Marks Allotted
1.	In-Sem Exam – I (ISE-I) (Written Examination)*	30
2.	In-Sem Exam – II (ISE-II) (Written Examination)*	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*are compulsory*

**Note:** Total Internal assessment should be out of 40

### INSTRUCTION

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.
2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.

3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

## **B. SEMESTER END EXAMINATION:**

Time table for end semester examination is published at least 25 days prior to the start of Examination.

### **I. Pre-Examination:**

#### **Eligibility Criteria for a student to appear in University Examinations:**

The student shall only be allowed to appear in a University Examination, if:

- i) He/ She is a registered student of the University;
- ii) He/ She is of good conduct and character;
- iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

### **II. Admit Card:**

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds.

### **III. Pattern of Question Papers:**

The question paper shall follow the principles of Bloom's Taxonomy.

Table

<b>S. N.</b>	<b>Level</b>	<b>Questions /verbs for test</b>
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify

4	Analyze	Classify, outline, categorize, analyze, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.
6	Create	Design, Formulate, Modify, Develop, integrate, etc.

**Note:** No course is to be evaluated on basis of **all 6 knowledge levels**.

The format of the question paper across all the program follow a unique pattern and the total marks is 60

**Table 1: Question paper pattern for End semester examination**

Sl no	Question pattern	Total marks
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

#### **V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

#### **VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Office-in-Charge of the center may take appropriate decisions as per the rules and



procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

## **VII. Instruction to the Students:**

- (i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- (ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- (iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.
- (iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- (v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- (vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- (vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.
- (viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- (ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

## **VIII. Provision for an Amanuensis (writer):**

- (i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself /

herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.

- (ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.
- (iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process.

### **C. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times CR$

#### **i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

#### **ii. Grade Point:**

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

#### **iii. Letter Grade:**

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.

- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

Letter Grade	Grade Points	Description
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

#### iv. Grade Point Average:

##### a. SGPA (Semester Grade Point Average)

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades 'O' to 'F' as given in Table 1.

$$SGPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation

(1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  registered Course and  $C_i$  is the Credit (weight) of that Course.

### **b. CGPA (Cumulative Grade Point Average)**

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrollment in the Programme. In other words, taking into account all the Courses graded with 'O' to 'P' as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrollment.
- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  completed Course and  $C_i$  is the Credit (weight) of that Course.

$$\text{CGPA} = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

- (iii) The CGPA shall be convertible into equivalent percentage of marks using Equation Conversion of CGPA to percentage marks: = CGPA\*10

## **D. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

## **ii. Grievance Readdress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.
- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite proforma available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.
- (vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.
- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.
- (ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# INSTRUCTION TO TEACHERS AND STUDENTS

## (Teaching and Learning Methods)

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

### **1. Student- centric / Constructivist Approach:**

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer and discuss in the

successive class. This will help in the preparation for various competitive examination and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student-centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

### **The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures	20%
Student-centric Approach, Students present and deliver lectures in the presence of teacher and supervised by teacher	60%
Students visit fields or perform experiments or teachers perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

### **Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned approaches and prepare a lesson plan for execution and maintain a file.

## Curriculum Framework

### Breakdown of Credits(for 2022-23 Syllabus)

Sl. No	Category	Total number of Credits
1	University Core(UC)	34
2	University Elective (UE)	0
3	Program Core(PC)	59
4	Program Elective (PE)	5
5	Faculty Elective (FE)	12
<b>Total number of credit</b>		<b>110</b>

### Breakdown by categories of courses

Sl no	Category	Credits	%
1	Paramedical Sciences	99	90%
2	Science	5	4.55%
3	humanities and social science	6	5.45%
<b>Total</b>		<b>110</b>	<b>100%</b>



## SEMESTER WISE COURSE DISTRIBUTION

	S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			Total
					L	T	P	S	R	O	C	IA*	SEE*	PE*		
Semester I	1.	22MECC111R	Patient Assessment & Medication Administration Procedure	PC	3	0	4	0	0		5	50	50	100	200	
	2	22MECC112R	Advanced Airway Management	PC	3	0	4	0	0	0	5	50	50	100	200	
	3	22MECC113R	Cardiovascular & Neurological Management	PC	4	0	4	0	0	0	6	50	50	100	200	
	4	22MECC114R	Applied Pharmacology I	PC	2	0	0	0	0	0	2	50	50	100	100	
	5	22UMPD111R	PDP-I	UC	0	0	4	0	0	0	2	-	-	100	100	
	6	22UMFS111R	Fundamentals of Statistics	UC	2	0	2	0	0	0	3	50	50	100	200	
	7	22MECC115R	Mini Research (Review of literature-R1)	UC	0	0	0	4	8	0	2	-	-	100	100	
	8	22MECCMO02	MOOCS	SE/FE	2	0	0	0	0	0	2	-	-	100	100	
	<b>Total</b>											27			1200	

	S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			Total
					L	T	P	S	R	O	C	IA*	SEE*	PE*		
Semester II	1.	22MECC121R	Medical Emergencies –I	PC	3	0	2	0	0	0	4	50	50	100	200	
	2	22MECC122R	Mechanical Ventilation	PC	2	0	2	0	0	0	3	50	50	100	200	
	3	22MECC123R	Trauma	PC	3	0	2	0	0	0	4	50	50	100	200	

			Management														
4	22MECC124R	Applied Pharmacology II	PC	2	0	0	0	0	0	0	2	50	50	0	100		
5	22MECC125R	TPS	PC	3	0	0	0	0	0	0	2	50	50	0	100		
6	22MECC127R	Mini Research (Research gap analysis-R2)	UC	0	0	0	4	1	6	0	3	-	-	100	100		
7	22MECCMO03	MOOCS/Online/ Courses from global platforms	SE/FE	2	0	0	0	0	0	0	2			100	100		
8	22MECCGE01	Generic elective	SE/FE	2	0	0	0	0	0	0	2	50	50	-	100		
9	22UMPD121R	PDP-II (Communication Mastery)	UC	0	0	4	0	0	0	0	2	-	-	100	100		
10	22UUHV104R	Universal Human Values	UC	1	0	0	0	0	0	0	1	50	50	-	100		
11	22UMRM121R	Research Methodology and statistical analysis	UC	1	0	0	4	0	0	0	2	50	50	-	100		
<b>Total</b>											<b>27</b>				<b>1400</b>		

S N .	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			Total
				L	T	P	S	R	O	C	IA*	SEE*	PE*		
1.	22MECC211R	Medical Emergencies –II	PC	4	0	4	0	0	0	0	6	50	50	100	200
2	22MECC212R	Dialysis	PC	4	0	4	0	0	0	0	6	50	50	100	200
3	22MECC213R	Emergency Medical Services-Operations	PC	4	0	0	0	0	0	0	4	50	50	0	100
4	22MECC214R	Patient care & Procedures in	PC	3	0	4	0	0	0	0	5	50	50	100	200

			ICU													
5	22MECC215R	Mini Research (Survey/experiments)-R3	UC	0	0	6	4	0	0	4	-	-	100	100		
6	22MECC216R	Techno Professional Skills	PC	0	0	4	0	0	0	2	-	-	100	100		
7	22MECCMO01	MOOCS 1	SE/FE	2	0	0	0	0	0	2	-	100	-	100		
8	22MECCMO02	MOOCS 2	SE/FE	2	0	0	0	0	0	2	-	100	-	100		
9	22UMPD211R	PDP-III	UC	0	0	4	0	0	0	2	-	-	100	100		
10	22MECCGE01	Generic Elective	SE/FE	2	0	0	0	0	0	2	-	100	-	100		
11	22UMRE211R	Research Ethics	UC	2	0	0	0	0	0	1	50	50	-	100		
<b>Total</b>										<b>36</b>				<b>1400</b>		

SN.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
1.	22MECC221R	Critical Care Transport	PC	3	0	0	0	0	0	3	50	50	0	100
2	22MECC222R	Health Care System in India	PE	3	0	0	0	0	0	3	50	50	0	100
3	22MECC223R	Forensic Medicine & Medical Ethics	PE	2	0	0	0	0	0	2	50	50	0	100
4	22MECC224R	Research/data analysis/documentation-R4)	UC	0	0	20	4	8	0	12	0	0	100	100
<b>Total</b>										<b>20</b>				<b>400</b>

**\*IA: Internal Assessment, SEE: Semester End Examination, PE: Practical Examination**

**SEMESTER – I**

<b>SEMESTER – I</b>									
<b>Course Title</b>	<b>PATIENT ASSESSMENT &amp; MEDICATION ADMINISTRATION PROCEDURE</b>								
<b>Course code</b>	<b>22MECC111R</b>	<b>Total credits: 5</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 45T+60P</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>MSc. Emergency and Critical Care</b>								
<b>Semester</b>	<b>SEMESTER – I</b>								
<b>Course Objectives</b>	1. To understand the principles and techniques of patient assessment 2. Develop skills in conducting physical examinations and obtaining medical histories 3. Analyze patient data to identify potential health problems and develop treatment plans 4. Learn the principles of medication administration, including dosage calculation and medication interactions 5. Understand the various routes of medication administration and their indications 6. Develop skills in medication administration via various routes, including oral, intravenous, and intramuscular 7. Understand the principles of medication safety and quality improvement								
<b>CO1</b>	Understand and apply the techniques of assessment for medical patient.								
<b>CO2</b>	Understand and apply the techniques of assessment for trauma patient.								
<b>CO3</b>	Develop skills to obtain vital signs, and recognize the significance of communication skills and documentation procedures								
<b>CO4</b>	Identify the different composition of fluid in the body, different types of IV fluids, gain IV sites and access.								
<b>CO5</b>	A comprehensive knowledge on the routes of drug administration and utilize skills to perform correct techniques								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Patient assessment</b> - Patient assessment – Medical	<b>5</b>	Prepared to investigate and spot any potential new issues that may emerge during medical care					1,2	
<b>II</b>	<b>Patient assessment</b> - Patient assessment – Trauma	<b>5</b>	Prepared to assess those who have experienced serious trauma from a professional standpoint.					1,2	
<b>III</b>	<b>Assessment of ICU Patient, Vital &amp; Physical Examination</b> - Critical Patient Assessment (ICU) - Techniques of history taking - Vital Signs. - Head to toe physical examination – Limitations. - Concept formation. - Data interpretation. - Communication techniques. - Documentation techniques.	<b>30</b>	Skilled in collecting a patient's history, doing a critical patient evaluation, and using all forms of documentation. -Well-versed in effective communication methods					1,2	
<b>IV</b>	<b>Venous access</b> -Fluid composition & distribution in the	<b>10</b>	Course covers fluid composition as well as other information on					1,2	

	body. -Fluid and Electrolytes in Children. - IV fluid composition.		various fluid types utilised in replacement therapy	
<b>V</b>	<b>Medication administration</b> Routes of Medication Administration. Techniques of IV Cannulation – Complications. Calculating medication Doses. Calculating Fluid infusion rates. Fluid Homeostasis. Disorders of Homeostasis. Management of Acute Water, Sodium, Chloride, Potassium & Calcium deficits	<b>10</b>	Gain knowledge of the idea of medicine administration. -Methodologies for calculating dosages. -Management of ions.	1,2
<b>Practical</b>	Patient assessment: Medical & trauma, Vital Signs, Head to toe physical examination Airway Maneuver: Head-tilt-chin-lift, Jaw thrust Procedures: Suctioning, inserting a oral airway, ET tube intubation, Non-invasive mask, Tracheotomy, Removal of ET tube  Medication administration: Medication administration Via IM,IV,SC,IM,, Techniques of IV Cannulation,	<b>100</b>	Demonstrate the techniques of IV cannulation, physical examination and medication administration via different routes	1,2, 3,4, 5

### TEXT BOOKS:

**T1- Nancy** Caroline (Emergency in the streets, 7<sup>th</sup> edition) Series editor: Andrew N. Pollak, MD, FAAOS

### REFERENCE BOOKS:

Clinical Examination: A Systematic Guide to Physical Diagnosis" by Nicholas J. Talley and Simon O'Connor

### OTHER LEARNING RESOURCES:

<https://www.health.ny.gov/professionals/ems/pdf/srgpadefinitions.pdf>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand and apply the techniques of assessment for medical patient.	<b>2,3,5,7</b>
<b>2</b>	Understand and apply the techniques of assessment for trauma patient.	<b>2,3,5,7</b>
<b>3</b>	Develop skills to obtain vital signs, and recognize the significance of communication skills and documentation procedures	<b>3,4</b>
<b>4</b>	Identify the different composition of fluid in the body, different types of IV fluids, gain IV sites and access.	<b>2,3,5,7</b>
<b>5</b>	A comprehensive knowledge on the routes of drug administration and utilize skills to perform correct techniques	<b>2,3,5,7</b>

**MAPPING TABLE,**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22MECC111R</b>	<b>Patient Assessment &amp; Medication Administration Procedure</b>	1	1	3	1	3		1

SEMESTER – I									
Course Title	ADVANCED AIRWAY MANAGEMENT								
Course code	22MECC112R	Total credits:	L	T	P	S	R	O/F	C
		Total hours:	3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MSC. EMERGENCY AND CRITICAL CARE								
Semester	SEMESTER – I								
Course Objectives	<ol style="list-style-type: none"> <li>1. Recognizing and treating upper airway blockage caused by infections and foreign substances, as well as other airway compromises.</li> <li>2. Using the idea of the three "pillars" or cornerstones of airway care — patency, protection, and gas exchange — describe how to evaluate an airway for indicators of compromise</li> </ol>								
CO1	Develop fundamental knowledge on airway management.								
CO2	Understand the skills on techniques of basic airway management and apply those skills on the practical field.								
CO3	Implement skills on the techniques of advanced airway management like ET intubation, tracheostomy etc.								
CO4	Implement knowledge on assessment of respiratory problems								
CO5	A comprehensive knowledge about the various respiratory emergencies and how to appropriately identify them.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Advanced Airway Management</b>	<b>10</b>	Introduce advanced airway management to the students.				1,2		
II	<b>Basic Airway Management.</b> <ul style="list-style-type: none"> <li>• Manual Airway Opening Techniques.</li> <li>• Airway Adjuncts.</li> <li>• Supplemental O<sub>2</sub> therapy &amp; amp; delivery devices.</li> <li>• Suctioning.</li> </ul> Introduction to artificial ventilation	<b>10</b>	Learn the fundamentals of managing the airways, oxygen therapy, and mechanical ventilation				1,2		
III	<b>Advanced Airway management</b> <ul style="list-style-type: none"> <li>• Endotracheal Intubation.</li> <li>• Kings PTL Airway.</li> <li>• Digital intubations.</li> <li>• Laryngeal mask airways &amp; amp; combitube</li> <li>• intubations.</li> <li>• Rapid sequence intubations.</li> <li>• Indications for&amp; amp; Management of</li> <li>• Tracheostomy.</li> </ul>	<b>20</b>	The idea of advanced airway management, including managing tracheostomies and particular issues, with ‘Rapid Sequence intubation				1,2		

	Special patient consideration.			
<b>IV</b>	<b>Patient Assessment</b>  Assessment and Management of various respiratory problems	<b>10</b>	Orient the students about the patient assessment and management of various respiratory problems	1,2
<b>V</b>	<b>Respiratory Emergencies</b> <ul style="list-style-type: none"> <li>• Acute Respiratory Failure.</li> <li>• Hyperbaric Oxygen in Critical Care.</li> <li>• Acute Lung Injury &amp; and Acute Respiratory Distress Syndrome.</li> <li>• Aspiration Pneumonitis &amp; and Pneumonia.</li> <li>• Severe Asthma Exacerbation.</li> <li>• Chronic Obstructive Pulmonary Disease.</li> <li>• Pulmonary Embolism.</li> <li>• Other Embolic Syndromes (Air, Fat, Amniotic Fluid)</li> <li>• Pleural disease &amp; Pneumothorax - Pulmonary Hypertension.</li> </ul>	<b>10</b>	The concept of acute respiratory illnesses, including pneumonia, COPD, pneumothorax, pulmonary embolism, and other conditions	1,2
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Airway Maneuver- <ul style="list-style-type: none"> <li>• Head-tilt-chin-lift</li> <li>• Jaw thrust</li> </ul> </li> <li>2. Suctioning, inserting a oral airway</li> <li>3. ET tube intubation</li> <li>4. Non-invasive mask</li> <li>5. Tracheotomy</li> <li>6. Removal of ET tube</li> </ol>	<b>100</b>	Explain the indications, contraindications and demonstrate the techniques of inserting all the advance airway management equipments	1,2,3

### TEXT BOOKS:

T1- Nancy Caroline (Emergency in the streets, 7th edition) Series editor: Andrew N. Pollak, MD, FAAOS

T2- Airway Management (by Geetanjali S Verma) First edition, Jaypee Brothers Medical Publishers

### REFERENCE BOOKS:

Practical Airway Management in Adults and Children" by Kenneth M. Grundfast and John D. Pellicone

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge on airway management.	1,2,3



<b>2</b>	Understand the skills on techniques of basic airway management and apply those skills on the practical field.	<b>1,2,3,4,5,7</b>
<b>3</b>	Implement skills on the techniques of advanced airway management like ET intubation, tracheostomy etc.	<b>3</b>
<b>4</b>	Implement knowledge on assessment of respiratory problems	<b>1,2</b>
<b>5</b>	A comprehensive knowledge about the various respiratory emergencies and how to appropriately identify them.	<b>1,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22MECC112R</b>	<b>ADVANCED AIRWAY MANAGEMENT</b>	1	2	3	1	2		1

SEMESTER – I									
Course Title	CARDIOVASCULAR & NEUROLOGICAL MANAGEMENT								
Course code	22MECC113R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 60T+60P	4	0	4	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MSC. EMERGENCY AND CRITICAL CARE								
Semester	SEMESTER – I								
Course Objectives	-To understand the normal anatomy and physiology of Cardiovascular system and nervous system -To demonstrate the basic and complex arrhythmias including pharmacological and electrical management -To demonstrate the knowledge of the methods and applications of BLS and ACLS techniques -To understand and be familiar with differential diagnosis, diagnostic and therapeutic approach to common neurologic emergencies								
<b>CO1</b>	Develop knowledge on the cardiovascular system's structure and physiology								
<b>CO2</b>	Recognize and manage the crises including angina and acute coronary syndromes, as well as shock.								
<b>CO3</b>	Understand and implement knowledge on the principles of ECG, different cardiac arrhythmias.								
<b>CO4</b>	Illustrate knowledge on the neurologic system's architecture and physiology.								
<b>CO5</b>	Recognize abrupt neurologic disorientation, manage neuro muscular problems in the intensive care unit.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	<b>CARDIOVASCULAR SYSTEM – EMERGENCIES</b> Review of Anatomy and Physiology	<b>10</b>	Develop an understanding of the cardiovascular system's anatomy, physiology, and crises					1,2	
<b>II</b>	<b>ASSESSMENT &amp; AND MANAGEMENT OF</b> <ul style="list-style-type: none"> <li>• Chest pain.</li> <li>• Acute coronary syndromes:</li> <li>• Pathophysiology &amp; Diagnosis.</li> <li>• Management &amp; Complications</li> <li>• Pulmonary Edema.</li> <li>• Severe heart failure.</li> <li>• Pericardial Diseases.</li> <li>• Hypertensive Urgencies &amp; Crisis.</li> <li>• Pathophysiology &amp; Classification of Shock States.</li> <li>• Resuscitation from Circulatory Shock.</li> </ul>	<b>30</b>	Adequate knowledge on Assessment and management of acute coronary syndromes, severe heart failure along with pathophysiology of shock					1,2	

	<ul style="list-style-type: none"> <li>Resuscitation of Hypovolemic Shock.</li> </ul>			
<b>III</b>	<b>ECG &amp; arrhythmias.</b> <ul style="list-style-type: none"> <li>- 12 lead ECGs</li> <li>- Basic &amp; advanced cardiac life support</li> <li>Cardiopulmonary cerebral resuscitation.</li> <li>Tachycardia &amp; Bradycardia</li> <li>Ventricular Arrhythmias.</li> <li>Conduction Disturbances &amp; cardiac Pacemakers</li> <li>Sudden cardiac Death-Implantable Defibrillators</li> </ul>	<b>20</b>	Utilize cardiac gadgets to learn more about arrhythmias and ECG rhythm	1,2
<b>IV</b>	<b>NEUROLOGICAL EMERGENCIES</b> - Review of anatomy & physiology	<b>10</b>	Gain competence in the area of nervous system anatomy and physiology	1,2
<b>V</b>	<b>ASSESSMENT AND MANAGEMENT OF</b> <ul style="list-style-type: none"> <li>Sudden deterioration of Neurological Status.</li> <li>Agitation/ Delirium.</li> <li>Coma</li> <li>Management of Acute Ischemic Stroke.</li> <li>Seizures in the Critically ill.</li> <li>Neuromuscular disorders in the ICU.</li> <li>Management of pain, Anxiety &amp; Delirium</li> </ul>	<b>20</b>	Learn about the evaluation and treatment of neurological crises.	1,2
<b>Practical</b>	<ol style="list-style-type: none"> <li>Cardiac monitoring procedure</li> <li>12-Lead ECG Placement</li> <li>ECG Interpretation</li> <li>CPR Skills Training</li> <li>AED Operation Simulation</li> <li>Cardiac Arrest Scenario Simulation</li> <li>Basic Arrhythmia Recognition</li> <li>Hands-On Defibrillator Practice</li> <li>Team-Based BLS Scenario Drill</li> <li>Team-Based ACLS Scenario Drills</li> <li>Transcutaneous Pacing Simulation</li> <li>Cardio version Techniques</li> <li>FAST (Face, Arms, Speech, Time) Assessment Drill</li> <li>Glasgow Coma Scale (GCS) Application Practice</li> <li>Emergency Response to Seizure Scenario</li> <li>Brain Injury Assessment</li> </ol>	<b>60</b>	Demonstrate proficiency in applying theoretical knowledge to effectively manage both cardiac and neurological emergencies, including ECG interpretation, CPR skills, AED operation, arrhythmia recognition, ACLS protocols, neurological assessments, and emergency responses to seizures and brain injuries	3,4,5

**TEXT BOOKS:**

T1- Nancy Caroline (Emergency in the streets, 7<sup>th</sup> edition) Series editor: Andrew N. Pollak, MD, FAAOS

**REFERENCE BOOKS:**

Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine

Neurology in Clinical Practice by Bradley, Daroff, Fenichel, Jankovic

**OTHER LEARNING RESOURCES:**

<https://teachmemedicine.org/cleveland-clinic-cardiovascular-emergencies>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop knowledge on the cardiovascular system's structure and physiology	<b>1</b>
<b>2</b>	Recognize and manage the crises including angina and acute coronary syndromes, as well as shock.	<b>2,3,7</b>
<b>3</b>	Understand and implement knowledge on the principles of ECG, different cardiac arrhythmias.	<b>3</b>
<b>4</b>	Illustrate knowledge on the neurologic system's architecture and physiology.	<b>1</b>
<b>5</b>	Recognize abrupt neurologic disorientation, manage neuro muscular problems in the intensive care unit.	<b>1,2,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22MECC113R</b>	<b>Cardiovascular &amp; Neurological Management</b>	1	1	1	1	1		1

<b>SEMESTER – I</b>									
<b>Course Title</b>	<b>APPLIED PHARMACOLOGY I</b>								
<b>Course code</b>	22MECC114R	<b>Total credits: 2</b> <b>Total hours: 30T</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			2	0	0	0	0	0	2
<b>Pre-requisite</b>	Nil	<b>Co-requisite</b>	Nil						
<b>Programme</b>	<b>MSC. EMERGENCY AND CRITICAL CARE</b>								
<b>Semester</b>	<b>SEMESTER – I</b>								
<b>Course Objectives</b>	1. Describe the therapeutic uses, dosage, adverse effects, and mode of action of each medicine used to treat different illnesses. 2. Talk about how drugs are classified, including their purposes, methods, pharmacodynamics, pharmacokinetics, indications, warnings, side effects, and other implications.								
<b>CO1</b>	Develop knowledge on concepts of Pharmacology including Emergency Medicines and their properties.								
<b>CO2</b>	Understand the principles, impact of medications on the autonomic nervous system, and shock pharmacotherapy								
<b>CO3</b>	A comprehensive knowledge on diuretics and antidiuretics drug's function and affect the body including their side effects.								
<b>CO4</b>	Understand the concepts of cardiovascular system and the use, function of drugs such as anti-arrhythmic, antihypertensive								
<b>CO5</b>	Implement knowledge on the drugs related to autonomic nervous system								
<b>Unit-No.</b>	<b>Content</b>		<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>
<b>I</b>	<b>GENERAL PHARMACOLOGY</b> <ul style="list-style-type: none"> <li>• Introduction &amp; Sources of drugs.</li> <li>• Routes of drug administration.</li> <li>• Pharmacokinetics.</li> <li>• Pharmacodynamics.</li> <li>• Adverse Effects.</li> <li>• Factors modifying drug response.</li> </ul> - Drug interactions		<b>10</b>	Orient about the general pharmacology along with their mechanism of action.					1,2
<b>II</b>	<b>CENTRAL NERVOUS DRUGS.</b> <ul style="list-style-type: none"> <li>• Drugs affecting the brain and spinal cord</li> <li>• Sedatives, hypnotics, and anxiolytics</li> <li>• Antipsychotic and antidepressant drugs</li> </ul> Drugs used in the treatment of epilepsy and pain		<b>08</b>	Learn about the different classification of drugs used in CNS disorder.					1,2
<b>III</b>	<b>URINARY SYSTEM</b> Diuretics & Antidiuretics		<b>02</b>	Understand the urinary system and the action of diuretics and antidiuretics drugs.					1,2
<b>IV</b>	<b>CARDIOVASCULAR SYSTEM</b> <ul style="list-style-type: none"> <li>• Drugs for Cardiac failure.</li> <li>• Antihypertensive drugs.</li> </ul>		<b>05</b>	Learn about the cardiovascular system and how antihypertensive and anti-arrhythmic medications					1,2

	<ul style="list-style-type: none"> <li>Drugs for Ischemic Heart Disease</li> </ul> Anti-arrhythmic Drugs		work	
<b>V</b>	<b>AUTONOMIC NERVOUS SYSTEM</b> <ul style="list-style-type: none"> <li>General Considerations.</li> <li>Cholinergic system.</li> <li>Anticholinergic drugs.</li> <li>Skeletal muscle relaxants.</li> <li>Adrenergic System.</li> <li>Adrenergic Drugs.</li> <li>Antagonists.</li> <li>Pharmacotherapy of Shock.</li> </ul>	<b>05</b>	Orient the students about the general pharmacology of autonomic nervous system acting drugs	1,2

**TEXT BOOKS:**

T1: Bertram G. Katzung (Basic & Clinical Pharmacology) Editor: Bertram G. Katzung

**REFERENCE BOOKS:**

Essentials of Medical Pharmacology by K.D. Tripathi

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Develop knowledge on concepts of Pharmacology including Emergency Medicines and their properties.	<b>1,5,7</b>
<b>2</b>	Understand the principles, impact of medications on the autonomic nervous system, and shock pharmacotherapy	<b>1,5,7</b>
<b>3</b>	A comprehensive knowledge on diuretics and antidiuretics drug's function and affect the body including their side effects.	<b>1,5,7</b>
<b>4</b>	Understand the concepts of cardiovascular system and the use, function of drugs such as anti-arrhythmic, antihypertensive	<b>1,5,7</b>
<b>5</b>	Implement knowledge on the drugs related to autonomic nervous system	<b>1,5,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22MECC114R</b>	<b>Applied Pharmacology I</b>	2				1		1

SEMESTER – I									
Course Title	EFFECTIVE ENGLISH (Communicative English & Soft Skills)								
Course code	22UMPD111R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 60P	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MSC. EMERGENCY AND CRITICAL CARE								
Semester	SEMESTER – I								
Course Objectives	1. To introduce the types of sentences and their significance. 2. To strengthen the students' vocabulary to enhance their speaking and writing skills. 3. To familiarize the students with the importance of dress codes in various organizations. 4. To introduce the 3 P's (Planning, prioritizing & performing) of Time Management. 5. To give insight into English pronunciation and into central concepts in phonetics								
CO1	Enable to analyse and identify the different types of sentences.								
CO2	Ability to integrate the skills of reading and speaking in professional communication.								
CO3	Dress code Etiquette sessions will boost their confidence and morals								
CO4	Acquire knowledge about the effective and efficient utilization of time.								
CO5	Introduction to Phonetics and its importance will improve the learners' pronunciation								
Unit-No.	Content				Contact Hour	Learning Outcome			K L
I	<b>MODULE 1- GRAMMAR</b> i. Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences ii. Types of Tenses iii. Common Errors iv. Synonyms v. Antonyms vi. Homonyms				3	Enable to analyse and identify the different types of sentences			1,2
II	<b>MODULE 2- READING SKILLS</b> i. Techniques of Effective Reading ii. Gathering ideas and information from a text The SQ3R Technique Interpret the text				4	Ability to integrate the skills of reading and speaking in professional communication			1,2
III	<b>MODULE 3-LISTENING SKILLS</b> i. What is listening? ii. The Process of Listening iii. Factors that adversely affect Listening iv. Difference between Listening and Hearing,				3	Dress code Etiquette sessions will boost their confidence and morals			1,2

	v. Purpose and Importance of Effective Listening vi. How to Improve Listening Process			
<b>IV</b>	<b>MODULE 4- CONFLICT MANAGEMENT</b> i. Definition ii. Type of Conflict Management iii. Effects of Conflict Management iv. Methods to deal with Conflicts (Negative)	<b>3</b>	Acquire knowledge about the effective and efficient utilization of time	1,2
<b>V</b>	<b>MODULE 5- TIME-MANAGEMENT SKILLS</b> i. Introduction to Time Management, ii. Purpose and Importance of Time Management, iii. Basic Tips to Maintain Time.  Activity: Problem solving activity: A situation will be given to the students and they will have to tell us how to handle the situation or solve the problem.	<b>2</b>	Introduction to Phonetics and its importance will improve the learners' pronunciation	1,2

### TEXT BOOKS:

T1- Wren,P.C and Martin,H. 1995. *High School English Grammar and Composition*, S Chand Publishing. · *English Grammar in Use*, Raymond Murphy 4th edition, CUP.

T2- Barrett, Grant. 2016. *Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking*, Zephyros Press

### REFERENCE BOOKS:

R1- English Vocabulary in Use (Advanced), Michael McCarthy and Felicity, CUP. ·

R2-Effective Communication and Soft Skills, Nitin Bhatnagar, Pearsons.

### OTHER LEARNING RESOURCES:

- <https://www.classcentral.com/report/toefl-preparation/>
- <https://brightlinkprep.com/10-best-toefl-prep-books/>



## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Enable to analyse and identify the different types of sentences.	5,7,
2	Ability to integrate the skills of reading and speaking in professional communication.	5,7
3	Dress code Etiquette sessions will boost their confidence and morals	5,7
4	Acquire knowledge about the effective and efficient utilization of time.	5,7
5	Introduction to Phonetics and its importance will improve the learners' pronunciation	5,7

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
22UMPD111R	<b>Effective English (Communicative English &amp; Soft Skills)</b>				2	1		1

SEMESTER – I									
Course Title	FUNDAMENTAL OF STATISTICS								
Course code	22UMFS111R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T+60P	2	0	4	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MSC. EMERGENCY AND CRITICAL CARE								
Semester	SEMESTER – I								
Course Objectives	<ol style="list-style-type: none"> <li>To understand the basic principles of statistical inference, including probability theory, random variables and sampling distributions.</li> <li>To learn how to interpret statistical results and communicate them effectively to others.</li> <li>To learn how to summarize and visualize data using descriptive statistics such as measures of central tendency and variability, histograms, box plots, and scatter plots.</li> <li>To understanding the concepts of statistical hypothesis testing and estimation, including the use of t-tests, z-tests, confidence intervals and p-values.</li> <li>To understanding the principles of experimental design and the use of statistical methods in scientific research.</li> </ol>								
CO1	Students will have basic knowledge of Statistical methods								
CO2	Students will gain the knowledge of organizing & Cleaning.								
CO3	Students will be able to gain the Analytical Skill con								
CO4	Students will be able to acquire the knowledge of basic data analysis procedure for day to day use								
CO5	Students learn how to select and apply appropriate parametric tests for different types of data and research questions								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	STATISTICAL METHODS	10	understand the scope of statistics, distinguish between a population and a sample, identify quantitative and qualitative data, categorize data by attributes and variables, and apply nominal, ordinal, interval, and ratio scales of measurement				1,2		
II	PRESENTATION	10	Able to present data using tabular and graphical methods, They will understand and calculate measures of central tendency (mathematical and positional) and measures of dispersion Also, students will be able to describe data using.				1,2		

<b>III</b>	<b>BIVARIATE DATA</b>  Definition, scatter diagram, simple, partial and multiple correlation (3 variables only), rank correlation. Simple linear regression, fitting of polynomials and exponential curves	<b>5</b>	understand bivariate data, create scatter diagrams, and analyze simple, partial, and multiple correlations (with three variables). They will also compute rank correlation, perform simple linear regression, and fit polynomials and exponential curves to data.	1,2
<b>IV</b>	<b>RANDOM EXPERIMENT</b>  trial, sample point and sample space, event, Operations of Events, concepts of mutually exclusive and exhaustive events. Definition of probability: classical and relative frequency approach. Discrete probability space, Properties of probability, Independence of events, Conditional probability, total and compound probability rules, Normal probability Distribution, Binomial probability Distribution, Poisson Probability Distribution, Bayes' theorem and its applications	<b>10</b>	understand the concepts of random experiments,. Students will learn about event independence, conditional probability, total and compound probability rules, and various probability distributions . Additionally, they will understand Bayes' theorem and its applications	1,2
<b>V</b>	<b>Unit-V Testing of hypothesis, parametric test:</b>  t-test, z-test, chi-square test. Non-Parametric test: One sample Kolmogorov test, wilcoxon Signed test, Mann-Whitney Test, Kruskal walis test	<b>10</b>	To understand hypothesis testing and be able to perform parametric tests They will also be familiar with non-parametric tests	1,2
<b>Practical</b>	Based on theory syllabus	<b>60</b>		1,2, 3,4

### TEXT BOOKS:

Introduction to the Practice of Statistics" by David S. Moore, George P. McCabe, and Bruce A. Craig

### REFERENCE BOOKS:

Statistics for Business and Economics" by Paul Newbold, William L. Carlson, and Betty Thorne

### OTHER LEARNING RESOURCES:

Fundamentals of Statistics" by Michael Sullivan III

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Students will have basic knowledge of Statistical methods	<b>6,7</b>

<b>2</b>	Students will gain the knowledge of organizing & Cleaning.	<b>6,7</b>
<b>3</b>	Students will be able to gain the Analytical Skill con	<b>6,7</b>
<b>4</b>	Students will be able to acquire the knowledge of basic data analysis procedure for day to day use	<b>6,7</b>
<b>5</b>	Students learn how to select and apply appropriate parametric tests for different types of data and research questions	<b>6,7</b>

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22UMFS111R</b>	<b>Fundamental Of Statistics</b>				1		3	1

SEMESTER – I									
Course Title	MINI RESEARCH (REVIEW OF LITERATURE- R1)								
Course code	22MECC115R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 120R	0	0	0	0	8	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MSC. EMERGENCY AND CRITICAL CARE								
Semester	SEMESTER – I								
Course Objectives	<ol style="list-style-type: none"> <li>To introduce students to the basics concept of writing research, including the writing process, the elements of effective writing, and the different types of research</li> <li>To teach students how to research and find relevant and credible sources of information to support their research</li> <li>To introduce students to various tools and resources they can use to enhance their research,</li> <li>To teach students about the importance of academic integrity and the ethical considerations involved in writing, including how to properly cite sources and avoid plagiarism</li> </ol>								
CO1	Acquire a comprehensive knowledge about the basic principles of research, including the research process, different types of research, and the importance of research in various fields								
CO2	Able to identify relevant research topics and develop research questions that can be investigated through independent research.								
CO3	Learnt how to use various tools for reference, including online databases, academic journals, and other resources that can support their research.								
CO4	Enhance knowledge on how to conduct a literature review and identify gaps in existing research, in order to develop a research question and design a research project								
CO5	Gain a better understand regarding the ethical considerations involved in conducting research, including the importance of obtaining informed consent, maintaining confidentiality, and adhering to ethical guidelines.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Introduction & compressive Knowledge on research search engine.	3	To introduce the comprehensive knowledge on research engines				1,2		
II	Section of Topic	3	Gain confidence in selection of the topic.				1,2		
III	Tools for reference citation	2	Learn to use different tools for reference citation				1,2		
IV	Introduction & typing review Writing	3	Gain knowledge in typing the review writing of the research				1,2		
V	Plagiarism, ethnical issue in writing review Knowledge on online & Selection of Journal	4	To being able to completing the research and selectionof proper journal				1,2		

### TEXT BOOKS:

**T1-** Multiple Stressors: Literature Review and Gap Analysis (WERF Research Report Series) by S.M. Swanson.

**REFERENCE BOOKS:**

"A Step-by-Step Guide to Conducting a Literature Review in Health Sciences" by Khalid Saeed Khan

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Acquire a comprehensive knowledge about the basic principles of research, including the research process, different types of research, and the importance of research in various fields	<b>1,1,3,1</b>
<b>2</b>	Able to identify relevant research topics and develop research questions that can be investigated through independent research.	<b>1,1,3,1</b>
<b>3</b>	Learnt how to use various tools for reference, including online databases, academic journals, and other resources that can support their research.	<b>1,1,3,1</b>
<b>4</b>	Enhance knowledge on how to conduct a literature review and identify gaps in existing research, in order to develop a research question and design a research project	<b>1,1,3,1</b>
<b>5</b>	Gain a better understand regarding the ethical considerations involved in conducting research, including the importance of obtaining informed consent, maintaining confidentiality, and adhering to ethical guidelines.	<b>1,1,3,1</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22MECC115R</b>	<b>Mini Research (Review Of Literature- R1)</b>				1	1	3	1

**2<sup>nd</sup> SEMESTER**

<b>SEMESTER – I</b>									
<b>Course Title</b>	<b>Medical Emergencies –I</b>								
<b>Course code</b>	<b>22MECC121R</b>	<b>Total credits: 4</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 45T+45P</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>MSC. EMERGENCY AND CRITICAL CARE</b>								
<b>Semester</b>	<b>SEMESTER – I</b>								
<b>Course Objectives</b>	1. To introduce the students on how to recognize, assess and manage any medical emergencies in the hospital as well as out of hospital settings. 2. To understand the necessary implications and differential diagnosis of common medical emergencies								
<b>CO1</b>	Develop knowledge on the principles underlying psychiatric disorders								
<b>CO2</b>	Comprehend the pathophysiology of various illnesses, disorders, and gynaecological emergencies.								
<b>CO3</b>	Understand the female reproductive system's anatomy, physiological changes that occur throughout pregnancy, and manage complications of labor								
<b>CO4</b>	Recognise the physiological changes in neonate, its assessment and management of various emergencies								
<b>CO5</b>	A comprehensive knowledge on toxicology, its impact on the human body with for diagnosis of different toxic substance.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>PSYCHIATRIC DISEASES</b>  Pathophysiology, Assessment and Management of Acute Psychosis, Agitated delirium, Dementia.  Management and handling of hostile and violent patients.	<b>10</b>	Learn how to assess and manage patients with psychiatric conditions					1,2	
<b>II</b>	<b>GYNAECOLOGICAL EMERGENCIES</b> <ul style="list-style-type: none"> <li>• Review of anatomy and physiology.</li> <li>• Pathophysiology of various diseases.</li> <li>• Assessment and management Ectopic Pregnancy, Pelvic inflammatory Disease, Ovarian Cyst, Prolapsed Uterus.</li> </ul>	<b>10</b>	Knowledge of the reproductive system's architecture and physiology as well as several gynaecological emergencies					1,2	
<b>III</b>	<b>OBSTETRICS</b> <ul style="list-style-type: none"> <li>• Review of anatomy of the female reproductive system.</li> <li>• Conception and gestation.</li> </ul>	<b>20</b>	Orient the students about conception gestation, maternal physiologic changes including complication of delivery					1,2	

	<ul style="list-style-type: none"> <li>• Physiology of maternal changes during pregnancy.</li> <li>• Cardiovascular and Endocrinological changes associated with the pregnant state.</li> <li>• Complications of pregnancy and labor.</li> <li>• Hypertensive disorders of pregnancy.</li> <li>• Stages of labor and abnormal presentations.</li> <li>• Peripartum Hemorrhage</li> </ul>			
<b>IV</b>	<b>NEONATOLOGY &amp; PAEDIATRICS</b> <ul style="list-style-type: none"> <li>• Physiological changes in neonates.</li> <li>• Specific intervention and resuscitation steps.</li> <li>• Management of premature seizures, thermoregulation, hypoglycaemia.</li> <li>• Common birth injuries.</li> <li>• Approach to paediatric patients.</li> <li>• Assessment and management of respiratory, cardiovascular, shock, toxicological and sudden infant death syndrome.</li> <li>• Child abuse and neglect</li> </ul>	<b>10</b>	Orient the students about the Physiologic changes in neonates, approach to pediatric patients, identify child abuse, etc.	1,2
<b>V</b>	<b>TOXICOLOGY</b> <ul style="list-style-type: none"> <li>• Review of Anatomy and Physiology.</li> <li>• Pathophysiology.</li> <li>• Assessment and management Bites, stings and injected poisons.</li> <li>• Poisoning: Overview of approaches for evaluation and treatment.</li> <li>• Tricyclic and SSRI Antidepressants.</li> <li>• Nonsteroidal Anti-inflammatory Agents.</li> <li>• Opioids.</li> <li>• Pesticides and Herbicides.</li> <li>• Sedatives and Hypnotics.</li> <li>• Toxic inhalants.</li> <li>• Cocaine.</li> <li>• Methamphetamine, ecstasy and other street drugs</li> </ul>	<b>10</b>	Gain knowledge on various toxic substances, their effect on human body, with the assessment and management	1,2
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Physical and chemical Restraint</li> <li>2. Assisting Delivery, Delivery of the Placenta, Birthing positions ,OB Kit and preparation</li> <li>3. Neonatal Resuscitation</li> </ol>	<b>100</b>	Demonstrate the appropriate use of physical and chemical restraints, assist in delivery including placenta delivery and birthing positions using an OB kit, and perform neonatal resuscitation to ensure patient and newborn safety	1,3,4

**TEXT BOOKS:**

T1- Nancy Caroline (Emergency in the streets, 7<sup>th</sup> edition) Series editor: Andrew N. Pollak, MD, FAAOS



T2- D.K.Gupta, Binny(Medical Emergencies in General Practise 2011) <https://medicineplus.gov-> Medical encyclopedia

**REFERENCE BOOKS:**

Rosen's Emergency Medicine: Concepts and Clinical Practice" by John A. Marx

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop knowledge on the principles underlying psychiatric disorders	<b>1,2,4,5</b>
<b>2</b>	Comprehend the pathophysiology of various illnesses, disorders, and gynaecological emergencies.	<b>1,2,5</b>
<b>3</b>	Understand the female reproductive system's anatomy, physiological changes that occur throughout pregnancy, and manage complications of labor	<b>1,2,3,4,5,7</b>
<b>4</b>	Recognise the physiological changes in neonate, its assessment and management of various emergencies	<b>1,2,3,4,5</b>
<b>5</b>	A comprehensive knowledge on toxicology, its impact on the human body with for diagnosis of different toxic substance.	<b>1,2,3,4,5,</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22MECC121R</b>	<b>Medical Emergencies –I</b>	1	2	3	1	1		1

SEMESTER – II									
<b>Course Title</b>	<b>Mechanical Ventilation</b>								
<b>Course code</b>	<b>22MECC122R</b>	<b>Total credits: 3</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>Total hours: 30T+30</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>MSC. EMERGENCY AND CRITICAL CARE</b>								
<b>Semester</b>	<b>SEMESTER – II</b>								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>To understand the anatomy and physiology of the respiratory system and the pathophysiology of respiratory failure.</li> <li>Learn the different types of mechanical ventilation, including positive pressure ventilation, negative pressure ventilation, and high-frequency ventilation</li> <li>Develop an understanding of the principles of mechanical ventilation, including the use of ventilator modes, settings, and alarms</li> <li>Develop the skills necessary to provide effective mechanical ventilation to a wide range of patients, including those with acute respiratory distress syndrome (ARDS), chronic obstructive pulmonary disease (COPD), and neuromuscular disorders.</li> </ol>								
<b>CO1</b>	Recognize the principles of mechanical ventilation, controlling conditions that may require MV, provide appropriate oxygen therapy.								
<b>CO2</b>	Develop skills on monitoring arterial blood gases, vital signs with electrolyte balances in fluids also apply in the practical field.								
<b>CO3</b>	Apply knowledge to operate ventilator modes also the mechanics of breathing								
<b>CO4</b>	Utilize skill to increase ventilation and oxygenation, preserving the balances of acid, base, and fluid electrolytes.								
<b>CO5</b>	Understand hemodynamic monitoring and ability to manage mechanical ventilation.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>PRINCIPLES OF MECHANICAL VENTILATION</b> <ul style="list-style-type: none"> <li>Airway resistance.</li> <li>Lung compliance.</li> <li>Dead space.</li> <li>Tidal volume.</li> <li>Ventilation- ventilatory failure.</li> <li>Oxygenation failure.</li> <li>Clinical conditions leading to mechanical ventilation.</li> </ul> Oxygen therapy, Aerosol therapy and Humidification.	<b>06</b>	Get knowledge on principles of mechanical ventilation, airway resistance, oxygen therapy, etc.				1,2		
<b>II</b>	<b>MONITORING IN MECHANICAL VENTILATION</b> <ul style="list-style-type: none"> <li>Concepts of monitoring.</li> <li>Vital signs.</li> <li>Chest inspection and auscultation.</li> </ul>	<b>05</b>	To understand about concepts of monitoring, checking vital signs including fluid electrolyte				1,2		

	<ul style="list-style-type: none"> <li>Fluid electrolyte balance.</li> <li>Arterial blood gases.</li> </ul> <p>Oxygen and end tidal carbon dioxide monitoring</p>		balance.	
<b>III</b>	<p><b>OPERATING MODES OF VENTILATION</b></p> <ul style="list-style-type: none"> <li>Basics concepts – Mechanics of ventilation.</li> <li>Work of breathing.</li> <li>Initiation of mechanical ventilation.</li> <li>Different modes of Mechanical Ventilation.</li> <li>Ventilator settings.</li> <li>Timings – Inspiratory, Expiratory, Inspiratory hold.</li> <li>PEEP</li> <li>Fio<sub>2</sub></li> <li>Non Invasive ventilation: CPAP &amp;BiPAP</li> <li>Invasive modes – Controlled, Assisted, SIMV, APRV, Pressure Support.</li> <li>Troubleshooting during Mechanical Ventilation and Alarm settings.</li> <li>Weaning during Mechanical Ventilation.</li> <li>Care of Ventilator, tubing and sterility.</li> </ul> <p>Complications during Mechanical Ventilation.</p>	<b>10</b>	Gain concepts of operating modes of ventilation, weaning of MV, including complications related to MV	1,2
<b>IV</b>	<p><b>MANAGEMENT OF MECHANICAL VENTILATION</b></p> <ul style="list-style-type: none"> <li>Strategies to improve ventilation and oxygenation.</li> <li>Acid base electrolyte balance and their correction.</li> </ul> <p>fluid electrolyte nutrition balance and management</p>	<b>05</b>	Learn about the different strategies to improve mechanical ventilation along with maintaining fluid electrolyte balances.	1,2
<b>V</b>	<p><b>HEMODYNAMIC MONITORING &amp; AIRWAY MANAGEMENT IN MECHANICAL VENTILATION</b></p> <ul style="list-style-type: none"> <li>ECG arterial catheter</li> <li>CVP</li> <li>Pulmonary artery catheter</li> <li>Cardiac output and vascular resistance circulation</li> <li>Preload afterload contractility assessment</li> <li>Calculation of hemodynamic values</li> <li>Monitoring of mixed venous saturation</li> <li>Intubation, common artificial airways.</li> <li>Orotracheal intubation procedures, Tracheostomy minitracheostomy Endotracheal intubation</li> <li>Management of oro tracheal and tracheostomy tubes</li> <li>Extubation and post extubation care</li> <li>Complications of the above</li> </ul> <p>Intubation methods</p>	<b>19</b>	Gain knowledge of hemodynamic monitoring with airway management in ventilation	1,2
<b>Practical</b>	<ol style="list-style-type: none"> <li>Setting Up the Ventilator.</li> <li>Ventilator Modes</li> <li>Patient Assessment and Monitoring</li> <li>Adjusting Ventilator Settings</li> </ol>	<b>100</b>	Learn to set up the ventilator, understand various ventilator modes, assess and monitor patients, adjust settings, troubleshoot alarms, wean patients from ventilation, and perform emergency procedures.	1,2,3,4,5

	5.Troubleshooting Alarms 6 .Weaning from Mechanical Ventilation 7. Emergency Procedures			
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**TEXT BOOKS:**

T1-Nancy Caroline (Emergency in the streets, 7th edition) Series editor: Andrew N. Pollak, MD, FAAOS

T2- Kumar B Umesh (Handbook of Mechanical Ventilation) July 20

**REFERENCE BOOKS:**

"Mechanical Ventilation: Clinical Concepts and Practice" by David C. Shelledy and Jay I. Peters

**OTHER LEARNING RESOURCES:**

<https://my.clevelandclinic.org/mechanicalventilation>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Recognize the principles of mechanical ventilation, controlling conditions that may require MV, provide appropriate oxygen therapy.	3,4,7
2	Develop skills on monitoring arterial blood gases, vital signs with electrolyte balances in fluids also apply in the practical field.	1,2,3,7
3	Apply knowledge to operate ventilator modes also the mechanics of breathing	4,7
4	Utilize skill to increase ventilation and oxygenation, preserving the balances of acid, base, and fluid electrolytes.	4,7
5	Understand hemodynamic monitoring and ability to manage mechanical ventilation.	2,3,5,7

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
22MECC122R	Mechanical Ventilation		1	1	1			1

SEMESTER – II										
Course Title	Trauma Management									
Course code	22MECC123R	Total credits: 4	L	T	P	S	R	O/F	C	
		Total hours: 45T+30P	3	0	2	0	0	0	4	
Pre-requisite	Nil	Co-requisite	Nil							
Programme	MSC. EMERGENCY AND CRITICAL CARE									
Semester	SEMESTER – II									
Course Objectives	<ol style="list-style-type: none"> <li>To understand the different types of trauma and their impact on the body and mind.</li> <li>To learn the principles of primary and secondary survey, including airway management, breathing support, circulation management, and other life-saving interventions</li> <li>Develop skills necessary to prioritize care and manage multiple injuries or patients in a mass casualty situation</li> <li>Develop skills and knowledge necessary to provide effective trauma care in a variety of settings, including emergency departments, trauma centers, and military and disaster response settings</li> </ol>									
CO1	Develop fundamental knowledge in trauma system, mechanism of injury, assessment and management of shock.									
CO2	Demonstrate skills to assess and manage soft tissue injuries, such as burns, crush injuries, blast injuries, etc.									
CO3	Illustrate knowledge on the anatomy, physiology of the musculoskeletal system and assess a variety of musculoskeletal injuries.									
CO4	Apply knowledge of the anatomy, physiology of the thoracic cavity, to examine and treat the injury.									
CO5	Comprehend the anatomy, physiology of the abdominal cavity's organs, to examine and treat the injury.									
Unit-No.	Content	Contact Hour	Learning Outcome						KL	
I	<b>TRAUMA SYSTEMS, MECHANISM OF INJURY &amp; BLEEDING &amp; SHOCK</b> Energy. Biomechanics & Kinematics. Types of trauma. Review of cardiovascular system. Pathophysiology of Haemorrhage. Assessment & management of bleeding patients. Pathophysiology of Shock. Assessment & management of	5	Understand the concepts of mechanism of injury, types of trauma, with assessment and management.						1,2	

	shock			
<b>II</b>	<p><b>SOFT TISSUE INJURY &amp; BURNS</b></p> <ul style="list-style-type: none"> <li>• Review of anatomy &amp; physiology of skin</li> <li>• Wound healing</li> <li>• Closed versus open wounds.</li> <li>• Crush injuries.</li> <li>• Blast injuries.</li> <li>• Assessment &amp; management of soft tissue injury.</li> <li>• Management of crush syndrome.</li> <li>• Review of anatomy &amp; physiology of skin.</li> <li>• Pathophysiology of burns.</li> <li>• Assessment &amp; management of burns.</li> <li>• Burns &amp; inhalation injury.</li> </ul>	<b>15</b>	Prepare with the ideas of various soft tissue injuries, such as burns, explosion, crush injury, etc. by learning about the anatomy and physiology of skin.	1,2
<b>III</b>	<p><b>HEAD &amp; FACE, SPINAL &amp; MUSCULOSKELETAL INJURIES</b></p> <p>Review of anatomy.</p> <p>Assessment &amp; management of head &amp; facial injuries.</p> <p>Traumatic Brain injury.</p> <p>Management of the Brain-Dead Organ Donor.</p> <p>Review of anatomy &amp; physiology.</p> <p>Assessment &amp; management of spinal injuries.</p> <p>Spinal Cord injury</p> <p>Drowning</p> <p>Spinal immobilization techniques.</p> <p>Review of anatomy &amp; physiology of the musculoskeletal system.</p> <p>Mechanisms of injury.</p>	<b>10</b>	Orient about the anatomy and physiology of head-face, spinal cord, and musculoskeletal system along with assessment and management.	1,2

	<p>Fractures.</p> <p>Strains.</p> <p>Sprains.</p> <p>Dislocations.</p> <p>Amputations.</p> <p>Assessment &amp; management of musculoskeletal injuries</p>			
<b>IV</b>	<p><b>THORACIC INJURIES</b></p> <p>Review of anatomy &amp; physiology of thorax.</p> <p>Pathophysiology, assessment &amp; management of thoracic injuries.</p> <p>Thoracic Trauma</p>	<b>10</b>	Gain confidence with the organs related to the thoracic cavity including knowledge on the assessment and management after injury.	1,2
<b>V</b>	<p><b>ABDOMEN INJURIES</b></p> <p>Review of anatomy &amp; physiology of abdomen.</p> <p>Pathophysiology, Assessment &amp; management of abdomen injuries.</p> <p>Abdominal Trauma.</p> <p>Abdominal Trauma</p> <p>Thoracic &amp; major Long Bone Fractures</p>	<b>5</b>	Prepare with the anatomy and physiology of organs related with abdomen and how to assess or manage if undergoes trauma	1,2
<b>Practical</b>	<p>Assessment &amp; management of bleeding patients</p> <p>Assessment &amp; management of burns.</p> <p>Assessment &amp; management of soft tissue injury.</p> <p>Assessment &amp; management of head &amp; facial injuries.</p> <p>Assessment &amp; management of spinal injuries</p> <p>Spinal immobilization techniques.</p> <p>Mechanisms of injury.</p> <p>assessment &amp; management of thoracic injuries.</p> <p>Assessment &amp; management of abdomen</p>	<b>100</b>	Demonstrate the skills and techniques of assessing and managing various medical emergencies.	

	injuries.			
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**TEXT BOOKS:**

T1- Nancy Caroline (Emergency in the streets, 7<sup>th</sup> edition) Series editor: Andrew N. Pollak, MD, FAAOS

T2- Simant Kumar Jha, Jayant Kumar, Abhinav Gupta, Srinivas Samavedam, Arindam Kar (ISCCM Manual of Trauma Care, 1/e edition) 2020

**REFERENCE BOOKS:**

Trauma Care Manual" by Ian Greaves and Keith Porter

**OTHER LEARNING RESOURCES:**

<https://my.clevelandclinic.org>

<https://www.ems1.com>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop fundamental knowledge in trauma system, mechanism of injury, assessment and management of shock.	<b>1,2,3,4</b>
<b>2</b>	Demonstrate skills to assess and manage soft tissue injuries, such as burns, crush injuries, blast injuries, etc.	<b>2,3,4</b>
<b>3</b>	Illustrate knowledge on the anatomy, physiology of the musculoskeletal system and assess a variety of musculoskeletal injuries.	<b>1,2,3,4</b>
<b>4</b>	Apply knowledge of the anatomy, physiology of the thoracic cavity, to examine and treat the injury.	<b>1,2,3,4</b>
<b>5</b>	Comprehend the anatomy, physiology of the abdominal cavity's organs, to examine and treat the injury.	<b>1,2,3</b>

**MAPPING TABLE**



Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
22MECC123R	Trauma Management	1	2	2	1			1

SEMESTER – II											
Course Title	APPLIED PHARMACOLOGY II										
Course code	22MECC124R	Total credits: 2			L	T	P	S	R	O/F	C
		Total hours: 30T			2	0	0	0	0	0	2
Pre-requisite	Nil		Co-requisite		Nil						
Programme	MSC. EMERGENCY AND CRITICAL CARE										
Semester	SEMESTER – II										
Course Objectives	1. This subject will provide students with pharmacological knowledge to manage patients with complex health problems, including comorbidities. 2. It will also prepare students to understand the cellular mechanisms and physiological outcomes of drug actions and interactions										
CO1	A comprehensive knowledge on drugs related to respiratory system										
CO2	Develop knowledge about the function and effects of drugs related blood										
CO3	Acquire knowledge about the function of gastrointestinal drugs.										
CO4	Understands about the effects of drugs that regulates the hormones.										
CO5	A comprehensive knowledge on drugs that regulates the endocrine system										
Unit-No.	Content			Contact Hour	Learning Outcome					KL	
I	<b>RESPIRATORY SYSTEM</b> Bronchodilators  Antihistamines.			2	Prepare with the knowledge of respiratory drugs such as bronchodilators, etc.					1,2	
II	<b>BLOOD</b> Hematinics.  Drugs used in coagulation disorders  Hypolipidemic drugs			3	Orient about the blood function along with drugs used for coagulation disorders and more					1,2	
III	<b>GASTROINTESTINAL DRUGS</b>  Emetics Antiemetics  Drugs used in Peptic Ulcer disease			3	Gain confidence in gastrointestinal drugs and their effect on human body					1,2	
IV	<b>HORMONES</b> Corticosteroids			3	Proper understanding of hormones and function of steroids on body.					1,2	

	ulin & Oral hypoglycemic agents			
<b>V</b>	<b>ENDOCRINOLOGY DRUGS</b> Hormones and their receptors ugs used in the treatment of diabetes, thyroid orders, and reproductive disorders	<b>4</b>	To have a comprehensive knowledge about various drugs in endocrine disorders	1,2

### TEXT BOOKS:

**T1:** Bertram G. Katzung (Basic & Clinical Pharmacology) Editor: Bertram G. Katzung

### REFERENCE BOOKS:

Goodman & Gilman's: "The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, Randa Hilal-Dandan, and Bjorn C. Knollmann

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	A comprehensive knowledge on drugs related to respiratory system	<b>1,5,7</b>
<b>2</b>	Develop knowledge about the function and effects of drugs related blood	<b>1,5,7</b>
<b>3</b>	Acquire knowledge about the fuction of gastrointestinal drugs.	<b>1,5,7</b>
<b>4</b>	Understands about the effects of drugs that regulates the hormones.	<b>1,5,7</b>
<b>5</b>	A comprehensive knowledge on drugs that regulates the endocrine system	<b>1,5,7</b>

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22MECC124R</b>	<b>Applied Pharmacology II</b>	1				1		1

SEMESTER – II									
Course Title	RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS								
Course code	22UMRM121R	Total credits: 2 Total hours: 15T+60S	L	T	P	S	R	O/F	C
			1	0	0	4	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MSC. EMERGENCY AND CRITICAL CARE								
Semester	SEMESTER – II								
Course Objectives	1. To understand some basic concepts of research and its methodologies. 2. To identify appropriate research topics, select and define appropriate research problems and parameters, prepare a project proposal (to undertake a project), organize and conduct research (advanced project) in a more appropriate manner								
CO1	Explain key research concepts and issues								
CO2	Write a research report and thesis and write a research proposal (grants).								
CO3	Read comprehend, and explain research articles in their academic discipline.								
CO4	Understand the use of abstracts, the presentation of statistics, and proper referencing and bibliography formats.								
CO5	Analyze case studies on Basmati rice, turmeric, and neem patents.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Research Methodology-		3	Students will have basic knowledge of Research methods.				1,2	
An Introduction- meaning and objectives of research, motivation in research, types and significance of research, criteria of good research. Defining the Research Problems- definition of research problem, necessity of defining research problem									
II	Research Design-		4	Students will gain the knowledge of Research Methodology				1,2	
meaning and need of research design, features of a good design, different research designs, Sampling Design- steps in sampling design, Sample Size determination, criteria for selecting a sampling design, different types of sampling design, Experimental Design, Principles of Design of Experiment, One – way ANOVA, Two- Way ANOVA, CRD, RBD, LSD, 22									

	, 23 Factorial Design			
<b>III</b>	<p><b>Types of data</b></p> <p>sources of data collection, tools of data collection, Nominal, ordinal, interval and ratio</p> <p>– Attitude scale construction and measurement, rating scales, semantic differential (SD), Use of scale in statistical analysis, Schedules for interviews preparation and standardization, development of survey</p> <p>instruments and item analysis for the questionnaire</p>	<b>3</b>	Students will be able to gain the Skill questionnaire development. basic	1,2
<b>IV</b>	<p><b>Planning and organizing research report</b></p> <p>Format of research report, Different steps of writing report,</p> <p>lay out of the research report , How to organize thesis/Dissertation, mechanics of writing research report,</p> <p>standard methods of quoting- presenting the result, written and oral reports, Uses of abstract, format</p> <p>of research report, presentation of statistics - tabular and graphic references and uses of references,</p> <p>Bibliography and presentation of bibliography</p>	<b>3</b>	Students will be able to acquire the knowledge of Basic knowledge of basic Report/dissertation Procedure	1,2
<b>V</b>	<p><b>Intellectual property right (IPR)</b></p> <p>Introduction and the need for IPR, IPR in India and worldwide, Patents,</p> <p>Trademarks, Copyright &amp; Related Rights, Industrial Design, Traditional Knowledge and Geographical</p> <p>Indications, Patentable and non-patentable, patenting life, Filing of a patent application, The different layers</p> <p>of the international patent system, Case studies on Basmati rice, Turmeric, and Neem patents</p>	<b>2</b>	Students will have an insight knowledge of IPR	1,2

**TEXT BOOKS:**

T1- Boyle JS. Styles of ethnography. In: JM Morse, editor. Critical issues in qualitative research methods

**REFERENCE BOOKS:**

"Research Methods for Business: A Skill-Building Approach" by Uma Sekaran and Roger Bougie

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain key research concepts and issues	<b>5,7</b>
<b>2</b>	write a research report and thesis and write a research proposal (grants).	<b>5,7</b>
<b>3</b>	Readcomprehend, and explain research articles in their academic discipline.	<b>5,7</b>
<b>4</b>	understand the use of abstracts, the presentation of statistics, and proper referencing and bibliography formats.	<b>5,7</b>
<b>5</b>	analyze case studies on Basmati rice, turmeric, and neem patents.	<b>5,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22UMRM121R</b>	<b>Research Methodology And Statistical Analysis</b>					3		1

SEMESTER – II									
Course Title	COMMUNICATION MASTERY (Communicative English & Soft Skills)								
Course code	22UMPD121R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 60P	0	0	4	0	0	0	2
Pre-requisite	22UMPD111R Effective English	Co-requisite	Nil						
Programme	MSC. EMERGENCY AND CRITICAL CARE								
Semester	SEMESTER – II								
Course Objectives	1. To familiarize students with the transformation of sentences and the appropriate use of prepositions. 2. To enhance the writing skills in different areas including CV and cover letter writing. 3. To convey meaning by reinforcing, substituting for or contradicting verbal communication. 4. Productivity and performance boosting activities for professional goal achievement								
CO1	Practice of grammar will polish their writing skills.								
CO2	It will enhance their communication and interpretative skills								
CO3	Introduction to behavioural skills, thoughts, and emotions will enable them to behave in a conscious and productive way.								
CO4	It will have a positive impact in their thought process and problem-solving skill								
CO5	Participants will grasp the fundamentals of non-verbal communication and body language, enabling them to apply effective techniques and avoid common pitfalls in interpersonal interactions.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Module1-Grammar</b> i. Use of Prepositions ii. Tag questions iii. Idioms, Phrases and Clauses iv. Simple, complex, compound sentences	3	students will confidently utilize prepositions, construct tag questions, understand idioms, phrases, and clauses, and differentiate between simple, complex, and compound sentences				1,2		
II	<b>Module2-Grammar</b> i. Active and Passive Voice ii. Direct and Indirect Speech	2	To be able to master the usage of active and passive voice, as well as direct and indirect speech in various contexts.				1,2		
III	<b>Module3-Writing Skills</b> i. The Basics of Writing ; avoid ambiguity and vagueness ii. Paragraph Writing iii. Precis Writing iv. Letter Writing v. Resume, CV and Cover Letter	3	will be proficient in writing clear and concise content, including paragraphs, precis, letters, resumes, CVs, and cover letters, while minimizing ambiguity and vagueness.				1,2		
IV	<b>Module4-Self-Management Skills</b>	4	Able to conduct SWOT analysis, set and regulate goals effectively,				1,2		

	i. SWOT Analysis ii. Self-Regulation-Goal Setting iii. Personal Hygiene		and maintain personal hygiene for enhanced self-management skills.	
<b>V</b>	<b>Module5-Non-VerbalCommunication-Sciences of Body Language</b> i. What is Non-Verbal Communication& Body Language, ii. Elements of Communication, iii. Types of Body Language, iv. Importance and Impact of Body Language, v. Types of Communication through Body Language, vi. Introduction to Haptic, Introduction to Kinesics vii Introduction to Proxemics, viii Body Language Do's and Don'ts, Doubt Clearing Session.	<b>3</b>	To understand non-verbal communication and body language, including its elements and types, recognize its importance and impact, identify various forms of communication conveyed through body language like haptics, kinesics, and proxemics, and apply effective do's and don'ts of body language etiquette.	1,2

### TEXT BOOKS:

T1- Barrett, Grant. 2016. Perfect English Grammar: The Indispensible Guide to Excellent Writing and Speaking, Zephyros Press.

T2- McDowell, Gayle Laakmann. 2008. Cracking the Coding Interview (Indian Edition).

### REFERENCE BOOKS:

R1- Communication Skills Training: A Practical Guide to Improving Your Social Intelligence, Presentation and Social Speaking, Ian Tuhovsky,2019

R2- A Textbook for AECC English Communication: Interface, Dr.KironmoyChetia and Pranami Bania Breez MohanHazarika,January2019

### OTHER LEARNING RESOURCES:

- <https://youtu.be/x60GHpQ8gJk>
- [https://youtu.be/Ke\\_oSN-BCaY](https://youtu.be/Ke_oSN-BCaY)
- <https://youtu.be/TDPDtrLxT-c>
- <https://www.classcentral.com/report/toefl-preparation/>

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Practice of grammar will polish their writing skills.	<b>5,7</b>
<b>2</b>	It will enhance their communication and interpretative skills	<b>5,7</b>
<b>3</b>	Introduction to behavioural skills, thoughts, and emotions will enable them to behave in a conscious and productive way.	<b>5,7</b>
<b>4</b>	It will have a positive impact in their thought process and problem-solving skill	<b>5,7</b>
<b>5</b>	Participants will grasp the fundamentals of non-verbal communication and body language, enabling them to apply effective techniques and avoid common pitfalls in interpersonal interactions.	<b>5,7</b>

### MAPPING TABLE

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22UMPD121R</b>	<b>Communication Mastery (Communicative English &amp; Soft Skills)</b>				2	1		1



SEMESTER – II									
Course Title	ACLS								
Course code	22MECC125R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 60p	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MSC. EMERGENCY AND CRITICAL CARE								
Semester	SEMESTER – II								
Course Objectives	This course encourages students to acquire knowledge and develop skill in providing first aid treatment in emergencies either in the hospital or in any setting								
CO1	Have an insight knowledge about the implications of ACLS								
CO2	Ability to apply the BLS, Primary, and Secondary Assessments sequence for a systematic evaluation of adult patients								
CO3	Perform prompt, high-quality BLS, including prioritizing early chest compressions and integrating early automated external defibrillator (AED) use								
CO4	Ability to recognize and perform early management of respiratory arrest								
CO5	Ability to recognize and perform early management of cardiac arrest until termination of resuscitation or transfer of care, including immediate post-cardiac arrest care								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	<b>INTRODUCTION TO ACLS</b> -Definition -Chain of Survival -Indications	2	To know the basics of ACLS	1,2					
II	<b>THE INITIAL ASSESSMENT</b> -Airway Management -Breathing adequacy -Circulatory system -Assessment Techniques	3	To know the basics of the initial examination of the patient	1,2					
III	<b>BASIC LIFE SUPPORT</b> -Initiation -Algorithm -CPR -Ventilation Techniques Maneuvers	3	To know the Basic Life support given before ACLS	1,2					
IV	<b>PRINCIPLES OF EARLY DEFIBRILLATION</b> -Terminology -Conduction system -Basics of Arrhythmia Defibrillator	4	To know the basics of Defibrillation and it's need	1,2					
V	<b>ACLS ALGORITHM</b> -Initiation	3	To know how to provide ACLS	1,2					

	-Sequence Intervention			
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**TEXT BOOKS:**

T1- Caroline N. Nancy Caroline’s Emergency Care in the Streets 7<sup>th</sup> Edition. Pollak, Andrew N. Elling, Bob.-American Academy of Orthopaedic SurgeonsSudbury,Mass:Jones&Barlett Learning,(2013)

**REFERENCE BOOKS:**

R1- American Heart Association's "Advanced Cardiovascular Life Support (ACLS) Provider Manual" 2020 edition

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Have an insight knowledge about the implications of ACLS	<b>1,2,3,4,7</b>
<b>2</b>	Ability to apply the BLS, Primary, and Secondary Assessments sequence for a systematic evaluation of adult patients	<b>1,2,3,4,5,7</b>
<b>3</b>	Perform prompt, high-quality BLS, including prioritizing early chest compressions and integrating early automated external defibrillator (AED) use	<b>2,3,4,5,7</b>
<b>4</b>	Ability to recognize and perform early management of respiratory arrest	<b>1,2,3,4,5,7</b>
<b>5</b>	Ability to recognize and perform early management of cardiac arrest until termination of resuscitation or transfer of care, including immediate post-cardiac arrest care	<b>2,3,4,5,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>22MECC125R</b>	ACLS	1	2	3	3	1		1

### III SEMESTER

SEMESTER – III									
Course Title	Medical Emergencies –II								
Course code	22MECC211R	Total credits: 4	L 3	T 0	P 4	S 0	R 0	O/F 0	C 5
		Total hours: 45T+120P							
Pre-requisite	Nil		Co-requisite	Nil					
Programme	Faculty of Paramedical sciences								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<p>1. To understand the organization and procedure of the emergency medical services, gather knowledge and skills to provide comprehensive care for patients of all age groups and to get the confidence to handle critical situations with quick and effective decisions for patients.</p> <p>2.To be familiar with the drugs used in emergencies and relevant equipment, to be able to diagnose common illness, access &amp; select the appropriate investigations required and their accurate interpretation keeping the patient's safety in prime consideration and to enhance the skills in useful techniques to be used in emergency situations</p>								
CO1	Develop knowledge on the basics of endocrinology, allergic emergencies.								
CO2	Prepare with gastrointestinal emergencies including their pathophysiology, assessment, and management.								
CO3	Show understanding on the basics of urological emergencies including pathophysiology, assessment, and management.								
CO4	Apply knowledge for diagnosing and manage the common hematological emergencies.								
CO5	Demonstrate knowledge on pathophysiology, preventive measures on infectious and communicable diseases.								
Unit-No.	Content	Contact Hour	Learning Outcome				K L		
I	<b>Endocrine &amp; Allergic emergencies:</b> Review of anatomy and physiology, Pathophysiology, Assessment & management, Hypoglycemia, Hyperglycemic Comas, Hyperglycemia& Blood glucose Control, Adrenal Insufficiency, Thyroid Gland Disorders, Diabetes Insipidus	25	Describe, illustrate and explaincell organization and functions, microscopy and structural differences.				1,2		
II	<b>Gastrointestinal emergencies:</b> Review of anatomy and physiology, Pathophysiology, Assessment & management, Gastrointestinal hemorrhage, The management of gastrointestinal bleeding, Diarrhea, Hepatorenal Syndrome, Hepatic Encephalopathy, Calculous AcalculousCholecystitis, Acute Pancreatitis, Peritonitis & intra-abdominal infection	15	Describe, illustrate and explainmembrane structure, function; cell organization and the proteins involved in transportation.				1,2		
III	<b>Renal &amp; urological emergencies:</b> Review of anatomy & physiology. Pathophysiology,	15	Describe, illustrate and explain chromosomal structure and types.				1,2		

	Assessment & management, Oliguria, Clinical assessment of Renal Function, Acute renal Failure, Urinary Tract Obstruction, Glomerulonephritis & Interstitial Nephritis, Drug therapy in Renal Failure			
<b>IV</b>	<b>Hematological emergencies:</b> Review of anatomy & Physiology, Pathophysiology, Assessment & Management, Blood Component Therapies, Anaemia, Management of Leukopenia	<b>10</b>	Describe, illustrate and explain the mechanism of cell to cell communication	1,2
<b>V</b>	<b>Infectious &amp; communicable diseases:</b> Transmission of communicable diseases., Precautions for health care providers., Ambulance cleaning & disinfection., Fever & Hypothermia, Community Acquired Pneumonia, Nosocomial Pneumonia, Pulmonary infections in the Immunocompromised Patient. Prevention & control of Nosocomial infection. Selective Digestive Decontamination. Vascular Catheter related infections., Pathophysiology of Sepsis & multiple Organ Dysfunctions, Septic Shock, Sepsis & Multiple Organ System failure in children, Infections of the Urogenital Tract, Central Nervous System infections, Infections of skin, muscle & soft tissue Infections in the Immunocompromised patient Infectious Endocarditis, Fungal Infections, Human Immunodeficiency Virus infection., Jaundice, Tuberculosis, Malaria & other tropical infections in the intensive care unit, Dengue	<b>25</b>	Describe, illustrate and explain the cell cycle and division in general and in some specific cell types	1,2
<b>Practical</b>	<b>Endocrine Emergencies:</b> Hypoglycemia, Hyperglycemic Emergencies , Adrenal Insufficiency , Thyroid Emergencies  <b>Gastrointestinal Emergencies:</b> GI Hemorrhage, Gastrointestinal Bleeding Management, Diarrhea, Hepatic Encephalopathy, Acute Pancreatitis  <b>Renal &amp; Urological Emergencies:</b> Oliguria, Acute Renal Failure (AKI), Renal Function Assessment, Urinary Tract Obstruction, Drug Therapy in Renal Failure  <b>Hematological Emergencies:</b> Blood Component Therapies, Anemia (Including Acute Blood Loss), Management of Leukopenia, Other Disorders  <b>Infectious &amp; Communicable Diseases</b> Transmission, Precautions, Fever, Hypothermia Management, Pneumonia Pulmonary Infections in Immunocompromised	<b>100</b>	Demonstrate the skills and techniques of assessing and managing various medical emergencies.	1,2,3,4

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**TEXT BOOKS:**

T1: Andrew N Pollak. Emergency care in the streets. seventh Edition Jones & Barlett Learning

**REFERENCE BOOKS:**

R1: Jean-Louis Vincent, Edward Abraham et,al Textbook of critical care. Saunders sixth edition

R2: D.K.Gupta. Medical Emergencies in General Practise Binny, 2011

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop knowledge on the basics of endocrinology, allergic emergencies.	1,2
2	Prepare with gastrointestinal emergencies including their pathophysiology, assessment, and management.	1,2,3
3	Show understanding on the basics of urological emergencies including pathophysiology, assessment, and management.	1, 3
4	Apply knowledge for diagnosing and manage the common hematological emergencies.	1,2
5	Demonstrate knowledge on pathophysiology, preventive measures on infectious and communicable diseases.	1,2

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	
22MECC211R	Medical Emergencies –II	3	2	1	1			1	

SEMESTER – III									
Course Title	DIALYSIS								
Course code	22MECC212R	Total credits: 4 Total hours: 60T+120P	L	T	P	S	R	O/F	C
			4	0	4	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Faculty of Paramedical sciences								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	1. Prepare the students to perform hemo dialysis treatments to patients with renal failure. 2. Will gain a comprehensive knowledge about the equipment used in dialysis unit 3. To improve patient's quality of life by delivering efficient dialysis treatment								
CO1	Show understanding about the structure and physiological function of the renal system.								
CO2	Develop a fundamental concept on indications, mechanism of functioning and management of dialysis machine.								
CO3	Comprehend knowledge on aseptic acute vascular access catheter care and dialysis initiation.								
CO4	Apply skills to diagnose, intervention to prevent life threatening conditions related to renal replacement therapies.								
CO5	Utilize knowledge to identify, manage acute and chronic complications of hemodialysis, metabolic complications of peritoneal dialysis.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Review of Anatomy &amp; Physiology:</b> Anatomy of Kidney, Physiology of Kidney	5	Describe, illustrate and explain the anatomy and physiology of Kidney				1,2		
II	<b>Basics of Dialysis:</b> Indications of dialysis, Principles of dialysis, definitions, Types of dialysis.	5	Describe, illustrate and explain basic principles of dialysis				1,2		
III	<b>Haemodialysis:</b> Haemodialysis apparatus – types of dialyzer & membrane, Types of vascular access for haemodialysis, Introduction, functioning and management machine., Priming of dialysis apparatus, Dialyzer reuse, Monitoring of patient during dialysis	20	Explain and classify the types of dialyzers & membrane used in hemodialysis including the complications and monitoring techniques during dialysis				2,3		
IV	<b>Peritoneal Dialysis:</b> Peritoneal dialysis machine, Peritoneal access devices-types of catheter insertion, Techniques & associated complications, Peritoneal	20	Describe, illustrate and explain the types of catheters used in peritoneal dialysis				2,3		

	equilibration test (PET), Anticoagulation, Peritonitis & exit site infection, Withdrawal of dialysis criteria		along with the complications and withdrawal	
<b>V</b>	<b>Complications of Dialysis:</b> Metabolic complications, Cardiovascular complications, Infections complications, Hematologic complications	<b>10</b>	Describe, illustrate and explain the pathophysiology , risk factors and complications of dialysis	2,3
<b>Practical</b>	<b>Vascular Access (Fistula, Graft, Catheter)</b>  Machine Setup and Management  Monitoring During Dialysis  Catheter Insertion Techniques  Peritoneal Equilibration Test (PET)  Complications of Dialysis		Demonstrate the skills and techniques of monitoring and managing complications during dialysis	1,2,3,4

### TEXT BOOKS:

T1: Allen R Nissenson and Richard N Fine Handbook of dialysis therapy 6<sup>th</sup> edition.

### REFERENCE BOOKS:

R1: Dr Anjani Sharma, Faswal Pichan Handbook for dialysis technician, 2<sup>nd</sup> edition

### OTHER LEARNING RESOURCES:

<https://www.pdfdrive.com/handbook-of-dialysis-e158833389.html>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Show understanding about the structure and physiological function of the renal system.	<b>1,2,3</b>

<b>2</b>	Develop a fundamental concept on indications, mechanism of functioning and management of dialysis machine.	<b>1,3</b>
<b>3</b>	Comprehend knowledge on aseptic acute vascular access catheter care and dialysis initiation.	<b>2,3</b>
<b>4</b>	Apply skills to diagnose, intervention to prevent life threatening conditions related to renal replacement therapies.	<b>2,3</b>
<b>5</b>	Utilize knowledge to identify, manage acute and chronic complications of hemodialysis, metabolic complications of peritoneal dialysis.	<b>2,3</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	
<b>22MECC212R</b>	Dialysis	3	3	3				2	



SEMESTER – III									
Course Title	Emergency Medical Services- Operations								
Course code	22MECC213R	Total credits:	L	T	P	S	R	O/F	C
		4	4	0	0	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Faculty of Paramedical sciences								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<p>1.Explain the history of EMS dispatch, describe basic configuration of EMS communication systems</p> <p>2. Recall components of an EMS dispatch program and discuss enhancements of communications such as automatic number/location/vehicle identification as well as the role of federal and state agencies within EMS systems.</p>								
CO1	Understanding on the components of an EMS dispatch program and discuss enhancements of communications.								
CO2	Apply practical understanding for paramedic wellbeing, its components, and related implications.								
CO3	A comprehensive knowledge on injury and illness prevention strategies.								
CO4	Demonstrate knowledge towards Medical, legal, and Ethical issues faced during EMS at large.								
CO5	Utilize knowledge on ambulance operations and its relative implications.								
Unit-No.	Content				Contact Hour	Learning Outcome			KL
I	<b>EMS systems, Roles, and Responsibilities:</b> EMS system development., EMT education., Licensure, certification, and registration, Professionalism, Roles and responsibilities, Medical direction., EMS research.				10	Describe, illustrate and explain the system of EMS along with their roles and responsibilities			1,2
II	<b>Well-being of the paramedic:</b> Components of well-being, Stress, Coping with death and dying, Personal protective equipment's, Building teamwork to improve outcomes				10	Describe, illustrate and explain the step that contributes to wellness and their importance in managing stress			1,2
III	<b>Illness and injury prevention:</b> Principles of injury prevention, Prevention programs, Teachable moment				10	Describe, illustrate and explain the roles of paramedic in promoting public health both in terms of injury and illness			2,4
IV	<b>Medical, legal issues and Ethical issues:</b> Legal system in India, Legal accountability of the paramedic., Scope of practice, Negligence, Crime scene and emergency scene responsibilities.,				15	Describe, illustrate and explain the difference between the laws and ethics and the implication			2,4

	Documentation, Reportable cases, Medical ethics. Basic Ethical Principles in Critical Care, Patient's rights, End of Life in the ICU, Autonomy, Withholding or withdrawing resuscitation		of medical ethics for paramedic	
<b>V</b>	<b>Ambulance operations Medical incident command:</b> Understanding your ambulance, Ambulance staffing & development, Emergency vehicle operation, The incident commands, Standard operating procedures, Medical incident command, Triage	<b>15</b>	Describe, illustrate and explain in managing emergencies disasters, and ensure the safety and well-being of patients and healthcare personnel	2,4

### TEXT BOOKS:

T1: Nancy Caroline (Emergency in the streets, 7<sup>th</sup> edition) Series editor: Andrew N. Pollak, MD, FAAOS

### REFERENCE BOOKS:

R1: Emergency Medical Service Systems: A Global Perspective by Shakti Kumar Gupta, Sunil Kant, Angel Rajan Singh

### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/?term=Emergency%20Medical%20Services-%20Operations>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Understanding on the components of an EMS dispatch program and discuss enhancements of communications.	<b>4,7</b>
<b>2</b>	Apply practical understanding for paramedic wellbeing, its components, and related implications.	<b>1,3</b>
<b>3</b>	A comprehensive knowledge on injury and illness prevention strategies.	<b>1,7</b>

<b>4</b>	Demonstrate knowledge towards Medical, legal, and Ethical issues faced during EMS at large.	<b>1,5,7</b>
<b>5</b>	Utilize knowledge on ambulance operations and its relative implications.	<b>1,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	
<b>22MECC213R</b>	Emergency Medical Services-Operations	2		2	2			2	

<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>Patient care &amp; Procedures in ICU</b>								
<b>Course code</b>	<b>22MECC214R</b>	<b>Total credits:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>4</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
		<b>Total hours:</b>							
		<b>45T/120P</b>							
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Faculty of Paramedical sciences</b>								
<b>Semester</b>	<b>Fall/ I semester of first year of the programme</b>								
<b>Course Objectives</b>	1. To assist students, develop solid and firm ICU foundation. 2.The students will learn how to manage the care of critically ill patients as well as interpret test results.								
<b>CO1</b>	Develop knowledge towards the ICU and different specialities under it.								
<b>CO2</b>	Apply knowledge of admission and discharge criteria for patient interventions.								
<b>CO3</b>	Demonstrate knowledge towards different ICU monitoring parameters.								
<b>CO4</b>	Understanding of ICU procedures required during patient assessment and management of a patient.								
<b>CO5</b>	Utilize knowledge and skill set towards other patient care consideration and importance of Physiotherapy.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Introduction of ICU:</b> Different Specialties in ICU Equipment used in ICU.	<b>5</b>	Explain, illustrate and describe the basic functioning of the ICU along with the roles and responsibilities of each healthcare provider in the ICU.					1,2	

<b>II</b>	<b>Admission &amp; Discharge Criteria:</b> Introduction to admission and discharge criteria in healthcare, Factors influencing admission and discharge decisions, Medical considerations for admission and discharge, Social and ethical considerations for admission and discharge, Developing effective plans of care, Legal and regulatory requirements for admission and discharge	<b>5</b>	Explain and illustrate the methods and consideration for admission and discharge criteria	1,2
<b>III</b>	<b>ICU Monitoring:</b> Monitoring of the patients in ICU, Monitoring of Arterial Blood Gases, ICU Care Plan	<b>10</b>	Describe, Illustrate and explain different monitoring and care plan in ICU	2,4
<b>IV</b>	<b>Procedures in ICU:</b> Endotracheal Intubation., Tracheostomy, Infusion pump medication administration, Insertion of chest tube., Procedure of Pericardiocentesis, Insertion of Central Venous line., Insertion of Arterial line, Insertion of Urinary Catheter (Male & Female)	<b>10</b>	Illustrate and explain different procedures techniques required in ICU	2,4
<b>V</b>	<b>Other patient care Consideration:</b> Nutritional Care, Importance of Physiotherapy in ICU	<b>5</b>	Explain and describe patient care consideration in ICU	2,4
<b>Practical</b>	Equipment used in ICU  Monitoring of the patients in ICU, Monitoring of Arterial Blood Gases, ICU Care Plan  Endotracheal Intubation., Tracheostomy, Infusion pump medication administration, Insertion of chest tube., Procedure of Pericardiocentesis, Insertion of Central Venous line., Insertion of Arterial line, Insertion of Urinary Catheter	<b>100</b>	Demonstrate the techniques used in monitoring the patient and performing procedures in ICU.	1,2,3,4

**TEXT BOOKS:**

T1: *Caroline, N.L., & Hazinski, M. F (2018). Nancy caroline's Emergency care in the streets (8<sup>th</sup> edition). Jones & Barlett Learning.*

**REFERENCE BOOKS:**

R1: Mohan Gurjar, manual of ICU procedures 1<sup>st</sup> edition

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/books/?term=Patient+care+%26+Procedures+in+ICU>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop knowledge towards the ICU and different specialities under it.	<b>1,2,7</b>
<b>2</b>	Apply knowledge of admission and discharge criteria for patient interventions.	<b>1,2,7</b>
<b>3</b>	Demonstrate knowledge towards different ICU monitoring parameters.	<b>1,2,3,7</b>
<b>4</b>	Understanding of ICU procedures required during patient assessment and management of a patient.	<b>1,2,3,7</b>
<b>5</b>	Utilize knowledge and skill set towards other patient care consideration and importance of Physiotherapy.	<b>1,2,3,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	

<b>22MECC214R</b>	<b>Patient care &amp; Procedures in ICU</b>	3	3	3	2				1	
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<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>Mini research (survey/experiments) R3</b>								
<b>Course code</b>	<b>22MECC215R</b>	<b>Total credits:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>4</b>			<b>6</b>	<b>4</b>			<b>4</b>
		<b>Total hours:</b>							
		<b>180P</b>							
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Faculty of Paramedical sciences</b>								
<b>Semester</b>	<b>Fall/ I semester of first year of the programme</b>								
<b>Course Objectives</b>	To have a basic knowledge and understanding of surveys and experiments in clinical practice. To learn to review and assess scientific literature critically. To write and present an overview of the relevant literature for a specific research topic								
<b>CO1</b>	Understand a thorough understanding of how survey /experiments can provide useful causal inferences.								
<b>CO2</b>	Acquire knowledge in designing and analyzing simple and complex experiments/surveys								
<b>CO3</b>	Evaluate experimental research / surveys and apply these methods in their own research.								
<b>CO4</b>	Develop knowledge and understanding in undertaking surveys and experiments into their clinical practice								
<b>CO5</b>	Develop new skills and strategies in designing their survey/Experiments which can be implemented in patient care.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	Introduction to Surveys as Research Methodology: What is survey research ,Survey strengths, Survey weakness	<b>37</b>	Describe and explain survey strength and weakness				<b>1,4</b>		

<b>II</b>	Survey Process: Survey design, sample selection, sample size, degree of precision, statistical power, effect size as a determinant of power, survey instrument development, Types of Survey	<b>37</b>	Describe and explain survey process required for the research	1,2,4
<b>III</b>	Qualitative Methods: Unstructured & Semi-structured Interviewing; Coding Responses to Open-Ended Questions	<b>37</b>	Describe and explain the methods and response to open ended questions	2,4
<b>IV</b>	Survey Data Processing and Basic Data Analysis	<b>39</b>	Describe and explain the Survey Data Processing and Basic Data Analysis	3,4

**TEXT BOOKS:**

T1: McGuire, W. G. (1997). Creative hypothesis generating in psychology: Some useful heuristics. *Annual Review of Psychology*, 48, 1-30.

T2: Beatty, P., & Hermann, D. (2002). To answer or not to answer: Decision processes related to survey item nonresponse. In D. A. Dillman, J. L. Eltinge, R. M. Groves, & R. J. A. Little (Eds.). (2002). *Survey nonresponse* (pp. 71-86). New York: Wiley

**REFERENCE BOOKS:**

R1: Fink, A. (2019). *Conducting research literature reviews: From the internet to paper*. Sage publications.

R2: Cooper, H. (1998). Cooper, Harris, *Synthesizing Research: A Guide for Literature Reviews*, Thousand Oaks, CA: Sage, 1998.

R3: Hart, C. (2018). *Doing a literature review: Releasing the research imagination*.

**OTHER LEARNING RESOURCES:**

1. Frey, J. H., & Oishi, S. M. (1995). *How to conduct interviews by telephone and in person*. Thousand Oaks, CA: Sage

2. Fowler, F. J. (1995). *Improving survey questions: Design and evaluation*. Thousand Oaks, CA: Sage.



**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand a thorough understanding of how survey /experiments can provide useful causal inferences.	<b>5,6,7</b>
<b>2</b>	Acquire knowledge in designing and analyzing simple and complex experiments/surveys	<b>5,6,7</b>
<b>3</b>	Evaluate experimental research / surveys and apply these methods in their own research.	<b>5,6,7</b>
<b>4</b>	Develop knowledge and understanding in undertaking surveys and experiments into their clinical practice	<b>5,6,7</b>
<b>5</b>	Develop new skills and strategies in designing their survey/Experiments which can be implemented in patient care.	<b>5,6,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7
<b>22MECC215R</b>	<b>Mini research (survey/experiments) R3</b>	1				1	3	2

SEMESTER – III									
Course Title	Basic care of patient in ICU								
Course code	22MECC216R	Total credits:	L	T	P	S	R	O/F	C
		1			2				1
		Total hours:							
		60P							
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Faculty of Paramedical sciences								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. To provide knowledge and skills on monitoring the patients in ICU.</li> <li>2. To give an insight knowledge and skills on different positioning and mobilization of patients.</li> <li>3. To instill knowledge and skills on maintaining of airway.</li> <li>4. To provide knowledge and skills on medication administration to the patients.</li> <li>5. To provide knowledge and skills on the control of infection in ICU</li> </ol>								
CO1	Ability to identify any changes in the patient condition that may indicate potential medical problem and immediately able to deliver an appropriate care.								
CO2	Develop a competence skills to improving the quality of care provided to ICU Patients and promote a better health outcomes								
CO3	Ability to provide a high quality of care and appropriate techniques to patients with airway compromise and contribute to better patient outcomes.								
CO4	Ability to determine the accurate drug dosages and identify the correct routes of								

	administration thereby decreasing the potential Medication errors			
<b>CO5</b>	Develop knowledge and skills on the importance of infection control and methods in order to terminate the complications that may arise due to inappropriate delivery of patient care.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<b>Monitoring of patients in ICU:</b> Vital signs monitoring, ECG monitoring, Pain and sedation monitoring	7	Explain, describe and applying skills in monitoring patients in ICU	3,4
<b>II</b>	<b>Positioning and Mobilization:</b> Positioning techniques, Mobility techniques, Pressure injuries and prevention in ICU patients	6	Explain, describe and applying techniques in positioning and mobilizing the patients in ICU	3,4
<b>III</b>	<b>Airway maintenance:</b> Positioning, Airway maneuvers, Airway adjuncts, Advanced airway equipment, Pharmacological interventions, Bronchodilators, Anti-inflammatory, Mucolytic agents	10	Explain, describe and applying skills in stabilizing the airway using equipments and drugs.	3,4
<b>IV</b>	<b>Medication administration:</b> Routes of administration, Dose calculation	4	Explain, describe and applying skills in administering medications to patients whenever is required	3,4
<b>V</b>	<b>Infection Control:</b> Hand hygiene, Personal protective equipments, Isolation precautions	3	Explain, and describe the importance of hygiene to prevent infection in ICU.	3,4

### TEXT BOOKS:

T1: *Caroline, N.L., &Hazinski, M. F(2018). Nancy caroline's Emergency care in the streets (8<sup>th</sup> edition). Jones &BarlettLearning.*

### REFERENCE BOOKS:

R1:*LCGUPTA, Manual of first aid management of general injuries and common injuries 1<sup>st</sup> edition,2010*

### OTHER LEARNING RESOURCES:

<https://www.nhs.uk/conditions/intensive-care/>

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Ability to identify any changes in the patient condition that may indicate potential medical problem and immediately able to deliver an appropriate care.	<b>1,2,3,4,7</b>
<b>2</b>	Develop a competence skills to improving the quality of care provided to ICU Patients and promote a better health outcomes	<b>1,2,3,4,7</b>
<b>3</b>	Ability to provide a high quality of care and appropriate techniques to patients with airway compromise and contribute to better patient outcomes.	<b>1,2,3,4,7</b>
<b>4</b>	Ability to determine the accurate drug dosages and identify the correct routes of administration thereby decreasing the potential Medication errors	<b>1,2,3,4,7</b>
<b>5</b>	Develop knowledge and skills on the importance of infection control and methods in order to terminate the complications that may arise due to inappropriate delivery of patient care.	<b>1,2,3,4,7</b>

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	
<b>23MECC216R</b>	<b>Basic care of patient in ICU</b>	3	3	3	2	2		1	

SEMESTER – III									
Course Title	Research Ethics								
Course code	22UMRE211R	Total credits:	L	T	P	S	R	O/F	C
		1			2				1
		Total hours:							
		60							
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Faculty of Paramedical sciences								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	1.To understand and Apply Ethical Principles 2.To identify and Address Ethical Dilemmas 3. Comply with Regulatory and Institutional Guidelines								
CO1	Able to describe and apply theories and methods in ethics and research ethics								
CO2	Acquire an overview of important issues in research ethics, like responsibility for research, ethical vetting, and scientific misconduct.								
CO3	Acquire skills of presenting arguments and results of ethical inquiries.								
CO4	Able to Identify the concepts and procedures of sampling, data collection, analysis, and reporting								
CO5	Equip with the skills and knowledge necessary to navigate and utilize research databases and metrics effectively in their research endeavours.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>ETHICS and SCIENTIFIC CONDUCT:</b> Introduction to the course and each other; an introduction to moral theory. Ethics: definition, moral philosophy, nature of moral judgements and reactions. Research regulation; self – regulation; research ethics. Honesty, candour, compromise, and integrity. Data ownership and stewardship; conflicts of interest; collaboration. Human and Non-Human subjects. Research and researchers in	8	Describe, explain and classify the ethics and scientific conduct in research				3,4		

	<p>society</p> <p>-Ethics with respect to science and research. Intellectual honesty and research integrity. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP). Redundant publications: duplicate and overlapping publications, salami slicing. Selective reporting and misrepresentation of data. (5Lecture)</p>			
<b>II</b>	<p><b>PUBLICATION ETHICS-</b> Publication ethics: definition, introduction, and importance. Best practices / standards setting initiatives and guidelines: COPE, WAME, etc. Conflicts of interest. Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types. Violation of publication ethics, authorship, and contributor ship. Identification of publication misconduct, complaints, and appeals. Predatory publishers and journals.</p>	7	Describe and explain the importance of ethics for publication of a research paper	3,4
<b>III</b>	<p><b>OPEN ACCESS PUBLISHING-</b>Open access publications and initiatives. SHERPA/RoME0 online resource to check publisher copyright &amp; self-archiving policies. Software tool to identify predatory publications developed by SPPU. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc</p>	4	Describe and explain the policies related to copyrights using various tools.	3,4
<b>IV</b>	<p><b>PUBLICATION MISCONDUCT</b> Group Discussions; Subject specific ethical issues, FFP, authorship. Conflicts of interest. Complaints and appeals: examples and fraud from India and abroad. Software tools; Use of plagiarism software like Turnitin, Urkund and other open-source software tools.</p>	4	Describe and explain the software tools for any misconduct during publication	3,4
<b>V</b>	<p><b>DATABASES AND RESEARCH METRICS–Databases:</b> Indexing databases. Citation databases: Web of Science, Scopus, etc. Research Metrics: Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score. Metrics: h-index, g index, I 10 index, altmetrics.</p>	7	Describe and explain the metrics and databases on research	3,4

### TEXT BOOKS:

T1: Bird, A (2006). Philosophy of Science. Routledge.

T2: MacIntyre, Alasdair (1967) A Short History of Ethics. London.

T3: Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance (2019)

### REFERENCE BOOKS:

R1: National Academy of Science, National Academy of Engineering, and Institute of Medicine (2009). On Being a Scientist: A Guide of Responsible Conduct in Research: Third Edition, National academies Press

R2: George R, (2011). Sociological Theory, Rawat Publication, New Delhi, India. George R, (2019). PostModernSocialTheory, RawatPublication, NewDelhi, India.

### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/?term=Research+Ethics>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Able to describe and apply theories and methods in ethics and research ethics	1,5,7
2	Acquire an overview of important issues in research ethics, like responsibility for research, ethical vetting, and scientific misconduct.	1,5,7
3	Acquire skills of presenting arguments and results of ethical inquiries.	1,5,7
4	Able to Identify the concepts and procedures of sampling, data collection, analysis, and reporting	1,5,7
5	Equip with the skills and knowledge necessary to navigate and utilize research databases and metrics	1,5,7

	effectively in their research endeavors.	
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### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	
<b>22UMRE211R</b>	<b>Research Ethics</b>	2				3		3	

SEMESTER – IV									
Course Title	Critical Care Transport								
Course code	22MECC221R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 45T	3						3
Pre-requisite	Nil		Co-requisite	Nil					
Programme	Faculty of Paramedical sciences								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	1. To provide the necessary knowledge and skills for safely and effectively transport critically ill								



	<p>or injured patients between healthcare facilities or from the scene of an emergency to a healthcare facility.</p> <p>2. Recall components of different considerations of a patient transport to a proper setting according to their differential diagnosis.</p> <p>3. To promote the development of critical thinking and decision-making skills in the context of critical care transport.</p>			
<b>CO1</b>	Understand the history and development of CCT			
<b>CO2</b>	Acquire knowledge towards Medical-Legal issues			
<b>CO3</b>	Develop a comprehensive concepts of Air medical transport and its implications during Critical care transport			
<b>CO4</b>	Acquire a comprehensive knowledge about the impact of transport safety and flight physiology on the critical ill patient.			
<b>CO5</b>	Develop skills of patient assessment in a critical way required during transportation			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<b>Introduction to Critical Care Transport:</b> Introduction and History, Critical Care team composition, Modes of transportation and their differences, Transporting by ground Vs Air, Medical Control, Inter-facility transport, Interpersonal Communication.	<b>10</b>	Describe and explain the introduction of critical care transport history, different modes of transportation and the importance of communication	1,2
<b>II</b>	<b>Medical –Legal Issues:</b> Introduction, The Emergency Medical Treatment and Active labor Act Legal Practice Constraints for CCTPs, The patient rights, Transport Preparations	<b>10</b>	Describe and explain the federal and state rules and laws regarding medical control, standard of care and the critical care scope of practice	1,2
<b>III</b>	<b>Aircraft Fundamentals:</b> Introduction, The Air Medical Role, Communication, Rotor-Wing Transport vs. Fixed-Wing Transport, Rotor wing Aircraft, Fixed-wing Aircraft., Air Medical Efficacy, Crew Resource Management, Rotor-Wing Operations., Aircraft safety and Survival	<b>10</b>	Describe, classify and describe the fundamentals, types, and significance along with the management of an air ambulance.	1,2
<b>IV</b>	<b>Flight Physiology:</b> Introduction., The Atmosphere, Gas Laws, Types of Hypoxia, Four stages of Hypoxia as they relate to Altitude, Pressurized and unpressurized aircraft, Primary forces that act on an aircraft, Primary Stressors of flight, Factors affecting tolerance of the Physiologic Stressors of flight, Dysbarism & Evolved gas Disorders	<b>10</b>	Describe and explain the identification of flight stressor and intervention during air transport.	1,2
<b>V</b>	<b>Patient Assessment:</b> Introduction, Scene Transport, Inter-facility transport, The critical care system assessment, Communication and Documentation	<b>5</b>	Describe and explain the significance along with the procedure of assessing patients and transportation.	1,2

**TEXT BOOKS:**

T1: Jones and Bartlett (AAOS Critical Care Transport) Editor: Andrew N. Pollak, MD, FAAOS

**REFERENCE BOOKS:**

R1: Jones and Bartlett (AAOS Critical Care Transport) Editor: Andrew N. Pollak, MD, FAAOS

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/books/?term=Critical+Care+Transport>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the history and development of CCT	1,2,4,7
2	Acquire knowledge towards Medical-Legal issues	1,5,7
3	Develop a comprehensive concepts of Air medical transport and its implications during Critical care transport	1,2,4,7
4	Acquire a comprehensive knowledge about the impact of transport safety and flight physiology on the critical ill patient.	1,2,7
5	Develop skills of patient assessment in a critical way required during transportation	1,2,4,7

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7
Critical Care Transport	22MECC221R	2	1			2		1

SEMESTER – IV										
Course Title	Health Care System in India									
Course code	22MECC222R	Total credits: 3	L	T	P	S	R	O/F	C	3
			3							
Pre-requisite	Nil	Co-requisite	Nil							
Programme	Faculty of Paramedical sciences									

Semester	Fall/ IVsemester of 2nd year of the programme			
<b>Course Objectives</b>	1.Describe the health systems and learn about the public health care system in India. 2.Learn the basic aspects of a Health care system			
<b>CO1</b>	Learn the basic aspects of a Health care system.			
<b>CO2</b>	Develop, implement, and manage various public health programs in India			
<b>CO3</b>	Critically analyse the various components of health care delivery system in India and apply various principles of planning and management in implementing health projects and programmes.			
<b>CO4</b>	Ability to recognize the various sections of healthcare legislations in India and initiate appropriate actions in public health practice			
<b>CO5</b>	Understand different aspects of Health care system in India.			
Unit-No.	Content	Contact Hour	Learning Outcome	KL
<b>I</b>	<b>Health Care System:</b> Introduction to Health care Management., Evaluation of the Health Care System in India., Evaluation of present Health care services in India and current Health Care delivery system.	<b>10</b>	Describe and explain the different health care system in India	1,2
<b>II</b>	<b>Indian Acts:</b> Health Care System in Govt. Sector, Health Care System in the private sector, Continuous Education of the Health Care providers, Team working Law related to Medical & Health care, Consumer Protection Act, 1986, Right to Information Act, 2002	<b>10</b>	Describe and explain the acts related to medical and health care	1,2
<b>III</b>	<b>Laws:</b> Team working Law related to Medical & Health care	<b>5</b>	Describe and explain the types of laws related to Indian health care system	1,2
<b>IV</b>	<b>Health care Employment:</b> Current scenario in employment of the health care providers in healthcare industry	<b>5</b>	Describe and explain the scenario of employment in the health care industry	1,2
<b>V</b>	<b>Epidemiology and Epidemiological methods:</b> Aim of Epidemiology, Epidemiological approach., Rates and ratios, Measurement of mortality, Measurements of morbidity., Epidemiologic methods., Descriptive, Analytical & Experiential epidemiology, Epidemiology of various communicable and non-communicable diseases	<b>15</b>	Describe and explain the epidemiological approach and the measurement of mortality and morbidity rate	1,2

### TEXT BOOKS:

T1: Rajvir Bhalwar, 2009, Textbook of public health and community medicine, Department of community medicine, Armed forces medical college, Pune

**REFERENCE BOOKS:**

Healthcare Systems in Developing Countries" edited by Richard M. B. and Lawrence O.

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/books/?term=Health+Care+System+in+India>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Learn the basic aspects of a Health care system.	1,3,7
2	Develop, implement, and manage various public health programs in India	1,4,6,7
3	Critically analyse the various components of health care delivery system in India and apply various principles of planning and management in implementing health projects and programmes.	3,4,7
4	Ability to recognize the various sections of healthcare legislations in India and initiate appropriate actions in public health practice	4,7
5	Understand different aspects of Health care system in India.	1,4,7

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7	
22MECC222R	Health Care System in India	1		2	3		1	2	

SEMESTER – IV									
Course Title	Forensic Medicine & Medical Ethics								
Course code	22MECC223R	Total credits: 2	L	T	P	S	R	O/F	C
			2						
		Total hours:30							
Pre-requisite	Nil		Co-requisite	Nil					
Programme	Faculty of Paramedical sciences								

Semester	Fall/ IV semester of 2 <sup>nd</sup> year of the programme			
Course Objectives				
CO1	Understanding about the aspects of forensic medicine			
CO2	Ability to identify medico legal cases and define responsibilities of a basic EMT, both medico-legal and medico social.			
CO3	Being aware of the principles of analytical toxicology, diagnose, manage & document acute/chronic poisonings, perform and make observations in post mortems/make logical inferences			
CO4	Develop a competent knowledge towards Medical Ethics			
CO5	Acquire basic knowledge and understanding of various LAWS and implications of medical practice.			
Unit-No.	Content	Contact Hour	Learning Outcome	KL
I	<b>Introduction to Forensic Medicine</b> What is Forensic Medicine? a. Definition, Scope and its application. Medico legal Autopsy a. Procedure. b. Necessity. c. Protocol. d. Documentation. Evidence – Preservation and dispatch the material for Medico Legal aspects.	6	Explain and describe the	1,2
II	<b>Medical Practices</b> Medico legal practice mental health act – Discussion on organ transplantation, Human rights act, and its relevant sections, Legal hazards for medical professionals, Act of commission, Act of Omission. Negligence, Indemnity insurance for medical professionals.	6	Explain and describe the medico legal practices and acts	1,2
III	<b>Toxicology:</b> What is Toxicology, Common household poisons, Classification of poisons, Fate of poison in the body, Some common poisons, Law on poisons	6	Explain and describe the common household poisons and its classifications	1,2
IV	<b>Medical Ethics:</b> Introduction:, What is Ethics, Definition, Types of Medical Ethics, & Difference between law & Ethics, Medical Ethics- Overall review in Ethics for emergency Medical Technician (EMT)	6	Explain and describe the emedical ethics related to forensic medicine	1,2
V	<b>Laws:</b> Types of Law- in brief and legal system., Medical Practice Act, Health Insurance Portability & Accountability,	6	Explain and describe the types of laws and medical practice Act.	1,2

Emergency Vehicle laws, Medical Examination cases, Decision making capacity, Mandatory Reporting.			
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### TEXT BOOKS:

T1: Rajesh Bardale , Principles of Forensic Medicine and Toxicology, Third edition (1 January 2021)

### REFERENCE BOOKS:

R1: Bardale, R. V. (2021). Principles of forensic medicine and toxicology (3rd ed.). Elsevier

### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/?term=FORENSIC+MEDICINE>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding about the aspects of forensic medicine	1,5,7
2	Ability to identify medicolegal cases and define responsibilities of a basic EMT, both medico-legal and medico social.	1,5,7
3	Being aware of the principles of analytical toxicology, diagnose, manage & document acute/chronic poisonings, perform and make observations in post mortems/make logical inferences	1,5,7
4	Develop a competent knowledge towards Medical Ethics	1,5,7
5	Acquire basic knowledge and understanding of various LAWS and implications of medical practice.	1,5,7

### MAPPING TABLE

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7
22MECC223R	Forensic Medicine & Medical Ethics	3				3		2

<b>SEMESTER – IV</b>										
<b>Course Title</b>	<b>MINI-RESEARCH ( Research /Data analysis/documentation-R4)</b>									
<b>Course code</b>	<b>22MECC224R</b>	<b>Total credits: 12</b>	<b>Total hours: 360T</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
						<b>20</b>	<b>4</b>	<b>8</b>		<b>12</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>							
<b>Programme</b>	<b>Faculty of Paramedical sciences</b>									
<b>Semester</b>	<b>Fall/ I semester of first year of the programme</b>									
<b>Course Objectives</b>	1. Develop foundational research skills, mastering data collection and analysis techniques for accurate interpretation. 2. Cultivate effective documentation practices, emphasizing clarity, transparency, and ethical considerations. 3. Acquire proficiency in utilizing research tools, fostering continuous learning, and building a comprehensive research portfolio.									
<b>CO1</b>	Develop Proficient Statistical Analysis Skills									
<b>CO2</b>	Develop Effective Data Interpretation Capabilities									
<b>CO3</b>	Understand the In-depth Discussion and Critical Evaluation									
<b>CO4</b>	Acquire Clear Articulation of Feature Scope.									
<b>CO5</b>	Demonstrate Professional Final Presentation of the Thesis									
<b>Unit-No.</b>	<b>Content</b>			<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>	
<b>I</b>	Statistical analysis -Introduction to Statistical Concepts			<b>4</b>	Describe and explain the concept of statistical analysis				1,2	
<b>II</b>	Data interpretation -Parametric and Non-Parametric Tests: t-tests, ANOVA Chi-square tests - Interpretation of Results: Drawing meaningful conclusions			<b>8</b>	Describe, explain and classify the different parameters and interpret the result				1,2,3	
<b>III</b>	Discussion -Implications of findings Addressing limitations			<b>8</b>	Describe and explain the implications of findings				2,3	
<b>IV</b>	Future scope of the study - Research Design and Methodology -Emerging Trends in Research - Collaboration and Interdisciplinary Research			<b>8</b>	Describe, explain the scope of study in research				3,4	
<b>V</b>	Final presentation of the thesis - Scientific Writing - Effective Oral Presentation - Ethical Considerations in Research Communication			<b>4</b>	Describe and explain the scientific writing and presentation of the thesis				3,4	

**TEXT BOOKS:**

T1: John W. Creswell and J. David Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches

T2: Alan Agresti and Barbara Finlay; Statistical Methods for the Social Science, Third edition

**REFERENCE BOOKS:**

Practical Research: Planning and Design" by Paul D. Leedy and Jeanne Ellis Ormrod

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Develop Proficient Statistical Analysis Skills	<b>1,5,7</b>
<b>2</b>	Develop Effective Data Interpretation Capabilities	<b>1,5,7</b>
<b>3</b>	Understand the In-depth Discussion and Critical Evaluation	<b>1,5,7</b>
<b>4</b>	Acquire Clear Articulation of Feature Scope.	<b>1,5,7</b>
<b>5</b>	Demonstrate Professional Final Presentation of the Thesis	<b>1,5,7</b>

**MAPPING TABLE**

Course code	Course Name	PO1*	PO2	PO3	PO4	PO5	PO6	PO7
22MECC224R	MINI-RESEARCH ( Research /Data analysis/documentation-R4)	2				3		3





# Assam down town University

## Curriculum and Syllabus

### Master of Medical Laboratory Technology



OUTCOME BASED EDUCATION FRAMEWORK  
CHOICE BASED CREDIT SYSTEM

Version: 2.0

**FACULTY OF PARAMEDICAL  
SCIENCES**

July, 2022

# Preamble

Assam down town University is a premier higher educational institution which offers Bachelor, Master, and Ph.D. degree programmes across various faculties. These programmes, collectively embodies the vision and mission of the university. In keeping with the vision of evolutionary changes taking place in the educational landscape of the country, the university has restructured the course curriculum as per the guidelines of National Education Policy 2020. This document contains outline of teaching and learning framework and complete detailing of the courses. This document is a guidebook for the students to choose desired courses for completing the programme and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts, and reference books under different courses as guidance for the students to follow.

Recommended by the 14<sup>th</sup> Board of Studies (BoS) meeting of the Faculty of Paramedical Sciences held on dated 15/7/2022 and approved by the Emergent Academic Council (AC) meeting held on dated 30/07/2022



*Chairperson  
Board of Studies*



*Member Secretary  
Academic Council*



## ***Vision***

To become a Globally Recognized University from North Eastern Region of India, Dedicated to the Holistic Development of Students and Making Society Better

## ***Missions***

1. Creation of curricula that address the local, regional, national, and international needs of graduates, providing them with diverse and well-rounded education.
2. Build a diverse student body from various socio-economic backgrounds, provide exceptional value-based education, and foster holistic personal development, strong academic careers, and confidence.
3. Achieve high placement success by offering students skill-based, innovative education and strong industry connections.
4. Become the premier destination of young people, desirous of becoming future professional leaders through multidisciplinary learning and serving society better.
5. Create a highly inspiring intellectual environment for exceptional learners, empowering them to aspire to join internationally acclaimed institutions and contribute to global efforts in addressing critical issues, such as sustainable development, Climate mitigation and fostering a conflict-free global society.
6. To be renowned for creating new knowledge through high quality interdisciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stakeholders including educators, researchers and innovators
8. Adapt to the evolving needs and changing realities of our students and community by incorporating national and global perspectives, while ensuring our actions are in harmony with our foundational values and objectives of serving the community

# Programme Details

## Programme Overview

The Master's in Medical Laboratory Technology program provides focused instruction in critical areas of clinical laboratory science: Hematology, Blood Transfusion, Microbiology and Immunology. Students develop advanced skills in disease diagnosis, and prevention through in-depth exploration of these fields. Hands-on laboratory work and rigorous coursework enable students to proficiently analyze blood samples, comprehend immunological responses, and identify microbial pathogens. Equipped with this specialized knowledge, graduates are prepared for diverse roles in healthcare, including clinical laboratories, research institutions, and blood banks. Their robust expertise in Hematology, Blood Transfusion, Microbiology, and Immunology positions students for success in advancing patient care and driving biomedical research forward.

## I. Specific Features of the Curriculum

Well equipped with physical facilities such as spacious and well furnished classrooms, laboratories, skillcenters, library and hostels for enriching knowledge and to serve rural community and slums dwellersthroughthisknowledge.

Qualified and trained faculty who can foster research in different disciple and well versed to scientificallyformulae, implement and monitor community oriented programs and projects especially where level ofinvolvementinadoptionofinnovativeand appropriate technology involved.

## II. Eligibility Criteria:

The students who have passed B.Sc. MLT Course from recognized Institutions with not less than 50% of marks in aggregate and have completed 6months of compulsory rotating internship in recognized hospital. Candidates who have passed BMLT through Correspondence, Vocational or Distance Education program are not eligible.

## III. Program Educational Objectives (PEOs):

**PEO 1:** AdtU MLT postgraduates will be prepared for successful careers in diverse laboratory technologies as biochemist, microbiologist, pathologist, health and safety officer, biomedical analyst, research analyst, operation manager with precision, ensuring accurate diagnostics in various clinical situations.

**PEO 2:** Graduates of Medical Laboratory technology will be academically prepared to emerge as specialized and highly skilled professionals in medical laboratory settings, poised to make significant contributions to the advancement of healthcare and the well-being of humanity.

**PEO 3:** MLT postgraduates will enhance skills and facilitate healthcare innovations may establish diagnostic labs, engaging ethically with patients while contributing to ongoing research.

#### **IV. Program Specific Outcomes (PSOs):**

**PSO1: Practice-In-Industry:** Demonstrate clinical practice proficiency and laboratory testing efficiency in clinical posting and the healthcare industry.

**PSO 2: Quality Control and Assurance:** Evaluating and auditing the compliance criteria of standard analytical and quality control procedures for assuring the quality analysis outcomes.

**PSO 3: Global Competency:** Demonstrate global competency in the profession through international multidisciplinary and domain-specific certification courses.

#### **V. Program Outcome:**

**PO1 Integrated Domain Knowledge:** Apply integrated knowledge of human science, pathology, biochemistry fundamentals and specialization in haematology and blood transfusion, microbiology and immunology to the solution of medical laboratory problems.

**PO2 Problem-Analysis:** Identify and analyse complex medical laboratory problems and formulate an array of tests reaching substantiated high-quality results.

**PO3 Modern Techniques and Processes:** Apply standard procedures and contemporary techniques to operate modern analytical instruments, applying technical expertise and problem-solving skills to ensure accurate laboratory test reports.

**PO4 Research:** Apply analytical competency, critical thinking and statistical analysis using modern laboratory techniques in researching to overcome challenges in better identification of conventional/ emerging diseases.

**PO5 Communication:** Demonstrate proficiency in communication skills with patients, and fellow healthcare professionals within diverse healthcare scenarios.

**PO6 Teamwork:** Function proficiently as an individual and a member/ leader in diverse healthcare teams.

**PO7 Professional Ethics:** Adhere to ethical practices and professional conduct in the profession.

**PO8 Lifelong learning:** Ability to engage in lifelong learning in the context of technological and procedural advancement in medical laboratory technology.

**VI. Total Credits to be Earned: 122**

**VII. Career Prospects:**

Introduction to patient care with proper diagnosis and with the use of clinical laboratory equipment in two years duration is known as Master of Science in Medical Laboratory Technology. The Master of Science in medical laboratory Technology includes molecular Biology, Biochemistry, hematology, blood banking and Microbiology. The scope of Master of Science in medical laboratory technology is mentioned below:

- a) Students can apply for PhD degree once he/she completes Master of Science in medical laboratory technology and can increase their career options with decent salary packages.
- b) He/she can also apply for various posts such as lab technologist/technician, Senior Biomedical Analyst, Research scientist, Healthcare Administrator, Health and Safety Officer.
- c) After completion, one can also take on a teaching job (lecturer or Assistant Professor) offering Diploma, Bachelors, Master in MLT education or patient education programs.

## **EVALUATION METHODS**

The student performance shall be evaluated through In-semester (Sessional) and semester-end examinations. A weightage of 40% or as prescribed by the programme shall be added to the score of the end-semester examination.

#### **A. INTERNAL ASSESSMENT:**

The teacher who offers the course shall be responsible for internal assessment by conducting in-semester (sessional) examination and evaluating the performance of the students pursuing that course. The components for internal assessment are illustrated in the table given below.

<b>SN</b>	<b>Components/ Examinations</b>	<b>Marks Allotted</b>
1.	In-Sem Exam – I (ISE-I) (Written Examination)*	30
2.	In-Sem Exam – II (ISE-II) (Written Examination)*	30
3.	Assignment	10
4.	Presentation (SP)	10
5.	Quiz	5
6.	Class Performance based score*	5

*\*are compulsory*

**Note:** Total Internal assessment should be out of 40

#### **INSTRUCTION**

1. If a student fails to appear in the any of the component without any valid reason he/she shall be marked zero in that component. However, the course teacher at his discretion may arrange for the missed test on an alternate date for the absentee students after determining ground with genuine/valid reasons for the absent.
2. The report of evaluation of an activity towards the in-semester (sessional) component of a course shall be duly notified by the concerned course teacher within a week of completion.
3. The program coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the program to the Controller of Examinations before the start of the End-semester examination.

## **B. SEMESTER END EXAMINATION:**

Time table for end semester examination is published at least 25 days prior to the start of Examination.

### **I. Pre-Examination:**

#### **Eligibility Criteria for a student to appear in University Examinations:**

The student shall only be allowed to appear in a University Examination, if:

- i) He/ She is a registered student of the University;
- ii) He/ She is of good conduct and character;
- iii) He/ She has completed the prescribed Programme of study with minimum percentage of attendance as laid down in the Regulations of the Programme concerned.

Under special cases, a student may be allowed to appear for an examination without being registered in the University but the result of the said student will be kept on hold till the registration of the concerned student is completed.

### **II. Admit Card:**

Admit card for the examination may be downloaded through ERP where the system will generate a Unique ID Cards through online.

The University shall have the right to cancel admission for examination of any candidate on valid grounds.

### **III. Pattern of Question Papers:**

The question paper shall follow the principles of Bloom's Taxonomy.

Table

<b>S. N.</b>	<b>Level</b>	<b>Questions /verbs for test</b>
1	Remember	List, Define, tell, describe, recite, recall, identify, show who, when, where, etc.
2	Understand	Describe, explain, contrast, summarize, differentiate, discuss, etc.
3	Apply	Predict, apply, solve, illustrate, determine, examine, modify
4	Analyze	Classify, outline, categorize, analyze, diagrams, illustrate, infer, etc.
5	Evaluate	Assess, summarize, choose, evaluate, recommend, justify, compare etc.



6	Create	Design, Formulate, Modify, Develop, integrate, etc.
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**Note:** No course is to be evaluated on basis of **all 6 knowledge levels**.

The format of the question paper across all the program follow a unique pattern and the total marks is 60

**Table 1: Question paper pattern for End semester examination**

Sl no	Question pattern	Total marks
1	MCQs (10 Questions)	10
2	2 Marks questions (10 Questions)	20
3	4 Marks questions (5 Questions)	20
4	10 Marks questions (1 Question)	10

#### **IV. Examination Duration:**

Each paper of 60 marks shall ordinarily be of two hours duration.

#### **V. Practical Examinations, Viva-Voce etc.:**

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voce, Oral examinations of the Project report, Dissertation etc. shall be undertaken by a Board of Examiners constituted by the respective Dean of Program with the advice of Supervisor(s).

#### **VI. Procedure of Expulsion:**

If any candidate is found to be using any unfair-means during the examination, the invigilator may cease his/her answer sheet and report it directly to the Officer-in-Charge. The Office-in-Charge of the center may take appropriate decisions as per the rules and procedure of the examination. The Officer-in-Charge may allow the students to write the exam with new answer sheet or may expel the student from appearing the paper depending on the nature of unfair-

means. In case of Computer based test, the students may be directed to write an apology letter and sign in the prescribe expulsion form. The student may not be allowed to write that examination.

## **VII. Instruction to the Students:**

- (i) The students shall not bring to the Examination Hall, any electronic gadget used as a means of communication or record except electronic calculator, if required.
- (ii) The students shall not receive any book or printed or hand written or photo copy (Xerox) or blank-paper from any other person while he/she is in the examination-room or in laboratory or in any other place to which he/she is allowed to have access during course of examination.
- (iii) The students shall not communicate with any other candidate in the examination room or with any other person in and outside the examination-room.
- (iv) The students shall not see, read or copy anything written by any other candidate, nor shall he/she knowingly or negligently permit any other candidate to see, read or copy anything written by him/her or conveyed by him/her.
- (v) The students shall not write anything on the Question Paper or in other paper or materials during the examination, or pass any kind of paper to any other candidate in the examination-room, or to any person outside the room.
- (vi) The students shall not disclose his/her identity to the examiner by writing his/her name or putting any sign / symbol in any part of his answer-script.
- (vii) The students shall not use any abusive language or write any objectionable remark or make any appeal to examiner by writing in any part of his answer-script.
- (viii) The students shall not detach any page from the answer-script or insert any authorized or unauthorized loose sheet into it. He /she shall also not insert any other answer-script / loose sheet by removing the pins of the origin answer-scripts and re-fixing it.
- (ix) The students shall not resort to any disorderly conduct inside the examination-room or misbehave with the invigilator or any other examination official.

## **VIII. Provision for an Amanuensis (writer):**

- (i) A candidate may be provided with an Amanuensis (writer) to write down on dictation on his / her behalf on ground of his / her physical disability to write down by himself / herself due to accident or any other reason. The amanuensis may be provided till he / she recovers from the physical disability. The physical disability to write down by himself / herself must be supported by Medical Certificate from a competent Medical Officer.

- (ii) The qualifications of the amanuensis so provided must not be equal or higher than that of the candidate. This is also to be supported by Certificate from the Faculty of Study where the Amanuensis is provided.
- (iii) Such candidates are to be accommodated in a separate room under the supervision of an invigilator so that the fellow candidates are not disturbed in the process.

### **C. Credit Point:**

It is the product of grade point and number of credits for a course, thus,  $CP = GP \times CR$

#### **i. Credit:**

A unit by which the course work is measured. It determines the number of hours of instructions required per week. 'Credit' refers to the weightage given to a course, usually in terms of the number of instructional hours per week assigned to it. Credits assigned for a single course always pay attention to how many hours it would take for an average learner to complete a single course successfully.

#### **ii. Grade Point:**

Grade Point is a numerical weight allotted to each Grade Letter on a 10-point scale.

#### **iii. Letter Grade:**

Letter Grade is an index of the performance of students in a said paper of a particular course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Abs. Student obtaining Grade F / Grade Abs shall be considered failed/ absent and, will be required to appear in the subsequent ESE. The UGC recommends a 10-point grading system with the following (Table: 1) Letter Grades:

- (i) A Letter Grade shall signify the level of qualitative/quantitative academic achievement of a student in a Course, while the Grade Point shall indicate the numerical weight of the Letter Grade on a 10-point scale.
- (ii) There shall be 08 (eight) Letter Grades bearing specific Grade Points as listed in Table 1, where the Letter Grades 'O' to 'P' shall indicate successful completion of a course.
- (iii) Apart from the 08 (eight) regular Letter Grades listed in Table 1, there shall be 03 (three) additional Letter Grades, which shall be awarded if a Course is withdrawn or spanned over the next Semester or remains incomplete as stated in Table 2.

**Table 2: Letter Grades and Grade Points**

<b>Letter Grade</b>	<b>Grade Points</b>	<b>Description</b>
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C	5	Average
P	4	Pass
F	0	Fail
Abs	0	Absent
UFM	0	Unfair Means

**iv. Grade Point Average:**

**a. SGPA (Semester Grade Point Average)**

The SGPA of a student in a Semester shall be the weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered in that Semester, irrespective of whether he/she could or could not complete the Courses. More specifically, the calculation of SGPA shall take into account the Courses graded with Letter Grades ‘O’ to ‘F’ as given in Table 1.

$$SGPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (1.1)$$

The SGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.1) up to two decimal places, where n is the total number of Credit Courses registered by the student in that Semester,  $G_i$  is the Grade Point secured in the  $i^{\text{th}}$  registered Course and  $C_i$

is the Credit (weight) of that Course.

## **b. CGPA (Cumulative Grade Point Average)**

- (i) The CGPA of a student in a Semester of a Programme shall be the accumulated weighted average of the Grade Points secured by the student in all the Credit Courses (both Core and Elective Courses) he/she registered and successfully completed so far starting from the enrollment in the Programme. In other words, taking into account all the Courses graded with 'O' to 'P' as given in Table 1.1, generally the CGPA of a student shall be calculated starting from the first Semester of his/her enrolled Programme, while the CGPA of a lateral-entry student shall be calculated starting from the Semester of his/her enrollment.
- (ii) The CGPA of a student in a Semester shall be calculated on a 10-point scale using Equation (1.2) up to two decimal places, where N is the total number of Credit Courses registered and successfully completed so far by the student,  $G_i$  is the Grade Point secured in the  $i$ th completed Course and  $C_i$  is the Credit (weight) of that Course.

$$CGPA = \frac{\sum_{i=1}^N C_i G_i}{\sum_{i=1}^N C_i} \quad (1.2)$$

- (iii) The CGPA shall be convertible into equivalent percentage of marks using Equation Conversion of CGPA to percentage marks: = CGPA\*10

## **D. Post-Examination**

### **i. Transcript or Grade Card or Certificate:**

A marking certificate shall be issued to all the registered students after every Semester. The Semester mark sheet will display the course details (code, title, number of credits, grade secured) along with total credit earned in that Semester.

### **ii. Grievance Readdress Mechanism:**

Students with any dissatisfaction or grievance regarding the marks awarded in any of the Papers / Courses may appeal to the Controller of Examinations for remedial action such as Re-evaluation within 10 days of the declaration of result.

- (i) A student has options to appeal for re-evaluation of his /her answer script to the Controller of Examination.
- (ii) Application for re-evaluation / re-scrutiny of answer scripts shall be made in the definite proforma available with the Examination Office through the head of the respective departments within 10 days of declaration of the results of the respective examinations.
- (iii) The Controller of Examination may appoint an examiner for re-evaluation and will consider and recognize the evaluation done by a University appointed examiner.
- (iv) There shall be no provision for re-evaluation of the Practical Papers, Project Work, and Dissertation etc. However, the students fail in practical examination or viva voce and wish to appear again may apply to be evaluated can do so with the next schedule.
- (v) After screening the application for re-evaluation, the CoE may send the answer scripts of the student to the examiners appointed by the CoE with the approval of Vice Chancellor.
- (vi) The marks/grades achieved by the students after the re-evaluation shall be final and binding.
- (vii) Fresh Marks – sheets / Grade Card shall be issued only if the candidate secures pass marks / passing grade in the re-evaluated paper.
- (viii) Revaluation of answer scripts shall be deemed to be an additional facility provided to the students with a view to improving upon their results at the preceding examination result for any reason whatsoever shall not confer any right upon them for admission to next higher class which matters always be regulated in accordance with the relevant rules or regulations framed by the University.
- (ix) If as a result of revaluation of the candidate attracts the provision of condonation of deficiency, the same may be applied to his/her only for fresh attempt.

# INSTRUCTION TO TEACHERS AND STUDENTS

## (Teaching and Learning Methods)

In all the courses the teacher has to select topics for teacher-method which should not be less than 20 percent. The approach will be direct classroom teaching through a series of lectures delivering concepts using ITC facilities, white or blackboard. Notes may also be circulated to the students; however, the students are to be involved in the preparation of the notes. The teacher will be responsible for selecting the best note for circulation. The teacher-centric methodology has recently fallen out of favour because this strategy for teaching is seen to favour passive students.

### 1. Student- centric / Constructivist Approach:

The topics of the courses may be selected at the start of the class and assigned one topic to each of the students for studying by themselves, prepare presentations, notes, etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitates the learning of the students by guiding and providing input and explaining concepts. 60 percent of the course contents may be selected for this purpose. To avoid behaviour problems, teachers must lay a lot of groundwork in student-centric classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation.

**a. Project-Based Learning:** The teacher may select 5 percent of topics for the purpose and may conduct visits to the laboratory for experiments or field surveys. The selection of the topic may be done considering the available facility for the purpose. However, in the final semester of each of the programme the student has to undergo project-based learning at least 4 months duration. This approach will help the student to think critically, evaluate, analyze, make decisions, collaborate, and more.

**b. Inquiry-Based Learning:** The teacher/ students are supposed to list at least five questions in each contact hour and student solve these question or search for answer which becomes the home work for the students “question-driven” learning approach. The teacher may look for the correctness of the solution or the best possible answer and discuss in the successive class. This will help in the preparation for various competitive examination and develop a habit for search for solutions.

**c. Flipped Classroom:** About 10 percent of the course content has to be completed by this method. In this approach the students are asked to watch video or lecture prepared by the teacher or any video available (relevant to the course). A set of questions may be given to the

students for searching answers by the students. The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. The Flipped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student-centric teaching method.

**d. Cooperative Learning:** The remaining five percent has to be completed by cooperative learning approach. In this approach, the students are allotted problems. During library hours the students along with the teacher visit the library and search for probable solutions for the assigned problem. The same has to be done in groups so that the students discuss among themselves for the appropriate answers. Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required.

#### **The percentage categorization for the completion of a theory course**

Teacher-centric or Direct Classroom Teaching: Delivery by series of lectures	20%
Student-centric Approach, Students present and deliver lectures in the presence of teacher and supervised by teacher	60%
Students visit fields or perform experiments or teachers perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

#### **Inquiry-based approach has to be followed in all of the classes**

The teacher has to distribute the topics to be considered for teaching by the above-mentioned approaches and prepare a lesson plan for execution and maintain a file.



## Curriculum Framework:

### Breakdown of Credits(for 2022-23 Syllabus)

Sl. No	Category	Total number of Credits
1	University Core(UC)	29
2	University Elective (UE)	11
3	Program Core(PC)	68
4	Program Elective (PE)	6
5	Faculty Elective (FE)	4 + 4
<b>Total number of credit</b>		<b>122</b>

### Breakdown by categories of courses

Sl no	Category	Credits	%
1	Paramedical	111	90.9%
2	Engineering	-	-
3	Commerce and Management	-	-
4	Humanities and social science	11	9.01%
<b>Total</b>		<b>122</b>	<b>100%</b>

**PCI, INC, AICTE regulated programs shall have to follow the regulating body**

## SEMESTER WISE COURSE DISTRIBUTION

Sl. no	Course Code	CourseTitle	Course Category	Engagement							MaximumMarks for				Total
				L	T	P	S	R	O	C	IA*	SEE*	PIE*	PE E	
1.	22MMLT111R	Biochemistry	PC	3	0	4	0	0	0	5	40	60	0	100	200
2	22MMLT112R	Clinical Pathology	PC	3	0	4	0	0	0	5	40	60	0	100	200
3	22MMLT113R	Histopathology and Cytopathology	PC	3	0	4	0	0	0	5	40	60	0	100	200
4	22MMLT114R	Introduction to Microbiology	PC	3	0	4	0	0	0	5	40	60	0	100	200
5	22UMPD111R	Personal Development programme I (Effective Communication)	UE	0	0	4	0	0	0	2	0	0	50	50	100
6	22UMFS111R	Fundamental of Statistics	UC	2	0	2	0	0	0	3	40	60	0	100	200
7	22MMLT115R	Mini Research (Review of literature-R1)	UC	0	0	0	4	8	0	2	0	0	50	50	100
8	22MOCEP111R	MOOCS (Coursera)	FE	2	0	0	0	0	0	2	0	100	0	0	100
<b>Total</b>				<b>16</b>	<b>0</b>	<b>22</b>	<b>4</b>	<b>8</b>	<b>0</b>	<b>29</b>	<b>200</b>	<b>400</b>	<b>100</b>	<b>600</b>	<b>1300</b>

S. No.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for				Total
				L	T	P	S	R	O	C	IA*	SEE*	PIE*	PEE		
1.	22MMLT121R	Biomedical Techniques and Laboratory Management	PC	2	0	4	0	0	0	4	40	60	0	100	200	
2	22MMLT122R	Hematology	PC	2	0	4	0	0	0	4	40	60	0	100	200	
3	22MMLT123R	Introduction to Blood Banking	PC	2	0	4	0	0	0	4	40	60	0	100	200	
4	22MMLT124R	Microbiology & Immunology	PC	2	0	4	0	0	0	4	40	60	0	100	200	
5	22MMLT125R	Molecular Biology	PC	2	0	2	0	0	0	3	40	60	0	100	200	
6	22UMPD121R	PDP-II (Communication Mastery)	UE	0	0	4	0	0	0	2	0	0	50	50	100	
7	22UUHV104R	Universal Human values	UC	1	0	2	0	0	0	2	40	60	0	100	200	
8	22MMLTGEO1/02	Generic elective	UE	2	0	0	0	0	0	2	50	50	0	0	100	
9	22UMRM121R	Research Methodology and Statistical Analysis	UC	1	0	0	4	0	0	2	40	60	0	100	200	
10	22MOCE121R	MOOCSEII	FE	2	0	0	0	0	0	2	0	100	0	0	100	
11	22MMLT126R	Quality management (Techno Professionals skills)	PC	0	0	4	0	0	0	2	0	0	0	100	100	
12	22MMLT127R	Mini Research (Research Gap Analysis-R2)	UC	0	0	0	4	16	0	3	0	0	50	50	100	
13	22UUDL103R	Digital literacy	UC	0	0	2	0	0	0	1	0	0	0	100	100	
		<b>Total</b>		<b>14</b>	<b>0</b>	<b>30</b>	<b>8</b>	<b>16</b>	<b>0</b>	<b>35</b>	<b>330</b>	<b>570</b>	<b>200</b>	<b>900</b>	<b>2000</b>	

S. No.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SE E*	PIE*	PEE	Total
1	22MOCEP211R	MOOCs CE	SE	2	0	0	0	0	0	2	40	60	0	0	100
2	22MOCEP212R	MOOCs CE	SE	2	0	0	0	0	0	2	40	60	0	0	100
3	22MMLT211R	Lab Management (Techno professional skills)	PC	0	0	4	0	0	0	2	0	0	0	100	100
4	22MMLT212R	Mini research (survey/experiments)-R3	UC	0	0	6	4	0	0	4	0	0	50	50	100
5	22UMRE211R	Research Ethics	UE	1	0	0	0	0	0	1	40	60	0	0	100
6	22MMLTGE01/02	Generic elective	UE	2	0	0	0	0	0	2	50	50	0	0	100
7	22UMPD211R	PDP-III (Corporate competency)	UE	0	0	4	0	0	0	2	0	0	0	100	100

Semester III

<p><b>To opt 1 Specialization from the following Group</b></p> <p><b>GroupA:HAEMATOLOGYANDBLOODTRANSFUSION</b></p>															
8	22MMLT214R	AdvancedHaematology	PC	4	0	8	0	0	0	8	40	60	0	100	200
9	22MMLT215R	Advanced Bloodbanking	PC	4	0	8	0	0	0	8	40	60	0	100	200
<p><b>GroupB:MICROBIOLOGYANDIMMUNOLOGY</b></p>															
10	22MMLT216R	MedicalMicrobiology	PC	4	0	8	0	0	0	8	40	60	0	100	200
11	22MMLT217R	DiagnosticMicrobiology andClinicalImmunology	PC	4	0	8	0	0	0	8	40	60	0	100	200
<b>Total</b>				<b>15</b>	<b>0</b>	<b>30</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>31</b>	<b>250</b>	<b>350</b>	<b>150</b>	<b>350</b>	<b>1100</b>

	S.N.	CourseCode	Course Title	Course Category	Engagement							MaximumMarks for				Total
					L	T	P	S	R	O	C	IA *	SE E*	PIE *	PE E	
<b>Semester IV</b>	1.	22MMLT221R	Clinical posting	PC	0	0	16	0	0	0	9	0	0	0	100	100
	2	22MMLT222R	Elective course I (Quality control in Diagnostic Lab.)	PE	3	0	0	0	0	0	3	40	60	0	0	100
	3	22MMLT223R	Elective course II (Efficient teaching Skill)	PE	3	0	0	0	0	0	3	40	60	0	0	100
	4	22MMLT224R	Research /Data analysis /documentation -R4)	UC	0	0	20	4	8	0	12	0	0	50	50	100
<b>Total</b>					<b>6</b>	<b>0</b>	<b>36</b>	<b>4</b>	<b>8</b>	<b>0</b>	<b>27</b>	<b>80</b>	<b>120</b>	<b>50</b>	<b>150</b>	<b>400</b>

SEMESTER – 1									
Course Title	BIOCHEMISTRY								
Course code	22MMLT111R	Total credits: 5 Total hours: 48T+64P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MASTER IN MEDICAL LABORATORY TECHNOLOGY								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	1. The students will learn about the important biomolecules essential to life processes. 2. To discuss aspects of the principles of organic chemistry in the structure and functions of important biomolecules. 3. The students will understand the molecular basis for a broad array of inborn error of metabolism								
CO1	Describe the structure, function, classification and biological importance carbohydrates								
CO2	Classify proteins and amino acids, exploring their molecular structures and involvement in biochemical processes.								
CO3	Discuss the structures, functions of lipids and its effects on various disorders.								
CO4	Demonstrate expertise in nucleic acids and enzymes, understanding their roles within cellular processes.								
CO5	Explain the clinical biochemistry techniques to analyze and interpret biochemical data effectively for diagnostic and research applications.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>CARBOHYDRATES</b> - General features - Classification - Reactions of monosaccharides - Disorders of Carbohydrate metabolism.		8	Explain on carbohydrates' general features and classification, illustrate monosaccharide reactions, and explain disorders in carbohydrate metabolism.				1,2	
II	<b>Proteins and Amino Acids</b> - general features - Classification of Amino acids - Properties of Amino acids - Structural organization of proteins Abnormalities of proteins in plasma.		8	Describe, illustrate and explain on protein and amino acid features, classification, properties, structural organization, and plasma abnormalities, enhancing their understanding of biochemistry and clinical implications.				1,2	
III	<b>CHEMISTRY OF LIPIDS</b> - General features		8	Describe the general features, classification, and properties of lipids, as well as explain				1,2	

	<ul style="list-style-type: none"> <li>- Classification of Lipids</li> <li>- Properties of Lipids</li> <li>- Disorders of plasma lipids and lipoproteins</li> </ul>		disorders related to plasma lipids and lipoproteins, fostering a comprehensive understanding of lipid biochemistry and its clinical implications	
<b>IV</b>	<p><b>NUCLEIC ACIDS AND ENZYMES</b></p> <ul style="list-style-type: none"> <li>- Nucleotides and its bases</li> <li>- rna/dna and its classification</li> <li>- classification of enzymes</li> <li>- factors affecting enzyme activity</li> <li>- specificity</li> <li>- enzyme kinetics</li> </ul> <p>enzymes in clinical diagnosis</p>	<b>10</b>	Describe, illustrate and explain on nucleic acid and enzyme basics, including nucleotide structures, RNA/DNA classification, enzyme classification, factors affecting activity and specificity, enzyme kinetics, and their clinical diagnostic relevance.	1,2,3
<b>V</b>	<p><b>Clinical significance, principle of estimation:</b></p> <ul style="list-style-type: none"> <li>- Glucose tolerance test (GTT) importance and principle and techniques of GTT</li> <li>- Insulin tolerance test</li> <li>- Xylose absorption test</li> <li>- Analysis of calculi</li> </ul> <p>Blood gases and pH.</p>	<b>14</b>	Explain the clinical significance and principles of diagnostic tests like GTT, insulin tolerance test, xylose absorption test, calculi analysis, and blood gas/pH measurements, advancing their understanding of clinical biochemistry and diagnostics.	2,3,4
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Estimation of blood glucose by Folin method, Ortho toluidine method &amp; CHOD-POD method.</li> <li>2. Estimation of protein by Biuret method, Lowry, UV method</li> <li>3. Estimation of serum creatinine by Jaffe's method</li> <li>4. Estimation of urea in blood sample by urease</li> <li>5. Estimation of Total cholesterol by CHOD/POD method.</li> <li>6. Estimation of Triglycerides by GOP/PA method</li> <li>7. Estimation of HDL Cholesterol by precipitation method</li> <li>8. Estimation of SGOT in blood sample by kinetic method</li> <li>9. Estimation of SGPT in blood sample by kinetic method</li> <li>10. Estimation of alkaline</li> </ol>	<b>64</b>	Estimate and analyze blood and urine parameters, enhancing skills in clinical biochemistry and laboratory diagnostics.	1,2,3,4,5

	<p>phosphatase in blood sample by kinetic method</p> <p>11. Estimation of acid phosphatase in blood sample by kinetic method</p> <p>12. Estimation of bilirubin in blood sample</p> <p>13. by kinetic method</p> <p>14. Estimation of Na<sup>+</sup>, K<sup>+</sup> &amp; Ca<sup>++</sup> by electrode analyzer</p> <p>Estimation of common parameters in urine through use of strips.</p>			
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**TEXT BOOKS**

**T1** Bishop M, Fody EP, Schoeff LE. Clinical Chemistry-Techniques, Principles, Correlations. Diabetes (FBS, RBS, OGTT, HbA1c). 2010;13:27.

**T2** Chatterjea MN, Shinde R. Textbook of medical biochemistry. Wife Goes On; 2011.

**T3** Vasudevan DM, Sreekumari S, Vaidyanathan K. Textbook of biochemistry for medical students. JP Medical Ltd; 2013 Aug 31.

**T4** Jung K. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, Carl A. Burtis, Edward R. Ashwood, and David E. Bruns, editors. St. Louis, MO: Elsevier Saunders, 2006, 2448 pp., \$229.00, hardcover. ISBN 0-7216-0189-8. Clinical Chemistry. 2006 Jun 1;52(6):1214-.

**REFERENCE BOOKS:**

**R1** Godkar PB, Godkar DP. Text book of medical laboratory technology. Bhalani publishing house; 2006.

**R2** Satyanarayana U. Biochemistry. Elsevier Health Sciences; 2013 Jun 15.

**OTHER LEARNING RESOURCES:**

1. <https://www.ncbi.nlm.nih.gov/books/NBK557845/>
2. <https://www.ncbi.nlm.nih.gov/books/NBK564343/>
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6822018/>



### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Describe the structure, function, classification and biological importance carbohydrates	<b>1,2</b>
<b>2</b>	Classify proteins and amino acids, exploring their molecular structures and involvement in biochemical processes.	<b>1,2</b>
<b>3</b>	Discuss the structures, functions of lipids and its effects on various disorders.	<b>1,2</b>
<b>4</b>	Demonstrate expertise in nucleic acids and enzymes, understanding their roles within cellular processes.	<b>1,2,3</b>
<b>5</b>	Explain the clinical biochemistry techniques to analyze and interpret biochemical data effectively for diagnostic and research applications.	<b>1,2,3</b>

SEMESTER – I									
Course Title	Clinical Pathology								
Course code	22MMLT112R	Total credits: 4 Total hours: 48T+64P	L	T	P	S	R	O/F	C
			2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Medical Laboratory Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	1.To teach the students about collection and preservation of urine, stool and body fluids for routine analysis. 2.To teach the students about Physical examination, Chemical examination, Microscopic examination of Urine, stool and body fluids. 3.To teach the students about Gastric juice analysis								
CO1	To summarize how to collect, preserve and transport various clinical samples.								
CO2	To understand about Physical, chemical and microscopic examination of urine ,stool.								
CO3	Discuss the clinical significance and diagnosis of various body fluids.								
CO4	Outline the various types of gastric juice analysis and its clinical significance.								
CO5	Illustrate the fundamental principles of pregnancy test.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Collection, transport, preservation and processing of various clinical specimens.		5	Describe, illustrate and explain composition and methods of estimating different components of urine, stool, body fluids etc				1,2	
II	<b>Urine examination:</b> Physical, chemical and microscopic examination Urine analysis by Strip method <b>Stool Examination:</b> Macroscopic, Chemical examination and Microscopic examination Concentration method and Flotation method Test for Occult blood-Benzidine Test <b>Sputum examination-</b> Physical, Chemical and Microscopic examination of sputum.		12	Describe, illustrate and explain for selected sophisticated laboratory techniques with adequate knowledge of various principles				1,2,3	
III	<b>Body fluids:</b> Physical chemical and Microscopic		15	Describe, illustrate and explain various kind of clinical samples which can be use for cancer				1,3	

	examination of Pleural, Pericardial Synovial, Ascitic and Peritoneal fluid.  <b>Cerebrospinal fluid</b>  Physical, chemical, microscopic, bacteriological and cytological examination.		diagnosis	
<b>IV</b>	<b>Gastric analysis</b> Methods of collection Indications and contraindication. Macroscopic and microscopic examination. I. Fractional test meal II. Augmented Histamine test III. Hollanders test	<b>8</b>	Describe, illustrate and explain about Gastric analysis its clinical significance which can help in diagnosis of various kind of Cancer	<b>2,3</b>
<b>V</b>	<b>Pregnancy-Test, Method Interpretation</b> Semen analysis	<b>8</b>	Describe, illustrate and explain various method for estimating HCG value.	<b>2,3</b>
<b>Practical I</b>	<b>Urine examination:</b> Physical, chemical and microscopic. Urine analysis by Strip method <b>Stool Examination:</b> Macroscopic Examination Concentration method, Flotation method Microscopic examination Chemical examination Test for Occult blood-Benzidine Test <b>Pregnancy-Test, Method Interpretation</b> <b>Semen analysis</b>	<b>64</b>	Describe, illustrate and explain to understand Urine examination, Stool examination, pregnancy test and Semen examination	<b>1,2,3,4</b>

**TEXT BOOKS:**

**T1:** Sood, Ramnik. Concise book of Medical laboratory technology. New Delhi: Jaypee Brothers Medical Publishers, 2015

**REFERENCE BOOKS:**

**R1:** Nayak, Ramdas, Rai, Sharada. Essentials in Hematology and Clinical Pathology. New Delhi: Jaypee Brothers Medical Publishers, 2017

**R2:** Sanyal, Sabitri, Aparna, Bhattacharyya. Clinical Pathology. New Delhi: Elsevier, 2011

**OTHER LEARNING RESOURCES:**

[https://en.wikipedia.org/wiki/Clinical\\_pathology#Macroscopic\\_examination](https://en.wikipedia.org/wiki/Clinical_pathology#Macroscopic_examination)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	To summarize how to collect , preserve and transport various clinical samples.	<b>1,2,3</b>
<b>2</b>	To understand about Physical, chemical and microscopic examination of urine , stool.	<b>1,2</b>
<b>3</b>	Discuss the clinical significance and diagnosis of various body fluids.	<b>1,2,3,4</b>
<b>4</b>	Outline the various types of gastric juice analysis and its clinical significance.	<b>1,2</b>
<b>5</b>	Illustrate the fundamental principles of pregnancy test.	<b>1,3</b>

SEMESTER – I									
Course Title	HISTOPATHOLOGY AND CYTOPATHOLOGY								
Course code	22MMLT113R	Total credits: 5 Total hours: 42T+64P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MASTER IN MEDICAL LABORATORY TECHNOLOGY								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>Students become familiar with the basics in operating computer</li> <li>Introduce fundamental concepts of computer hardware and software.</li> <li>Proficiency in using common computer applications and tools.</li> </ol>								
CO1	Explain the basic principles of histopathology and cytopathology								
CO2	Identify and understand the principles of fixatives and their use in different types of specimens and cytological preparations.								
CO3	Demonstrate the process involve in tissue processing and microscopic examination.								
CO4	Discuss the properties and applications of various staining dyes used in histopathology and cytopathology, including routine staining and special staining techniques, as well as the staining of pigments								
CO5	Understanding of immune histochemistry, Acquire the knowledge and skills necessary for the establishment and management of a histopathological laboratory, including quality control, safety protocols, equipment maintenance, and regulatory compliance, ensuring the provision of reliable and accurate diagnostic services in clinical and research settings and Develop a deep understanding of cancer biology								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction Histopathology & Cytopathology	5	Describe, illustrate and explain Histopathological and Cytological tests per for guidelines of the laboratory.					1,2,3	
II	Fixatives, Cytological fixative and mailing	10	Describe, illustrate and explain knowledge about Fixatives, Cytological fixative and mailing					1,3,4	
III	Tissue processing Decalcification Cell block preparation Microtome Frozen section	15	Describe, illustrate and explain understand Tissue processing Decalcification Cell block preparation Microtomy Frozensession for tissue processing					3,4	
IV	Staining Dyes, Routine staining,	10	Describe, illustrate and					1,2,	

	Special staining, Pigments and its staining		explain about various Staining techniques in histology and cytopathology laboratory.	3
<b>V</b>	Immuno histochemistry, Cytology classification Establishment of histopathological laboratory, Cancer biology	<b>2</b>	Describe, illustrate and explain the procedure and importance of Immuno histochemistry, Cytology and basic knowledge about cancer biology	3,4,5
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Fixatives</li> <li>2. Cytological fixative and mailing</li> <li>3. Tissue processing</li> <li>4. Decalcification</li> <li>5. Cell block preparation</li> <li>6. Microtomy</li> <li>7. Frozen section</li> <li>8. Staining</li> <li>9. Dyes,</li> <li>10. Routine staining,</li> <li>11. Special staining,</li> <li>12. Pigments and its staining</li> <li>13. Immuno histochemistry</li> <li>14. Cytology classification</li> <li>15. Establishment of histopathological laboratory.</li> <li>16. Cancer biology.</li> </ol>	<b>64</b>	Describe, illustrate and explain the procedure and Importance of Immunohistochemistry, Cytology	1,2,3,4

**TEXT BOOKS:**

T1- Techniques In Histopathology Cytopathology: A Guide For Medical Laboratory Technology Students 1st Edition 2017 by Sadhana Vishwakarma

**REFERENCE BOOKS:**

R1- Bancroft's theory and practice of Histological techniques by S. Kim Suvana, Christopher Layton, John D. Bancroft.

R2- Histopathology, A self instructional text by Freida L. Carson.

R3- Textbook of pathology by Harsh Mohan.

R4- Textbook of Medical Laboratory Technology – Praful B. Godkar, Darshan P Godkar.

R5- Medical Laboratory Technology Methods & interpretation – Ramnik Sood

R6- Manual of Medical Laboratory Techniques by S. Ramakrishnan & KN Sulochana.

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/books/?term=HISTOPATHOLOGY+AND+CYTOLOGY>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain the basic principles of histopathology and cytopathology	<b>1,2,3</b>
<b>2</b>	Identify and understand the principles of fixatives and their use in different types of specimens and cytological preparations.	<b>1,2,3</b>
<b>3</b>	Demonstrate the process involve in tissue processing and microscopic examination.	<b>1,2,3</b>
<b>4</b>	Discuss the properties and applications of various staining dyes used in histopathology and cytopathology, including routine staining and special staining techniques, as well as the staining of pigments	<b>1,2,3</b>
<b>5</b>	Explain the basic principles of histopathology and cytopathology	<b>1,2,3</b>

SEMESTER – I									
Course Title	INTRODUCTION TO MICROBIOLOGY								
Course code	22MMLT114R	Total credits: 5 Total hours: 48T+64P	L	T	P	S	R	O/F	C
			3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Medical Laboratory Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>To teach basic introduction, general characteristic, morphology and classification of microorganism/bacteriology.</li> <li>To teach about basic infection, types of infection and immunity &amp; Immunoglobulin.</li> <li>To teach about various staining methods to identify bacteria.</li> </ol>								
CO1	Understand the Historical background of Microbiology, the types and parts of Microscope and culture methods and media.								
CO2	Acquire knowledge and understand bacterial genetics.								
CO3	Explain on the classification of parasites.								
CO4	Outline the basic knowledge of general virology.								
CO5	Describe a comprehensive knowledge on Immunology, immunoglobulins and antigens.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Historical back ground.-</b> Microscopy. -Culture method sandmedia.	10	Describe, illustrate and explain the historical background of Microbiology, the types and parts of Microscope and culture methods and media.					1,2	
II	<b>Bacterial genetics:</b> -Transcription And Translation -Mutation and its type -Gene transfer -Genetic Mechanisms of drug resistance.	10	Describe, illustrate and explain the bacterial genetics.					1,2,3	
III	<b>Introduction to parasitology:</b> Parasitism, direct and indirect lifecycles, hosts.-Commensalism, symbiosis. -General Laboratory diagnosis -Classification of parasites	8	Describe, illustrate and explain the parasites and classification of parasites.					1,2	
IV	<b>General Virology</b> -Morphology and nomenclature. -Virus replication. -Cultivation of virus. -Vaccines and antiviral drugs.	10	Describe, illustrate and explain the general virology, vaccines and antiviral drugs.					1,2	



<b>V</b>	<b>Immunology:</b> -History of immunology, Innate and acquired immunity. -Immunoglobulin: Structure and function, classes and subclasses. -Antigens and types of antigens	<b>10</b>	Describe, illustrate and explain immunology, types of immunoglobulin's and antigens.	1,2
<b>Practical</b>	<b>Instrumentation in microbiology.</b> -Code and conduct of laboratory personnel. Laboratory diagnosis of blood parasites: Plasmodium, Leishmania, Microfilaria a Trypanosomes -Stool examination for parasites (Wet mount preparation)	<b>64</b>	Describe, illustrate, explain instrumentation in Microbiology and apply staining techniques and carry out microscopic examination.	1,2, 3,4

### TEXT BOOKS:

T1. Textbook of Microbiology Immunology by Subash Chandra Parija 2<sup>nd</sup> edition.

### REFERENCE BOOKS:

R1. C.P Baveja, "Textbook of Microbiology, 5<sup>th</sup> Edition.

R2. Ananthanarayan and Paniker, "Textbook of Microbiology 8<sup>th</sup> edition.

R3. Textbook of Essentials Microbiology Apurba Sankar Sastry Sandhya Bhat 4<sup>th</sup> edition.

### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
<b>1</b>	Understand the Historical background of Microbiology, the types and parts of Microscope and culture methods and media.	<b>1,3</b>
<b>2</b>	Acquire knowledge and understand bacterial genetics.	<b>1,4</b>
<b>3</b>	Explain on the classification of parasites.	<b>1,2</b>
<b>4</b>	Outline the basic knowledge of general virology.	<b>1,2</b>
<b>5</b>	Describe a comprehensive knowledge on Immunology, immunoglobulin and antigens.	<b>1,2 3</b>

SEMESTER – I									
Course Title	FUNDAMENTAL OF STATISTICS								
Course code	22UMFS111R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 32T+32P	2	0	2	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	All PG Programme								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	1. Understand key concepts such as descriptive statistics, probability distributions, and hypothesis testing. 2. Learn to analyze and interpret data using various statistical techniques and tools. 3. Apply statistical reasoning to evaluate data, identify limitations, and make informed decisions.								
CO1	Describe statistical population and sample, compile, classify and characterize data including scale of measurement.								
CO2	Compile and present univariate data in tabular and graphical form and explain the descriptive statistics.								
CO3	Compile and present bivariate data and explain it by various bivariate analysis, including the predictions/ forecasting.								
CO4	Compute probability including events and distributions (normal, binomial, poison).								
CO5	Explain the methods of hypothesis testing, parametric and non-parametric and used them to evaluate specific cases.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Statistical Methods:</b> Definition and scope of Statistics, concepts of statistical population and sample. <b>Data:</b> quantitative and qualitative, attributes, variables, scales of measurement nominal, Ordinal, interval and ratio.		7	Describe, illustrate and explain Basic knowledge of Statistical methods.				1,2	
II	<b>Presentation:</b> tabular and graphical, including histogram and gives.  <b>Measures of Central Tendency:</b> mathematical and positional. <b>Measures of Dispersion:</b> range,		4	Describe, illustrate and explain gain the knowledge of organizing & Cleaning Of Data				1,2	

	quartile deviation, mean deviation, standard deviation, coefficient of variation, skewness and kurtosis			
<b>III</b>	Bivariate data: Definition, scatter diagram, simple, partial and multiple correlation (3 variables only), rank correlation. Simple linear regression, fitting of polynomials and exponential curves.	<b>8</b>	Describe, illustrate and explain gain the Analytical Skill concept	1,2
<b>IV</b>	Random experiment: trial, sample point and sample space, event, Operations of Events, concepts of mutually exclusive and exhaustive events. Definition of probability: classical and relative frequency approach. Discrete probability space, Properties of probability, Independence of events, Conditional probability, total and compound probability rules, Normal probability, Distribution, Binomial probability Distribution, Poisson Probability Distribution, Bayes' theorem and its applications	<b>8</b>	Describe, illustrate and explain acquire the knowledge of basic Data Analysis Procedure for day-to-day use.	1,2
<b>V</b>	Testing of hypothesis, parametric test: t-test, z-test, chi-square test. Non-Parametric test: One sample Kolmogorov test, Wilcoxon Signed test, Mann-Whitney Test, Kruskal-Wallis test	<b>5</b>	Describe, illustrate and explain acquire the Testing of hypothesis, parametric test: t-test, z-test, chi-square test. Non-	1,2
<b>Practical I</b>	<p>Introduction to R programming language and environment for data analysis and graphics. Syntax of R expressions: Vectors and assignment, vector arithmetic, generating regular sequence, logical vector, character vectors, Index vectors; selecting and modifying subsets of data etc.</p> <p>1. Data objects: Basic data objects, matrices, partition of matrices, arrays, lists, creating and using these objects; Functions-Elementary functions and summary functions, applying functions to subsets of data. Data frames: The benefits of data frames, creating data frames, combining data frames, Adding new classes of variables to data frames; Data frame attributes. Importing data files: import.data function, read.table function; Exporting data: export.data function, cat, write, and write.table functions, function, formatting output-options, and format functions; Exporting graphs -</p>	<b>32</b>	Describe, illustrate and explain acquire the data objective, programming	1,2,3,4

	export.Graph function.Graphics 2. In R Visualizing the multivariate data: Scatter plot, Q-Q plot,P-Pplot. 3. Performing dataanalysis tasks:Reading data with scan,E xploring data using graphical tools, computing descriptivestatistics,onesampletests,two sa mpletests,Goodnessoffittests.Parametricte stand Non-Parametrictest			
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### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe statistical population and sample, compile, classify and characterize data including scale of measurement.	1,2,3
2	Compile and present univariate data in tabular and graphical form and explain the descriptive statistics.	1,2,3
3	Compile and present bivariate data and explain it by various bivariate analysis, including the predictions/ forecasting.	1,2,3
4	Compute probability including events and distributions (normal, binomial, poisson).	1,2,3
5	Explain the methods of hypothesis testing, parametric and non-parametric and used them to evaluate specific cases.	1,2,3

SEMESTER – I									
Course Title	EFFECTIVE ENGLISH (Communicative English & Soft Skills)								
Course code	22UMPD111R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours:	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> <li>1. To introduce the types of sentences and their significance.</li> <li>2. To strengthen the students vocabulary to enhance their speaking and writing skills.</li> <li>3. To familiarize the students with the importance of dress codes in various organizations</li> </ol>								
CO1	This course will enable students to analysis and identify the different types of sentences.								
CO2	Learners will be able to integrate the skills of reading and speaking in professional communication.								
CO3	Dress code Etiquette sessions will boosts their confidence and morals.								
CO4	Students will earn about the effective and efficient utilization of time.								
CO5	IntroductiontoPhoneticsanditsimportancewillimprovethelearners’pronunciation								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<b>Module1-Grammar</b> i. Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences ii. Types of Tenses iii. Common Errors iv. Synonyms v. Antonyms vi. Homonyms		3	Enable to analyse and identify the different types of sentences				1,2	
II	<b>Module2-ReadingSkills</b> i. Techniques of Effective Reading ii. Gathering ideas and information from a text The SQ3R Technique Interpret the text		4	Ability to integrate the skills of reading and speaking in professional communication				1,2	

<b>III</b>	<b>Module 3-Listening Skills</b> i. What is listening? ii. The Process of Listening iii. Factors that adversely affect Listening iv. Difference between Listening and Hearing, v. Purpose and Importance of Effective Listening How to Improve Listening Process	<b>3</b>	Dress code Etiquette sessions will boost their confidence and morals	1,2
<b>IV</b>	<b>Module4-ConflictManagement</b> <b>i. Definition</b> ii. Type of Conflict Management  iii. Effects of Conflict Management iv. Methods to deal with Conflicts (Negative)	<b>3</b>	Acquire knowledge about the effective and efficient utilization of time	1,2
<b>V</b>	<b>Module5-Time-ManagementSkills</b> i. Introduction To Time Management, ii. Purpose And Importance of Time Management, iii. Basic Tips to Maintain Time. Activity: Problem solving activity: A situation will be given to the students and they will have to tell us how to handle the situation or solve the problem	<b>2</b>	Introduction to Phonetics and its importance will improve the learners' pronunciation	1,2

**TEXTBOOKS:**

T1- Wren,P.C and Martin,H.1995.High School English Grammar and Composition, S Chand Publishing.

T2- English Grammar in Use, Raymond Murphy 4th edition, CUP.

T3- Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.

**REFERENCE BOOKS:**

R1- English Vocabulary in Use (Advanced), Michael McCarthy and Felicity, CUP.

R2- Effective Communication and Soft Skills, Nitin Bhatnagar, Pearsons.

**OTHER LEARNING RESOURCES:**

<https://www.classcentral.com/report/toefl-preparation/>

<https://brightlinkprep.com/10-best-toefl-prep-books/>

<b>SEMESTER – I</b>									
<b>Course Title</b>	<b>MINI-RESEARCH (REVIEW OF LITERATURE -R1)</b>								
<b>Course code</b>	<b>22MMLT115R</b>	<b>TOTAL CREDITS:2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>TOTAL HOURS: 48</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>8</b>	<b>0</b>	<b>2</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Master of Medical Laboratory Technology</b>								
<b>Semester</b>	<b>Fall/ I semester of first year of the programme</b>								
<b>Course Objectives</b>	1. To learn to review and assess scientific literature critically. 2. To write and presenting overview of the relevant literature for a specific research topic.								
<b>CO1</b>	Understanding of key ethical issues in research, ensuring compliance with informed consent, confidentiality, and responsible conduct standards.								
<b>CO2</b>	Discuss how critical evaluation and synthesis of existing research can be effectively achieved by understanding the foundational principles of literature reviews and scholarly writing.								
<b>CO3</b>	Apply various referencing styles (APA, MLA, Chicago, Harvard) to ensure precise citation and accurate compilation of bibliographies.								
<b>CO4</b>	Acquire practical skills in conducting thorough literature reviews, resulting in the ability to organize and present synthesized research coherently.								
<b>CO5</b>	Demonstrate in structuring, drafting, revising, and finalizing research papers to produce scholarly work of high quality.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>Introduction to Literature Review/Scholarly Writing:</b>  Need for Literature Review, Theoretical and Conceptual framework, Sources of Review of Literature, Chronological reporting Of review of literature Both Indian & foreign, Gap in Research on topic Of the study. Web Search and using Advanced Search Techniques for research	4	Describe, illustrate and explain to construct foundational knowledge and techniques of scholarly writing chronologically				1,2		

	through internet			
<b>II</b>	<b>Referencing style:</b> Referencing and various formats for reference writing of books and research papers.	14	Describe, illustrate and explain <b>Referencing style</b>	1,2
<b>III</b>	<b>Ethical considerations in research:</b> Ethical considerations for Conducting research and publication	<b>15</b>	Describe, illustrate and explain <b>Ethical considerations in research</b>	1,2
<b>IV</b>	<b>Practical training in Literature review:</b> Selecting one of the major key concepts and variables from the topic of the research and writing review literature with Different Sources and its assessment by the supervisor.	<b>10</b>	Describe, illustrate and explain the <b>Practical training in Literature review</b>	1,2
<b>V</b>	<b>Practical training of Research paper writing:</b>  Familiarity with Professional Journals – National & International. Selection of topic for writing Research paper, practical procedure for writing Research paper based on Modules of paper I & paper II.	<b>5</b>	Describe, illustrate and explain the cell	1,2

**TEXTBOOKS:**

T1- .Fink, A. (2019). Conducting research literature reviews: From the internet to paper. Sage publications.

**REFERENCEBOOKS:**

R1- Fink, A. (2019). *Conducting research literature reviews: From the internet to paper.* Sage publications.

R2- Cooper, H. (1998). Cooper, Harris, Synthesizing Research: A Guide for Literature Reviews, Thousand Oaks, CA: Sage, 1998.

R3- Hart, C. (2018). *Doing a literature review: Releasing the research imagination.*

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding of key ethical issues in research, ensuring compliance with informed consent, confidentiality, and responsible conduct standards.	<b>1,3 &amp; 4,7,8</b>
<b>2</b>	Discuss how critical evaluation and synthesis of existing research can be effectively achieved by understanding the	<b>1,2,4,7,8</b>



	foundational principles of literature reviews and scholarly writing.	
<b>3</b>	Apply various referencing styles (APA, MLA, Chicago, Harvard) to ensure precise citation and accurate compilation of bibliographies.	<b>1,2,4,7,8</b>
<b>4</b>	Acquire practical skills in conducting thorough literature reviews, resulting in the ability to organize and present synthesized research coherently.	<b>1,2,4,7,8</b>
<b>5</b>	Demonstrate in structuring, drafting, revising, and finalizing research papers to produce scholarly work of high quality.	<b>1,2,4,7,8</b>

SEMESTER – II									
Course Title	MOLECULAR BIOLOGY								
Course code	22MMLT125R	Total credits: 3 Total hours: 32T+64P	L	T	P	S	R	O/F	C
			2	0	2	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MMLT								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To teach the students about basic concept about the Structure, types,coiling and super coiling, topoisomerases, replication, satellite DNA.</li> <li>To teach the students about Transcription and translation.</li> <li>To teach the students hemoglobinopathies, phenyl ketonuria, alkaptonuria, homocystinuria.</li> </ol>								
CO1	Understand DNA structure, types, coiling, and topoisomerases.								
CO2	Explain transcription, translation, genetic codes, operons, and regulatory mechanisms.								
CO3	Analyze mutations, comprehend mutagenesis, and understand DNA repair mechanisms.								
CO4	Acquire proficiency in recombinant DNA technology principles, construct recombinant DNA, and apply cloning strategies.								
CO5	Apply genetic knowledge in medicine, including medical conditions, prenatal diagnosis, and applications in healthcare.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	DNA: the support of here dietary information Structure, types, coiling and super coiling, topoisomerases, replication, satellite DNA. Organization of Prokaryotic and Eukaryotic genome, chromosome's structure, number, sex chromosomes, human karyotype, methods for chromosome analysis, chromosome banding	8	Describe, illustrate and explain the basic concept about the Structure, types,coiling and super coiling, topoisomerases, replication, satellite DNA.					1,2	
II	Transcription and translation factors involved RNA processing, types of RNA, genetic code, Lac operon, Tryptophan operon, regulation in eukaryotes, gene dosage and gene amplification, generation of antibody diversity.	5	Describe, illustrate and explain on Transcription and translation and Mutation spontaneous, induced, point mutation and silent mutation, frame shift mutation,					1,2	

			physical and chemical mutagen and Recombinant DNA technology	
<b>III</b>	Structural organization of proteins Mutation spontaneous, induced, point mutation and silent mutation, frame shift mutation, physical and chemical mutagens, molecular basis, site directed mutagenesis, significance of mutagenesis, DNA repair, isolating mutants, Ames test.	<b>5</b>	Describe, illustrate and explain to understand Structural organization of proteins	3,4
<b>IV</b>	Recombinant DNA technology: necessary elements–enzymes and vectors –plasmids, cosmids, bacteriophages, shuttle vectors, expression vectors, construction of Rdna and cloning strategies – various methods, genomic libraries (e.g. using phage vectors), cDNA libraries, introduction of rDNA in to host–methods, restriction maps and sequencing.	<b>4</b>	Describe, illustrate and explain about Recombinant DNA Technology: necessary elements – enzymes and vectors–plasmids	3,4
<b>V</b>	Genetics in medicine: Hemoglobin and hemoglobinopathies, phenylketonuria, alkaptonuria, homocystinuria, Lesch-Nyhan syndrome, genetics of cancer, Down’s syndrome, Di-George syndrome, Klinefelters syndrome, Turner’s syndrome, hermaphroditism, cystic Fibrosis, hemophilia, prenatal diagnosis of genetic diseases, application of recombinant DNA Technology in medicine –PCR,RFLP,DNA finger printing, therapeutic proteins, vaccines, antibodies, transgenic organisms, gene therapy, Human genome project.	<b>10</b>	Describe, illustrate and explain The Knowledge about Genetics in medicine.	2,3, 4
<b>Practical</b>	PCR-Side Directed Mutagenesis DNA Isolation, DNA Cloning, Bacterial Transformation and Fusion Protein Purification (Demonstration only) Plasmid Analysis by Restriction Digestion and Protein Gel Electrophoresis DNA Gel Electrophoresis	<b>64</b>	Describe, illustrate and explain The Knowledge about Molecular techniques.	1,2, 3,4

**PE: Practical Examination**

**TEXT BOOKS:**

1. Molecular biology of the cell by Bruce Albert.

**REFERENCE BOOKS:**

1. Pathfinder Life science fundamentals and practice Part I and Part II

by Pranav Kumar (Fifth revised edition).

2. Wilson and Walkers Principles and Techniques of Biochemistry and Molecular biology.

3. Molecular biology of gene by Watson.

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand DNA structure, types, coiling, and topoisomerases.	<b>1,3,4</b>
<b>2</b>	Explain transcription, translation, genetic codes, operons, and regulatory mechanisms.	<b>1,3,4</b>
<b>3</b>	Analyze mutations, comprehend mutagenesis, and understand DNA repair mechanisms.	<b>1,3,4</b>
<b>4</b>	Acquire proficiency in recombinant DNA technology principles, construct recombinant DNA, and apply cloning strategies.	<b>1,3,4</b>
<b>5</b>	Apply genetic knowledge in medicine, including medical conditions, prenatal diagnosis, and applications in healthcare.	<b>1,3,4</b>

**SEMESTER – II**

<b>Course Title</b>	<b>UNIVERSAL HUMAN VALUES (UHV) + PROFESSIONAL ETHICS</b>								
<b>Course code</b>	<b>22UHV101R**</b>	<b>Total credits: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 15T</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Prerequisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>NILL</b>						
<b>Programme</b>	All UG and PG Programmes								
<b>Semester</b>	Autumn/ II semester of first year of the Programme								
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.</li> <li>2. It is free from any dogma or value prescriptions.</li> <li>3. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.</li> <li>4. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution.</li> <li>5. This self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs.</li> </ol>								
<b>CO1</b>	To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.								
<b>CO2</b>	To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way								
<b>CO3</b>	To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature								
<b>CO4</b>	Thus, this course is intended to provide a much needed orientation input in value education to the young enquiring minds.								
<b>Unit No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>Introduction-</b> Need, Basic Guidelines, Content and Process for Value Education. Understanding the need, basic guidelines, content and process for Value Education Self-Exploration– what is it?-its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self-exploration Continuous Happiness and Prosperity-A look at basic Human Aspirations Right understanding,	<b>3</b>	Students will learn to achieve happiness and prosperity through value education and self-exploration, aligning their aspirations with harmony at various levels.				1,2,3,		

	<p>Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority</p> <p>Understanding Happiness and Prosperity correctly-A critical appraisal of the current scenario</p> <p>Method to fulfil the above human aspirations: understanding and living in harmony at various levels.</p>			
<b>II</b>	<p><b>Understanding Harmony in the Human Being-</b></p> <p>Harmony in Myself!</p> <p>Understanding human being as a co-existence of the sentient 'I' and the material 'Body'</p> <p>Understanding the needs of Self ('I') and 'Body' - SukhandSuvidha</p> <p>Understanding the Body as an instrument of 'I'(I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail Programs to ensure Sanyam and Swasthya - Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>	<b>3</b>	Students will learn to achieve personal harmony by balancing the needs of the self and body through self-control and health practices.	1,2,,4,
<b>III</b>	<p><b>Understanding Harmony in the Family and Society-Harmony in Human Relationship:</b></p> <p>Understanding Harmony in the family—the basic unit of human interaction Understanding values in human human relationship; meaning of Nyaya and program for its fulfilment to ensure Ubhay-Tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.</p> <p>Understanding the meaning of Vishwas; Difference between intention and competence.</p> <p>Understanding the meaning of SammanDifference between respect and differentiation the othersalient values in relationship.</p> <p>Understanding the harmony in the <b>Society (society being an extension of</b></p>		Students will learn to apply principles of trust, respect, and universal goals to achieve harmony in family and society.	

	<p><b>family):</b> Samadhan, Samridhi, Abhay, Sahastitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (SarvabhaumVyawastha )- from family to world family!-Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>			
<b>IV</b>	<p><b>Understanding Harmony in the Nature and Existence-</b> Whole existence as Coexistence Understanding the harmony in the Nature Interconnectedness and mutual fulfilment among the four order so naturerecyclability and self-regulation in nature Understanding Existence as Co- existence (Sahastitva) of mutually interacting units in all-pervasive space Holistic perception of harmony at all levels of Existence-Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>		Students will grasp the harmony and interconnectedness in nature and existence through practical exercises and case studies.	
<b>V</b>	<p><b>Understanding of Harmony on Professional Ethics</b> Natural acceptance of human values Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional Ethics: Ability to utilize the professional competence for augmenting universal human order Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems Strategy for transition from the present state to Universal Human Order: At the level of individual: as socially and ecologically responsible engineers, technologists and</p>		Students will learn to apply professional ethics and human values to promote responsible and sustainable practices in technology and management.	

	managers11.At the level of society: as mutually enriching institutions and organizations.			
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### TEXT BOOKS:

a. The text book

R.RGaur,RSangal, GPBagaria, A foundation course in HumanValues and professional Ethics,Excel books,NewDelhi, 2010, ISBN978-8-174-46781-2

b. The teacher's manual

R.RGaur, RSangal,GP Bagaria,A foundation course in HumanValues and professional Ethics–Teachers Manual, Excelbooks, New Delhi,2010

c. A set of DVDs containing

- Video of Teachers'Orientation Program
- PPTs of Lectures and Practice Sessions
- Audio-visual material for use in the practice sessions

### REFERENCE BOOKS:

1. BLBajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow.Reprinted 2008.
2. PLDhar, RR Gaur,1990,*Science and Humanism*,Common wealth Purblishers.
3. SussanGeorge,1976,*How the Other Half Dies*,Penguin Press.Reprinted 1986,1991
4. IvanIllich,1974, *Energy & Equity*,TheTrinityPress,Worcester, and Harper Collins,USA
5. Donella H.Meadows,DennisL.Meadows, Jorgen Randers,WilliamW.BehrensIII,1972,limits to Growth, Club of Rome's Report, Universe Books.
6. SubhasPalekar,2000,*How to practice Natural Farming*, Pracheen (Vaidik) Krishi Tantra Shodh ,Amravati.
7. ANagraj, 1998, *Jeevan Vidyaek Parichay*,Divya Path Sans than, Amarkantak.
8. E.F.Schumacher,1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
9. A.N.Tripathy, 2003,*Human Values*,New Age International Publishers.

### *Relevantwebsites,moviesanddocumentaries*

1. Value Education websites ,<http://uhv.ac.in>,<http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. AlGore, *An Inconvenient Truth*, Paramount Classics,USA



4. Charlie Chaplin, *Modern Times*, United Artists, USA
5. IIT Delhi, *Modern Technology—the Untold Story*

**SEMESTER – II**

SEMESTER – II									
Course Title	Research Methodology and Statistical Analysis								
Course code	22UMRM121R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours:	1	0	0	4	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	All PG Programme								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	1. To understand some basic concepts of research and its methodologies. 2.To identify appropriate research topics, select and define appropriate research problems and parameters, prepare a project proposal (to undertake a project), organize and conduct research (advanced project) in a more appropriate manner								
CO1	Explain key research concepts and issues								
CO2	Write a research report and thesis and write a research proposal (grants).								
CO3	Read comprehend, and explain research articles in their academic discipline.								
CO4	Understand the use of abstracts, the presentation of statistics, and proper referencing and bibliography formats.								
CO5	Analyze case studies on Basmati rice, turmeric, and neem patents.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
<b>I</b>	<b>Research Methodology-</b> An Introduction-meaning and objectives of research, motivation in research, types and significance of research, criteria of good research. Defining the Research Problems- definition of research problem, necessity of defining research problem		<b>3</b>	Students will have basic knowledge of Research methods.				1,2	
<b>II</b>	<b>Research Design-</b> meaning and need of research design, features of a good design, different research designs, Sampling Design-steps in sampling design, Sample Size determination, criteria for selecting a sampling design, different types of sampling design, Experimental Design, Principles of Design of Experiment, One –wayANOVA,Two-WayANOVA,CRD,RBD,LSD,2 <sup>2</sup> ,2 <sup>3</sup> FactorialD esign		<b>4</b>	Students will gain the knowledge of Research Methodology				1,2	
<b>III</b>	Types of data sources of data collection, tools of data collection, Nominal, ordinal, interval and ratio  – Attitude scale construction and measurement, rating scales, semantic differential (SD), Use of scale in statistical analysis, Schedules for interviews preparation and standardization,		<b>3</b>	Students will be able to gain the Skill questionnaire development basic.				1,2	

	development of survey instruments and item analysis for the questionnaire			
<b>IV</b>	<p>Planning and organizing research report  Format of research report, Different steps of writing report, lay out of the research report ,  How to organize thesis/Dissertation, mechanics of writing research report, standard methods of quoting- presenting the result, written and oral reports, Uses of abstract, format of research report, presentation of statistics - tabular and graphic references and uses of references, Bibliography and presentation of bibliography</p>	<b>3</b>	<p>Students will be able to acquire  The knowledge of Basic knowledge of basic Report/dissertation Procedure</p>	1,2
<b>V</b>	<p>Intellectual property right (IPR), Introduction and the need for IPR, IPR in India and worldwide, Patents, Trademarks, Copyright &amp; Related Rights, Industrial Design, Traditional Knowledge and Geographical Indications, Patentable and non-patentable, patenting life, Filing of a patent application, The different layers of the international patent system, Case studies on Basmati rice, Turmeric, and Neem patents</p> <p><b>Laboratory using R Software:</b></p> <ol style="list-style-type: none"> <li>1. Analysis of One way ANOVA;</li> <li>2. Analysis of Two way ANOVA;</li> <li>3. Analysis of CRD</li> <li>4. Analysis of RBD</li> <li>5. Analysis of 2<sup>2</sup> and 2<sup>3</sup> Factorial Experiment</li> <li>6. Simulation-I using R (Bernoulli, Binomial, Poisson and Geometric distribution.).</li> <li>7. Simulation-II using R (Exponential and Normal distribution).</li> <li>8. Simple random Sampling</li> <li>9. Stratified Random Sampling</li> </ol>	<b>2</b>	<p>Students will have an insight knowledge of IPR</p>	1,2

## TEXT BOOKS:

T1- Boyle JS. Styles of ethnography. In: JM Morse, editor. Critical issues in qualitative research methods

## REFERENCE

1. Boyle JS. Styles of ethnography. In: JM Morse, editor. Critical issues in qualitative research methods. Thousand Oaks, CA: Sage, 1994: 159–85.
2. Coughlan M., Cronin P. and Ryan F. (2007). Step-by-step guide to critiquing research. Part 1: quantitative research. British Journal of Nursing 16(11).
3. Creswell, JW. (1998). Qualitative Inquiry and Research Design Choosing Among Five Traditions. Thousand Oaks, CA: Sage Publications.
4. Crotty, M. (1998). The Foundations of social research: Meaning and perspective in the research process. London: Sage.
5. Denzin, NK. (1978). Sociological Methods. New York: McGraw-Hill.
6. Hanson WE, JW Creswell, VL Plano Clark, KS Petska and JD Creswell. Mixed Methods Research Design in Counseling Psychology. Journal of Counseling Psychology, 2005, Vol. 52, No. 2, 224–235. [http://www.preciousheart.net/chaplaincy/Auditor\\_Manual/13casesd.pdf](http://www.preciousheart.net/chaplaincy/Auditor_Manual/13casesd.pdf)

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain key research concepts and issues	1,2,4
2	Write a research report and thesis and write a research proposal (grants).	1,2,4
3	Read comprehend, and explain research articles in their academic discipline.	1,2,4
4	Understand the use of abstracts, the presentation of statistics, and proper referencing and bibliography formats.	1,2,4
5	Analyze case studies on Basmati rice, turmeric, and neem patents.	1,2,4

SEMESTER – II									
Course Title	COMMUNICATION MASTERY (Communicative English & Soft Skills)								
Course code	22UMPD121R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours:	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To familiarize students with the transformation of sentences and the appropriate use of prepositions.</li> <li>To enhance the writing skills in different areas including CV and cover letter writing.</li> <li>To convey meaning by reinforcing, substituting for, or contradicting verbal communication.</li> <li>Productivity and performance boosting activities for professional goal achievement</li> </ol>								
CO1	Practice of grammar will polish their writing skills.								
CO2	It will enhance their communication and interpretative skills.								
CO3	Introduction to behavioural skills, thoughts, and emotions will enable them to behave in a conscious and productive way.								
CO4	It will have a positive impact in their thought process and problem-solving skills								
CO5	Participants will grasp the fundamentals of non-verbal communication and body language, enabling them to apply effective techniques and avoid common pitfalls in interpersonal interactions.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Module1-Grammar</b> i. Use of Prepositions ii. Tag questions iii. Idioms, Phrases and Clauses Simple, complex, compound sentences	3	students will confidently utilize prepositions, construct tag questions, understand idioms, phrases, and clauses, and differentiate between simple, complex, and compound sentences					1,2	
II	<b>Module2-Grammar</b> i. Active and Passive Voice ii. Direct and Indirect Speech	2	To be able to master the usage of active and passive voice, as well as direct and indirect speech in various contexts.					1,2	
III	<b>Module3-WritingSkills</b> i. The Basics of Writing; avoid ambiguity and vagueness	3	students will be proficient in writing clear and concise content, including paragraphs, precis, letters,					1,2	

	ii. Paragraph Writing iii. Précis Writing iv. Letter Writing v. Resume, CV and Cover Letter			
<b>IV</b>	<b><i>Module4-Self-ManagementSkills</i></b> i. SWOT Analysis ii. Self-Regulation-Goal Setting iii. Personal Hygiene	<b>4</b>	Able to conduct SWOT analysis, set and regulate goals effectively, and maintain personal hygiene for enhanced self-management skills.	1,2
<b>V</b>	Module5-Non-VerbalCommunication- Sciences of Body Language i. What is Non-Verbal Communication & Body Language, ii. Elements of Communication, iii. Types of Body Language, iv. Importance and Impact of Body Language, v. Types of Communication through Body Language, vi. Introduction to Haptic, Introduction to Kinesics vii Introduction to Proxemics, viii Body Language Do's and Don'ts, Doubt Clearing Session.	<b>3</b>	To understand non-verbal communication and body language, including its elements and types, recognize its importance and impact, identify various forms of communication conveyed through body language like haptics, kinesics, and proxemics, and apply effective do's and don'ts of body language etiquette.	1,2
<b>Practical</b>				

- **TEXT BOOKS:**

- Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.
- Mc Dowell, Gayle Laakmann. 2008. Cracking the Coding Interview (Indian Edition).

REFERENCES:

- Communication Skills Training: A Practical Guide to Improving Your Social Intelligence, Presentation and Social Speaking, Ian Tuhovsky, 2019
- A Text book for AECC English Communication: Interface, Dr. Kironmoy Chetia and Pranami Bania Breez Mohan Hazarika, January 2019.

OTHER LEARNING RESOURCES:

- <https://youtu.be/x60GHpQ8gJk>
- [https://youtu.be/Ke\\_oSN-BCaY](https://youtu.be/Ke_oSN-BCaY)
- <https://youtu.be/TDPDtrLxT-c>

SEMESTER – II									
Course Title	COMPUTATIONAL SYSTEMS AND DIGITAL WORLD								
Course code	22UUDL103R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours:	0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<p>1. Students will be able to understand the fundamentals of computer systems and Internet search along with advanced features of MS-Office.</p> <p>2. Students will be able to learn data management, statistical analysis and visualization.</p> <p>3. Students will be able to use social media and e-commerce portals, Digital Payment systems, and other utility software</p>								
CO1	Students will have basic understanding of Computer Systems and Internet search.								
CO2	Students will be able to solve data analysis, management and visualization issues using MS-Office products.								
CO3	Students will be able to efficiently and ethically use Social Media and de- commerce sites.								
CO4	Students will have introduction to various utility software used in research hand information management								
CO5	Students will be able to Introduction to Technical Document writing using LaTeX								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<p><b>Fundamentals of Computer Systems, Office Automation and Internet Search</b></p> <p>i. Components of a Computer and their functions.</p> <p>ii. Office Automation using MS-Word, MS-Excel, and MS-Power Point.</p> <p>iii. Data management, Statistical Data Analysis and Data Visualization with MS-Excel.</p> <p>Use of Functions, Graphs &amp; Charts in MS-Excel</p>	3	Describe, illustrate and explain Computer Systems, Office Automation and Internet Search					1,2	



<p><b>II</b></p>	<p>Internet &amp; Cyber World</p> <p>i. Introduction to Computer Networks, Internet and World Wide Web, Websites and Web portals.</p> <p>ii. Creation and use of Email Accounts.</p> <p>iii. Web browsing, Web Searching, Different aspects of Web Searching-Search Keywords, conditions and combinations.</p> <p>iv. Study of different Search Engines like Google, Microsoft Bing, Yahoo, Yandex, Duck Duck Go, Ask. Com etc.</p> <p>v. Cyber Crimes, Cyber Laws and IT Act 2000, India.</p>	<p>2</p>	<p>Describe, illustrate and explain the Internet &amp; Cyber World</p>	<p>1,2</p>
<p><b>III</b></p>	<p>Introduction to Social Media and E-Commerce</p> <p>i. Relevance of Social Media in present scenario. Posting different types of contents in Social Media.</p> <p>ii. Creating accounts and using some popular Social media portals and Apps like WhatsApp, Facebook, etc. Social Media Etiquettes &amp; Crimes.</p> <p>iii. Definition of E-Commerce; E-Commerce versus traditional Commerce.</p> <p>iv. Case studies of popular E-Commerce portals like Amazon.</p> <p>v. E-commerce Etiquettes &amp; Crimes.</p>	<p>3</p>	<p>Describe, illustrate and explain to Social Media and E-Commerce</p>	<p>1,2</p>
<p><b>IV</b></p>	<p>Digital Payments and Digital Transactions</p> <p>i. Introduction to Digital Payment Systems.</p> <p>ii. Creating accounts and</p>	<p>4</p>	<p>Describe, illustrate and explain to Digital Payments and Digital Transactions</p>	<p>1,2</p>

	<p>using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, UPI.</p> <p>iii. Digital payments Etiquettes &amp; Crimes.</p>			
V	<p>Basic Accounting and Utility Software</p> <p>Introduction to Basic accounting concepts, Introduction to an Accounting Software like Gnu Cash or Tally.</p> <p>Introduction to Technical Document writing using LaTeX.</p> <p>Introduction to Data Visualization software–Sigma, Google Charts, Tableau</p>	3	Describe, illustrate and explain of Basic Accounting and Utility Software	1,2

#### TEXT BOOKS:

1. Sinha PradeepK. And Priti Sinha. *Computer Fundamentals: Concepts Systems & Applications*. 3rded. New Delhi: BPB Publications.
2. Goel,A, 2010. *Computer Fundamentals*, Pears on India.

#### REFERENCE BOOKS:

1. Balaguruswamy, E.2009 *Fundamentals of Computers*,Tata Mc Graw-Hill Education.
2. Balaguruswamy,2014. *E.Fund Of Comp& Programming ( Updated Ed Sem.I, Au)* Tata McGraw-Hill Education.
3. Lawson, C. 2022.*Introduction to Social Media*,Oklahoma State University.

#### OTHER LEARNING RESOURCES:

1. <https://www.w3schools.com>
2. <https://edu.gcfglobal.org>
3. <https://www.tutorialspoint.com>
4. <https://www.javatpoint.com>

SEMESTER – II									
Course Title	BIOMEDICAL TECHNIQUES AND LABORATORY MANAGEMENT								
Course code	22MMLT121R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 32T+64P	2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MASTER IN MEDICAL LABORATORY TECHNOLOGY								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<p>1. The students will understand and create methods of qualitative analysis of biomolecules and detection.</p> <p>2. The students will have an understanding on the measurement of radioactive isotopes, and application of isotopes in research and clinical biochemistry.</p> <p>3. The student will have comprehensive knowledge on Lab automation.</p>								
CO1	Demonstrate an in-depth understanding of the principles and practical applications of qualitative analysis techniques.								
CO2	Demonstrate extensive proficiency in a range of photometric techniques, covering both theoretical foundations and practical execution.								
CO3	Apply isotope applications with a practical understanding of their versatile uses and implications.								
CO4	Illustrate advanced proficiency in essential laboratory management skills, displaying expertise in organizational and supervisory roles.								
CO5	Implement advanced proficiency in incorporating automation and executing Point-of-Care Testing (POCT), showcasing a high level of competence in utilizing state-of-the-art technologies for precise diagnostics.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Methods of qualitative analysis of biomolecules: Chromatography, Electrophoresis, Centrifugation Techniques, Ion selective procedures.	7	Explain biomolecule analysis methods, encompassing chromatography, electrophoresis, centrifugation, and ion-selective procedures.					1,2	
II	PHOTOMETRIC TECHNIQUES: Colorimetry, Spectrophotometry, Fluorometry, Reflectance photometry, Flame emission spectrophotometry, Atomic absorption spectrophotometry.	8	Explain the photometric techniques, including colorimetry, spectrophotometry, fluorometry, reflectance photometry, flame emission spectrophotometry, and atomic absorption spectrophotometry.					1,2	
III	ISOTOPES: Detection and measurement of radioactive isotopes, application of isotopes in research and clinical biochemistry.  CELL FRACTIONATION: Biochemical activities of different fractions, marker enzymes.	6	Explain on detection, measurement of radioactive isotopes' its application in research and clinical biochemistry, and illustrate cell fractionation's principles, techniques, and marker enzyme usage..					1,2	
IV	Laboratory Management: Laboratory design Laboratory safety: Fire, chemical,	6	Llustrateon laboratory management, safety protocols,					1,2, 3	

	<p>radiation and infection control, hazardous waste and transport of hazardous materials.</p> <p>-Responsibilities of laboratory personnel</p> <p>-Documentation and Maintenance of records in lab</p> <p>-Laboratory information Systems (LIS), Hospital information systems (HIS).</p>		<p>personnel responsibilities, documentation, and information systems for efficient lab operation and regulatory compliance.</p>	
<b>V</b>	<p>Automation in Biochemistry Laboratory- History, processes, types, steps of analysis.</p> <p>Point-of-care testing (POCT)- Requirements, Classification, Applications</p>	<b>5</b>	<p>Illustrate and explain on biochemistry lab automation and point-of-care testing, ensuring efficient diagnostic procedures.</p>	2,3,4
<b>Practical</b>	<p>Chromatography: Paper, Thin layer chromatography, Principle and Instrumentation of gel, ion-exchange chromatography, HPLC.</p> <p>Electrophoresis: Agarose gel electrophoresis, Principle and Instrumentation of slide gel, PAGE, SDS-PAGE.</p> <p>Photometry, Spectrophotometry -Principle, Instrumentation and analysis of blood samples</p> <p>Atomic absorption Spectrophotometry (Principle and Instrumentation).</p> <p>Cell fractionation–methods</p>	<b>64</b>	<p>Apply principles and instrumentation techniques of chromatography, electrophoresis, photometry, spectrophotometry, and atomic absorption spectrophotometry in biochemical analysis, as well as cell fractionation methods.</p>	1,2,3,4,5

## TEXT BOOKS

1.T1 Bishop M, Fody EP, Schoeff LE. Clinical Chemistry- Techniques, Principles, Correlations. Diabetes (FBS, RBS, OGTT, HbA1c). 2010; 13:27.

2.T2 Chatterjea MN, Shinde R. Textbook of medical biochemistry. Wife Goes On; 2011.

3.T3 Jung K. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, Carl A. Burtis, Edward R. Ashwood, and David E. Bruns, editors. St. Louis, MO: Elsevier Saunders, 2006, 2448 pp., \$229.00, hardcover. ISBN 0-7216-0189-8. Clinical Chemistry. 2006 Jun 1;52(6):1214-.

4.T4 National Research Council, Division on Earth, Life Studies, Board on Chemical Sciences, Committee on Prudent Practices in the Laboratory, An Update. Prudent practices in the laboratory: handling and management of chemical hazards, updated version.

## REFERENCE BOOKS:

1. R1 Godkar PB, Godkar DP. Textbook of medical laboratory technology. Bhalani publishing house; 2006.

2. R2 Rastogi VB. Fundamentals of Molecular Biology. Ane Books Pvt Ltd; 2010 Jan 30.

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2176284/?page=1>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418628/>

<https://www.ncbi.nlm.nih.gov/books/NBK535358/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate an in-depth understanding of the principles and practical applications of qualitative analysis techniques.	<b>1,3</b>
<b>2</b>	Demonstrate extensive proficiency in a range of photometric techniques, covering both theoretical foundations and practical execution.	<b>1,2</b>
<b>3</b>	Apply isotope applications with a practical understanding of their versatile uses and implications.	<b>1,2,3</b>
<b>4</b>	Illustrate advanced proficiency in essential laboratory management skills, displaying expertise in organizational and supervisory roles.	<b>5,6,7</b>
<b>5</b>	Implement advanced proficiency in incorporating automation and executing Point-of-Care Testing (POCT), showcasing a high level of competence in utilizing state-of-the-art technologies for precise diagnostics.	<b>1,2,3</b>

**SEMESTER – II**

<b>HEMATOLOGY</b>									
<b>Course Title</b>									
<b>Course code</b>	<b>22MMLT122R</b>	<b>Total credits: 6</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 30(T)+64(P)</b>	<b>2</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>Masters of Medical laboratory technology</b>								
<b>Semester</b>	<b>Fall/ II semester of second year of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	1.To teach the formation, morphology, composition, function and normal values of blood estimation in different methods. 2.To teach the preparation of blood thin film and staining along with total RBC, WBC, platelet counts. 3.To teach the disorders or blood cells and understand various techniques for the cell counts.								
<b>CO1</b>	Understand the origins, development, and disorders of red and white blood cells								
<b>CO2</b>	Analyze the various investigations and clinical features of anemia.								
<b>CO3</b>	Evaluate the origin, development, and disorders of white blood cells.								
<b>CO4</b>	Examine laboratory investigations pertaining to plasma cell disorders.								
<b>CO5</b>	Classify the types and laboratory investigations of platelet disorders.								
<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Hematopoiesis-</b> Origin, development, function and fate of blood cells. Erythropoiesis Origin, development of RBCs.	<b>6</b>	Describe ,illustrate and explain The formation of blood cells.					1,2	
<b>II</b>	<b>Anaemia:</b> Morphologic and Etiologic classification Investigations of anaemia.	<b>7</b>	Describe ,illustrate and explain red cells disorders ,anemia.					1,2	
<b>III</b>	<b>Leucocyte</b> – Origin types And functions. <b>Disorders of White blood cells:</b> Leukaemia, Definition, Etiology,Classification and Clinical features.	<b>6</b>	Describe, illustrate and explain the WBC disorders its classification and the clinical significance.					1,2	
<b>IV</b>	<b>Plasma cell disorders</b> –classification Plasma cell myeloma -definition, clinical features and investigations. Bone marrow Examination	<b>8</b>	Describe, illustrate and explain the morphology and functions of plasma cells and classify its types and understand bone marrow examination for diagnosis.					1,2	
<b>V</b>	<b>Thrombolytic</b> –Formation And function. Normal haemostasis. Classification and Investigation of haemorrhagic disorders	<b>5</b>	Describe, illustrate and explain about thrombocytes. Its function related to hemostasis and various disorders related to hemostasis disorders.					1,2	
<b>Practica I</b>	1. Anticoagulants used in Hematology. 2.Bloodcollection.Preparation of thick and thin blood film and staining 3.Blood smear staining and	<b>64</b>	Describe, illustrate and explain various haematological techniques and carry out microscopic examination.					1,2, 3,4	

	<p>Interpretation.</p> <p>4. Leishman's staining, Field stain, Albert staining, Giemsa Staining and MGG staining.</p> <p>4. Estimation of E.S.R</p> <p>5. Estimation of Differential</p> <p>6. leucocyte count.</p> <p>7. Platelet count.</p> <p>8. Total RBC count.</p> <p>9. Total leucocyte count.</p> <p>10. Absolute Eosinophil count Reticulocyte count</p> <p>11. Estimation of PCV.</p> <p>12. Red cell indices.</p> <p>13. Blood grouping. Coomb's test</p> <p>14. Determination of BT, CT, PT and APTT</p>			
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**TEXT BOOKS:**

T1:Text book of Pathology(Sixth Edition) –By Harsh Mohan

**REFERENCE BOOKS:**

1. R1: Clinical Haematology Principles, procedure, correlations by E. Anne Stiene Martin, Cheryl A. Lotspiech –Steininger, John A. Koepke.
2. R2: Clinical Haematology in Medical Practice – de Gruchy
3. R3: Medical Laboratory Technology Methods & interpretation – Ramnik Sood

**OTHER LEARNING RESOURCES:**

[https://www.researchgate.net/publication/260266684\\_CLINICAL\\_HEMATOLOGY](https://www.researchgate.net/publication/260266684_CLINICAL_HEMATOLOGY)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the origins, development, and disorders of red and white blood cells	<b>1,2</b>
<b>2</b>	Analyze the various investigations and clinical features of anemia.	<b>1,3</b>
<b>3</b>	Evaluate the origin, development, and disorders of white blood cells.	<b>1,3</b>
<b>4</b>	Examine laboratory investigations pertaining to plasma cell disorders.	<b>2,3</b>
<b>5</b>	Classify the types and laboratory investigations of platelet disorders.	<b>1,3</b>

SEMESTER – II									
Course Title	MICROBIOLOGY AND IMMUNOLOGY								
Course code	22MMLT124R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 32T+64P	2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MMLT								
Semester	SECONDSEMESTER								
Course Objectives (Minimum 3)	1. To teach the students to Understand the Compliment system 2. Student will be made to understand about the Antimicrobial resistance and the control measures. And about Antigen-antibody reactions. 3. To teach Basic knowledge about Mycology.								
CO1	Students will learn about Communicable diseases and non-Communicable diseases.								
CO2	Understanding the Compliment system								
CO3	Students will be made to understand about the Antimicrobial resistance and the control measures.								
CO4	Students will be made to understand Antigen-antibody reactions.								
CO5	Basic knowledge about Mycology.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	<b>Medically important bacteria associated with:</b> -Communicable diseases -Non-Communicable diseases	6	To find out Medically important bacteria and Understanding Compliment system				1,2		
II	<b>Compliment system:</b> Function, compliment receptors, activation pathways, control mechanisms, role in inflammation, Hypersensitivity, Autoimmunity Immunodeficiency diseases.	10	Understanding the Compliment System.				1,2		
III	<b>Antimicrobial Resistance</b> -MDR,XDR,PDR -Risk factor for Antimicrobial resistance -Control measures.	6	Students will be made to Understand about the Antimicrobial Resistance and the control measures				1,2		
IV	<b>Antigen-antibody reactions:</b> -Agglutination -Precipitation -Complement fixation -Immunofluorescence	6	Students will Be made to Understand Antigen antibody reactions				1,2		
V	<b>Introduction to Mycology:</b> -Classification of fungus. -Medically important Fungi	4	Basic knowledge about Mycology				1,2		
Practical	-Germ tube technique -KOH mount -Calcofluor staining -Antimicrobial sensitivity testing (AST): Diffusion methods	64	Student will be made to understand Germ tube, AST, Serological tests, etc.				1,2, 3,4		

	Dilution methods Serological tests: -Widal test, Weiffelixtest, HBsAg Detection -Biomedical waste Management -Handling Laboratory Accidents			
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**TEXT BOOKS:**

1. T1: Textbook of Microbiology by CP Baveja, 7<sup>th</sup> edition.

**REFERENCE BOOKS:**

1. R1: Reference: Textbook of microbiology and immunology by S.C. Parija
2. R2: Microbiology by Prescott, Harley, Kleis
3. R3: Textbook of Microbiology by Ananthanarayan and Paniker.

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Students will learn about Communicable diseases and non-Communicable diseases.	<b>1,2</b>
<b>2</b>	Understanding the Compliment system	<b>1,2</b>
<b>3</b>	Students will be made to understand about the Antimicrobial resistance and the control measures.	<b>1,2,3,4</b>
<b>4</b>	Students will be made to understand Antigen-antibody reactions.	<b>1,2</b>
<b>5</b>	Basic knowledge about Mycology.	<b>1,2</b>

SEMESTER – II									
Course Title	INTRODUCTION TO BLOOD BANKING								
Course code	22MMLT123R	Total credits: 4 Total hours: (T)32+(P) 64	L	T	P	S	R	O/F	C
			2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Program	Master of Science in Medical Laboratory Technology								
Semester	Second								
Course Objectives (Minimum 3)	1. Recall the different blood group systems and genetics and indicate the different types of blood product and their uses 2. Identify and categorize different types of anticoagulants used to store blood 3. Build strong basics in different types of immune-hematological testing in blood centers.								
CO1	Understand the basics of Immuno- Hematology, Blood groups, and genetics								
CO2	Explain the types of blood components and their indications for transfusion								
CO3	Understand, evaluate, demonstrate, and classify the different types of Antigen-antibody reactions in Immuno- hematological testing								
CO4	Understand the basic knowledge about Anticoagulants used to store blood								
CO5	Elaborate on Blood group systems -ABO system, Rh, MNS, Bombay blood group								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	History of Transfusion Medicine Blood group systems ABO, Rh – genetics	6	Understand the different Blood group systems, Elaborate on the ABO and Rh blood group system				L1, L2,		
II	<b>Blood components</b> Types, Indications Preparation of blood	5	Describe the different Blood components, Discuss on Indications and Preparation of blood components				L1, L2,		
III	<b>Blood donation</b> Donor registration, Donor Selection and Phlebotomy. Adverse donor reaction Transfusion-Transmitted Infectious Diseases and Disease Agents	6	Understand and explain the blood donation procedures, evaluate the Transfusion-Transmitted Infectious Diseases and Disease Agents				L1, L2,L4		
IV	<b>Blood storage</b> Anticoagulants used to store blood Changes occurring in the stored blood	6	Understand the basic knowledge about Anticoagulants used to store blood				L1, L2, L3		
V	<b>Basic immune hematology</b> Antigen–antibody reactions ABO system- Forward grouping, reverse group Coomb’s test – Application – DCT, ICT Compatibility testing – Major,	8	Describe and evaluate the basic immune-haematological testing, remember and analyse and classify different blood components Eg: ABO Forward grouping, reverse group, Coomb’s test, etc				L1, L2, L3, L4,L5		

	Minor			
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Blood grouping – ABO grouping, Forward grouping (slide &amp; tube method)</li> <li>2. Reverse grouping – preparation of pooled A, B &amp; O cells</li> <li>3. Grading of Reaction. Other methods of grouping.</li> <li>4. Rh grouping &amp; Rh typing (slide &amp; tube method)</li> <li>5. Du Testing</li> <li>6. Direct and Indirect , Preparation of Coomb's Control Cells</li> <li>7. Compatibility Testing</li> <li>8. Selection of blood</li> <li>9. Crossmatching Technique – Major, Minor, Saline, Albumin, Coomb's</li> <li>10. Emergency –Cross matches</li> <li>11. Blood Collection</li> <li>12. Donor selection</li> <li>13. Blood collection [Phlebotomy]</li> <li>14. Post-donation Care</li> <li>15. Cross-matching in Special Situations</li> <li>16. Investigation of Blood Transfusion reaction</li> </ol>	<b>64</b>		

**TEXTBOOKS:**

1. **T1:** Mollison's blood transfusion in clinical medicine, Harvey G. Klein MD Chief, Department of Transfusion Medicine 12th edition
2. **T2:** Modern blood banking & Transfusion Practices Sixth edition
3. **T3:** Transfusion medicine technical manual directorate General of health services ministry of health and Family Welfare Government of India, New Delhi Second Edition 2003

**REFERENCE BOOKS:**

1. **R1:** Blood banking and transfusion medicine, basic principles and practice, hullyersilbersteinesAndersonRoback 2nd edition
2. **R2:** <https://www.ncbi.nlm.nih.gov/books/NBK233081/>
3. **R3:** <https://www.ncbi.nlm.nih.gov/books/NBK499824/>

## RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the basics of Immuno- Hematology, Blood groups, and genetics	<b>1,2,3,4,5</b>
<b>2</b>	Explain the types of blood components and their indications for transfusion	<b>1,2,3,4,5,6,7</b>
<b>3</b>	Understand, evaluate, demonstrate, and classify the different types of Antigen-antibody reactions in Immuno-hematological testing	<b>2,3,4,8</b>
<b>4</b>	Understand the basic knowledge about Anticoagulants used to store blood	<b>2,3,4</b>
<b>5</b>	Elaborate on Blood group systems -ABO system, Rh, MNS, Bombay blood group	<b>1,2,3</b>

**SEMESTER – II**

<b>SEMESTER – II</b>									
<b>Course Title</b>	<b>QUALITY MANAGEMENT (Techno Professional Skills)</b>								
<b>Course code</b>	<b>22MMLT126R</b>	<b>Total credits: 2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 64P</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>MEDICAL LABORATORY TECHNOLOGY</b>								
<b>Semester</b>	<b>Fall/ II semester of first year of the programme</b>								
<b>Course Objectives</b>	1. Understanding the principles and applications of total quality management, emphasizing its relevance in laboratory settings. 2. To learn the importance of precision and adherence to established standards while executing laboratory processes. 3. Implement and manage quality assurance practices to ensure consistency and excellence in laboratory operations.								
<b>CO1</b>	Understanding of the total quality management framework, emphasizing its core principles and applications.								
<b>CO2</b>	Executing quality laboratory processes, emphasizing precision and adherence to established standards.								
<b>CO3</b>	Implement and manage quality assurance practices, ensuring consistency and excellence in processes.								
<b>CO4</b>	Systemic evaluation and assessment of quality standards, ensuring adherence and continual improvement.								
<b>CO5</b>	Elaborate on Blood group systems- ABO systems, Rh, MNS, Bombay blood group.								
<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>Introduction to total quality management framework</b>  QLP (Quality laboratory Processes) QAS (Quality Assurance) QA (Quality Assessment) QC (Quality Control)	<b>12</b>	To know the basics of quality management framework.				1,2		
<b>II</b>	<b>Quality laboratory Processes</b>  Maintenance of all equipment. Maintenance of standard operation procedures (SOPs). Record of standardization and validation of reagents and diagnostic kits.	<b>14</b>	To learn the maintenance of different equipment, reagents, diagnostic kits and its SOPs.				3,4		
<b>III</b>	Quality Assurance Commitment Facilities and resources Technical competence Technical procedures Problem solving mechanism	<b>12</b>	It will give knowledge on providing desired level of quality in a service.				3,4		
<b>IV</b>	Quality Assessment Monitoring of laboratory performances	<b>10</b>	To get basic idea on quality assessment of different test				3,4, 5		



	Specimen identification Test utility.		carried out in a laboratory.	
<b>V</b>	<b>Quality Control (Process control)</b> Sample management Collection and preservation Essential information for the test request form Sample processing Rejection of sample Recordkeeping	<b>16</b>	To learn and pay attention to the quality in every stage of the process.	3,4, 5

### TEXT BOOKS:

A textbook of Medical laboratory technology by PrafulB.Godkar and Darshan P.Godkar

### REFERENCE BOOKS:

- Laboratory management (Quality in Laboratory Diagnosis) by CandisA. Kinkus
- A text book of quality control and Quality assurance by Deepanti Gajjar, Ashish Budhrani, Dr.Md.Rageeb Md.Usman, Dr.Dilpreet Singh.
- A text book of Medical laboratory technology by PrafulB.GodkarandDarshanP.Godkar.Vol.1
- Total quality management-principles and practice by S.K.Mandal.

### OTHER LEARNING RESOURCES:

Quality management in healthcare: The pivotal desideratum - PMC (nih.gov)

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding of the total quality management framework, emphasizing its core principles and applications	1,2,3,6
2	Executing quality laboratory processes, emphasizing precision and adherence to established standards	2,3
3	Implement and manage quality assurance practices, ensuring consistency and excellence in processes.	3,6,7
4	Systemic evaluation and assessment of quality standards, ensuring adherence and continual improvement.	2,3,4,5,6,7
5	Elaborate on Blood group systems- ABO systems, Rh, MNS, Bombay blood group.	1,2,3,4

SEMESTER – II									
Course Title	Mini Research (Research Gap Analysis-R2)								
Course code	22MMLT127R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 32	0	0	0	4	16	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MEDICAL LABORATORY TECHNOLOGY								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	1. Ability to design, conduct, and analyze scientific research in medical laboratory technology. 2. Knowledge to practical laboratory problems using current scientific literature. 3. Foster critical thinking and problem-solving skills by identifying knowledge gaps and testing research hypotheses.								
CO1	Understand and implement a plan to bridge the gap								
CO2	Find the gap and evaluate solutions.								
CO3	Identify the ideal future state/action plan								
CO4	To analyse the current state/work of research								
CO5	To implement the strategies to meet the research gap under supervision.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction, Comprehension on Research search engines, Selection of Topic	7	Describe, illustrate and explain To get skills choose topic of their Interested Field.					1,2	
II	Tools for reference citation, Different methods for writing citation and references,	4	Describe, illustrate and explain skill to set up project works					2,3	
III	Review and specific features of review, Plagiarism, ethnical issue In Writing the review,	8	Describe, illustrate and explain write review of literature and how to check Plagiarism, ethnical issue					3,4	
IV	Mapping and selection of Journal of specific knowledge of discipline	8	Describe, illustrate and explain to select various objectives.					2,3	
V	Submission for publications	5	Describe, illustrate and explain for publications					3,4, 5	

**TEXT BOOKS:**

T1- Boyle JS. Styles of ethnography. In: JM Morse, editor. Critical issues in qualitative research methods

**REFERENCE BOOKS:** Internet sources and various journals

SEMESTER – III									
Course Title	RESEARCH ETHICS								
Course code	22UMRE214R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 30P	0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	All PG Programme								
Semester	Fall/ II semester of first year of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>1. This course aims to lay a foundation for empirical research in medical laboratory technology.</li> <li>2. It makes students aware of relevant guidelines, policies, and codes related to ethical research.</li> <li>3. The course provides an understanding of ethical theories and concepts through comprehensive study.</li> </ol>								
CO1	Able to describe and apply the ories and methods in ethics and research ethics								
CO2	Acquire an overview of important tissues in research ethics, like responsibility for research, ethical vetting, and scientific misconduct.								
CO3	Acquire skills of presenting arguments and results of ethical inquiries.								
CO4	Able to Identify the concepts and procedures of sampling, data collection, analysis and reporting								
CO5	Equip with the skills and knowledge necessary to navigate and utilize research databases and metrics effectively in their research endeavours.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	<p><b>ETHICS and SCIENTIFIC CONDUCT:</b>  Introduction to the course and each other; an introduction to moral theory. Ethics: definition, moral philosophy, nature of moral judgements and reactions. Research regulation; self – regulation; research ethics. Honesty, candour, compromise, and integrity. Data ownership and stewardship; conflicts of interest; collaboration. Human and Non-Human subjects. Research and researchers in society</p> <p>-Ethics with respect to science and research. Intellectual honesty and research integrity. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP). Redundant publications: duplicate and overlapping publications, salami slicing. Selective reporting and misrepresentation of data.</p>	8	Describe, explain and classify the ethics and scientific conduct in research.				3,4		

<b>II</b>	<b>PUBLICATION ETHICS-</b> Publication ethics: definition, introduction, and importance. Best practices / standards setting initiatives and guidelines: COPE, WAME, etc. Conflicts of interest. Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types. Violation of publication ethics, authorship, and contributor ship. Identification of publication misconduct, complaints, and appeals. Predatory publishers and journals.	<b>4</b>	Describe and explain the importance of ethics for publication of a research paper	3,4
<b>III</b>	<b>OPEN ACCESS PUBLISHING-</b> Open access publications and initiatives. SHERPA/RoME0 online resource to check publisher copyright & self-archiving policies. Software tool to identify predatory publications developed by SPPU. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc	<b>4</b>	Describe and explain the policies related to copyrights using various tools.	3,4
<b>IV</b>	<b>PUBLICATION MISCONDUCT</b> Group Discussions; Subject specific ethical issues, FFP, authorship. Conflicts of interest. Complaints and appeals: examples and fraud from India and abroad. Software tools; Use of plagiarism software like Turnitin, Urkund and other open-source software tools.	<b>4</b>	Describe and explain the software tools for any misconduct during publication	3,4
<b>V</b>	<b>DATABASES AND RESEARCH METRICS</b> –Databases: Indexing databases. Citation databases: Web of Science, Scopus, etc. Research Metrics: Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score. Metrics: h-index, g index, I 10 index, altmetrics.	<b>7</b>	Describe and explain the metrics and databases on research	3,4

### **TEXTBOOKS:**

T1: Bird, A (2006). Philosophy of Science. Routledge.

T2: MacIntyre, Alasdair (1967) A Short History of Ethics. London.

T3: Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance (2019)

### **REFERENCEBOOKS:**

1. National Academy of Science, National Academy of Engineering and Institute of Medicine(2009). On Being a Scientist: A Guide of Responsible Conduct in Research: Third Edition, National academics Press

2. GeorgeR,(2011).SociologicalTheory,RawatPublication,NewDelhi,India.GeorgeR,(2019).PostModernSocialTheory,RawatPublication,NewDelhi,India.

#### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Able to describe and apply theories and methods in ethics and research ethics	<b>2,4,7</b>
<b>2</b>	Acquire an overview of important tissues in research ethics, like responsibility for research, ethical vetting, and scientific misconduct.	<b>2,4,7</b>
<b>3</b>	Acquire skills of presenting arguments and results of ethical inquiries.	<b>2,4,7</b>
<b>4</b>	Able to Identify the concepts and procedures of sampling, data collection, analysis and reporting	<b>2,4,7</b>
<b>5</b>	Equip with the skills and knowledge necessary to navigate and utilize research databases and metrics effectively in their research endeavours.	<b>2,4,7</b>

SEMESTER – III									
Course Title	CORPORATE PROFICIENCY (Communicative English & Soft Skills)								
Course code	22UMPD211R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 75	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Fall/ III semester of first year of the programme								
Course Objectives (Minimum 3)	1. To acquaint students with the various tools of an effective presentation. 2. To acquire the speaking skill instruct, influence, engage, educate, or appease the listeners. 3. To increase proficiency, present ability and quality of resume and provide guidance for self-promotion and self-evaluation in social media								
CO1	It will prepare the learners to speak with greater control and char is main front of others.								
CO2	It will have appositive impact in the rethought process and problem-solving skills.								
CO3	It will arm the students with all the necessary tools and skill sets to prepare professional resume. They will learn to highlight and assess themselves in social media.								
CO4	It will impart in them techniques to solve critical problems in an interview, develop strategies to crack interviews, improve their communication skills, and boost their confidence.								
CO5	It will able to learn research paper–writing Skills and mock Interview								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	<b>Module1-Presentation Skills</b> i. Introduction ii. Essential characteristics of a good presentation iii. Preparation of a good presentation	7	Describe and explain about the Presentation Skills, Preparation of a good presentation.	1,2					
II	<b>Module2-Public Skills</b> i. Fear of Public Speaking, Understanding and Overcoming Fear of Public Speaking, iii. Confidence and Control, iv. Physiology and Stress-Control/Process, v. Tips for Presentations and Public Speaking, Tips for Using Visual Aids in Presentations, vii. Process for Preparing and Creating Presentations, viii. Delivering Presentations Successfully, Doubt Clearing and Summary of Main Points	10	Describe and explain about the Fear of Public Speaking	1,2					
III	<b>Module3-Practical session on Resume, Curriculum Vitae, Writing cover letter&amp; Linked In Profile</b> i. Preparation, submission & screening of	10	Describe and explain about the Practical session on Resume, Curriculum Vitae, Writing cover letter& Linked InProfile.	1,2					

	<p>Resume.</p> <p>ii. Practical session on cover letter screening session</p> <p>iii. Creating a profile on LinkedIn</p> <p>How to utilize it</p>			
<b>IV</b>	<p><b>Module 4-Leadership &amp; Management Skills and Module 5- Research Paper-Writing Skills</b></p> <p>i. Concepts of Leadership,</p> <p>ii. Leadership Styles,</p> <p>iii. Manager VS Leader,</p> <p>iv. How to be an Effective Leader,</p> <p>v. Mock/Practice Session,</p> <p>Doubt Clearing Session</p> <p><b>Module 5-Research Paper-Writing Skills</b></p> <p>i. How to write a research paper</p> <p>ii. Key point in Research Work</p>	<b>18</b>	Describe and explain of Leadership & Management Skills and Research Paper-Writing Skills	1,2
<b>V</b>	<p><b>Module6- Interview Skills &amp; Dress code Ethics and Module7-Mock Interview</b></p> <p>i. Types of the interview-telephonic, virtual &amp; face to face</p> <p>ii. Online interview, personal interview,</p> <p>iii. Panel interview,</p> <p>iv. Group interview,</p> <p>v. JAM session,</p> <p>vi. Types of interview questions traditional/common interview questions,</p> <p>vii. Case interview questions,</p> <p>viii. General Strategies for an wearing questions,</p> <p>ix. Marketing your skills and experiences,</p> <p>x. Preparation before the interview,</p> <p>xi. How to dress up for an interview,</p> <p>xii. How to maintain eye contact and positive body language,</p> <p>xiii. How to be presentable,</p> <p>xiv. Interviewed osanddon'ts,</p> <p>xv. Introduction to Dress Code Ethics,</p> <p>xvi. Purpose and Importance</p> <p>xvii. How to Make 'FIRST IMPRESSION'</p> <p>xviii. What to Wear During Interviews or Any Other Formal Meetings-Male &amp; Female</p> <p><b>Module7-Mock Interview</b></p> <p>i. Practical Mock Interview,</p> <p>ii. Feedback-Receiving Feedback,</p> <p>iii. Giving Feedback,</p> <p>iv. Advantages of Effective Feedback,</p> <p>How to deal with negative feedback</p>	<b>30</b>	Describe and explain of-Interview Skills & Dress code Ethics and Mock Interview	1,2

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Text Books:

1. Barrett, Grant.2016.Perfect English Grammar: The Indispensible Guide to Excellent Writing and Speaking, Zephyros Press.
2. Mc Dowell, Gayle Laakmann.2008.Cracking the Coding Interview (Indian Edition).

Reference Books:

1. Garg. ManojKr. (2018)English Communication: Theory and Practical

Other Learning Resources:

1. <https://brightlinkprep.com/10-best-toefl-prep-books/>
2. <https://files.eric.ed.gov/fulltext/EJ1132742.pdf>



SEMESTER – III									
Course Title	ADVANCED HEMATOLOGY								
Course code	22MMLT214R	Total credits: 8 Total hours: 64(T)+128P)	L	T	P	S	R	O/F	C
			4	0	8	0	0	0	8
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Masters of Medical laboratory technology								
Semester	Fall/ III semester of second year of the programme								
Course Objectives (Minimum 3)	<p>1. The students will be taught to understand the Origin, development, function, fate of blood cells, disorders of Red blood cells and white Blood cells.</p> <p>2. The students will have knowledge on Plasma cell myeloma and laboratory investigations.</p> <p>3. The students will understand to Elaborate on the Pathogenesis, Clinical feature on Vascular disorders, Platelet disorders, coagulation</p>								
CO1	Demonstrate knowledge acquisition regarding hematopoietic stem cells and the synthesis of cell formations.								
CO2	Evaluate and diagnose different types of anemia in the laboratory.								
CO3	Analyze the types and diagnose Leukemias.								
CO4	Understand various types of platelet disorders and conduct laboratory investigations for diagnosis.								
CO5	Examine thrombotic disorders and plasma cell disorders along with their laboratory investigations.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	General aspects of blood, Cells formation. Synthesis and types of hemoglobin. <b>Basic aspects of anaemia</b> Classification, pathophysiology and clinical features of anemia Investigation of Anemia in general. <b>Microcytic anaemias:</b> Sidero blastic anemia, Anaemiaof chronic infection. Haemoglobinopathies Thalassaemia, Iron deficiency anaemia.		13	Describe ,illustrate and explain The formation of blood cells and aspects of anaemia its classification based on the microcytic and various special test for anemias .					1,2
II	<b>MacrocyticAnaemias</b> Megaloblastic anaemia Pernicious anaemia Non Megaloblastic Anemia. <b>Normocytic normo chronic anaemia.</b> Anaemia in systemic disorders Acute blood loss, Renal failure Liver disorders etc. Haemolytic anaemia Polycythaemia <b>Haemorrhagic disorders:</b> Definition Pathogenesis and clinical features. Classification of Vascular disorders, platelet disorders, Coagulation disorders.		13	Describe, illustrate and explain About macrocytic, anemias, Normo cyticnormo chromican aemia and various hemorrhagic disorders and its laboratory diagnosis.					1,2
III	<b>Leucocyte disorders:</b> Leukemia, types and Cytochemical investigations for Leukemias. Leukopenia Leucocytosis. Leukemoid		12	Describe, illustrate and explain the Various white blood cell disorders and various cyto-chemical stains					1,2

	reaction, Myelodysplastic syndrome (MDS). Philadelphia chromosome. Leukocyte Alkaline Phosphatase [LAPscore.]		for diagnosis of leukemia.	
<b>IV</b>	<p>Plasma cell disorders-</p> <p><b>Quantitative platelet disorders:</b> Thrombocytopenia: Definition, Etiology, Lab Investigations, ITP Classification, Clinical, features, Diagnosis and B.M findings in ITP.</p> <p><b>Qualitative platelet disorders.</b> Thrombocytosis- Definition, Etiology, Lab Investigations.</p> <p><b>Coagulation disorders</b> Inherited- Haemophilia A and B Von Willebrand's disease Acquired; Vit.K deficiency, Liver disease, DIC Tests of vascular and platelet function. Bone Marrow examination Tests for coagulation disorders: Screening tests- First line tests. Second line tests – Mixing experiments. Coagulation factor assay. Urea solubility tests for Factor XIII Factor VIII inhibitor study. Fibrinogen assay Disseminated intra vascular coagulation- Definition, Pathogenesis, laboratory investigations</p>	<b>12</b>	Describe, illustrate and explain the quantitative and qualitative platelet disorders its clinical features and laboratory diagnosis of platelet disorders.	1,2
<b>V</b>	<p>Thrombotic disorders: Classification-Inherited and Acquired. Clinical features, Investigation of thrombotic disorders: Tests i. Protein C ii. Protein S iii. AT-III iv. Factor V Leiden v. Anti phospholipid antibody syndrome vi. Definition clinical feature laboratory investigation.</p>	<b>14</b>	Describe, illustrate and explain about thrombotic disorders its investigations and special test for diagnosis of thrombosis.	1,2
<b>Practical I</b>	<ol style="list-style-type: none"> <li>1. Staining and Interpretation of Peripheral smears.</li> <li>2. Microcytic hypo chromic anaemia-</li> <li>3. Peripheral smear, bone marrow Examination iron.</li> <li>4. Serum Total iron binding capacity [TIBC] bone marrow .Iron stain.</li> <li>5. Macrocytic Anaemia-Peripheral smear, bone marrow. Examination,</li> <li>6. VitB12 assay, Folate assay, Schilling Test.</li> <li>7. Plasma Hb Estimation Haemolytic</li> </ol>	<b>128</b>	Describe, illustrate and explain various haematological techniques and carry out microscopic examination.	1,2, 3,4

	<p>Workup Peripheral smear – specific morphologic abnormalities Special tests</p> <ul style="list-style-type: none"> <li>a) Osmotic fragility test</li> <li>b) Sickling test</li> <li>c) Kleihaueracidelution test</li> <li>c) Alkalide naturation Test</li> <li>e) Ham’s test, Sucrose lysis test</li> <li>f) Coomb’s test</li> <li>g) Electrophoresis– HbF, HbA2 estimation</li> <li>h) Tests for G-6PD deficiency</li> </ul> <p>Leukaemias:</p> <ul style="list-style-type: none"> <li>i. Myeloperoxidase</li> <li>ii. Periodic Acid Phosphatase[PAS]</li> <li>iii. Sudan Black</li> <li>iv. Esterase, Non specificesterse</li> <li>v. Leucocyte alkaline Phsophatase</li> </ul> <p>Tests for coagulation disordrs: Screening tests</p> <ul style="list-style-type: none"> <li>– First linetests- Prothrombin time (PT), Activated partial thromtime(APTT), Thrombintime(TT), INR.</li> </ul>			
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**TEXT BOOKS:**

1. T1: Text book of Pathology (Sixth Edition) –By Harsh Mohan
2. T2:Essential of clinical pathology -Shirish M Kawthalkar

**REFERENCE BOOKS:**

1. R1: Clinical Haematology Principles, procedure, correletions by E. Anne Stiene Martin, Cheryl A. Lotspiech –steininger, John A. Koepke.
2. R2: Clinical Haematology in Medical Practice – de Gruchy
3. R3: Medical Laboratory Technology Methods & interpretation – RamnikSood

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/books/NBK593683/>

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Demonstrate knowledge acquisition regarding hematopoietic stem cells and the synthesis of cell formations.	<b>1,2,3</b>
<b>2</b>	Evaluate and diagnose different types of anemia in the laboratory.	<b>3,8</b>
<b>3</b>	Analyze the types and diagnose Leukemias.	<b>5,3,2</b>
<b>4</b>	Understand various types of platelet disorders and conduct laboratory investigations for diagnosis.	<b>1,3</b>
<b>5</b>	Examine thrombotic disorders and plasma cell disorders along with their laboratory investigations.	<b>2,3,8</b>

**SEMESTER – III**

<b>SEMESTER – III</b>									
<b>Course Title</b>	<b>ADVANCED BLOODBANKING</b>								
<b>Course code</b>	<b>22MMLT215R</b>	<b>Total credits: 8</b> <b>Total hours:</b> <b>(T)64+128 (P)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			4	0	8	0	0	0	8
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Program me</b>	<b>Master of Science in Medical laboratory Science</b>								
<b>Semester</b>	<b>Third</b>								
<b>Course</b>	1. Recall the different blood group systems and genetics and indicate the different types of blood								

<b>Objectives (Minimum 3)</b>	product and their uses, Identify and categorize different types of anticoagulants used to store blood, 2. Build a strong knowledge on the medicolegal aspects of blood transfusion centers., 3. Understand the importance of apheresis and explore the future trends in blood transfusion practices.			
<b>CO1</b>	Understand the basics of Immuno- Hematology, Blood groups, and genetics			
<b>CO2</b>	Explain the types of blood components and their indications for transfusion, evaluate hemapheresis.			
<b>CO3</b>	Understand, evaluate, demonstrate, and classify the different types of Antigen-antibody reactions in Immuno-hematological testing			
<b>CO4</b>	Understand the basic knowledge about Anticoagulants used to store blood, quality assurance in blood centers.			
<b>CO5</b>	Elaborate on Blood group systems -ABO system, Rh, MNS, Bombay blood group, understand and apply the laws and orders concerning blood transfusion.			
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>	<b>KL</b>
<b>I</b>	<b>Immuno Haematology:</b> Blood groups and genetics, ABO System – ABO subgroups Bombay group, secretors, non-secretors. Rh system – Importance of the Rh system Du red cells (A variant of the Rh system) MNS System – clinical significance Coomb’s test – Application – DCT, ICT Rh antibody testing , Compatibility testing – Major, Minor.	<b>14</b>	Understand and Explain the basic Introduction to Immuno- Hematology, Systems and genetics, Rh system, Bombay group, classify and compare secretors, non- secretors	L1, L2
<b>II</b>	<b>Blood transfusion</b> Indications for blood transfusion Autologous transfusion, Transfusion transmitted disease, Haemolytic disease of the newborn and transfusion Transfusion Therapy, Transfusion in Special Situations, Autoimmune haemolytic anemia Transfusion reactions and investigation of transfusion reaction	<b>10</b>	Elaborate Understand and Explain on the different blood components and their indication. Amend a Comprehensive knowledge on Transfusion transmitted disease, HDN, AIHA and evaluate/analyze the condition.	L1, L2, L3, L4
<b>III</b>	<b>Blood donation</b> Donor Registration, Donor selection, Blood collection, Adverse donor reaction <b>Anticoagulants</b> used to store blood Changes occurring in the stored blood <b>Blood components</b> – Indications, Preparation of blood components	<b>10</b>	Understand the basic knowledge about Anticoagulants used to store blood	L1, L2, L3, L4
<b>IV</b>	Immunomodulation and graft versus host reaction <b>Haemapheresis</b> Definition, Types of Apheresis, Machines and Techniques. Tissue banking, Cord blood banking Stem cell processing, storage, and transplantation.	<b>15</b>	Elaborate on the practices of hemapheresis, understand techniques, types and machines and Medico legal aspects of	L1, L2, L3, L4

	Disposal of wastes and biologically hazardous substances in the blood bank Medico-legal aspects of blood transfusion Technical advances and future trends in blood bank Orientation of a routine blood bank		blood transfusion.	
<b>V</b>	Quality Assurance -General condition, Equipment Reagents, Donor processing, Drugs control regulation and Blood Bank	<b>15</b>	Comprehend on the quality assurance, apply the quality control procedures, analyse the quality control protocol.	L1, L2, L3, L4, L5
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. Blood grouping – ABO grouping, Forward grouping (slide &amp; tube method)</li> <li>2. Reverse grouping – preparation of pooled A, B &amp; O cells</li> <li>3. Grading of Reaction. Other methods of grouping.</li> <li>4. ABO antibody titration, Cold antibody titration.</li> <li>5. Rh grouping &amp; Rh typing (slide &amp; tube method)</li> <li>6. Du Testing</li> <li>7. Rh antibody titration</li> <li><b>8. Antiglobulin Testing</b></li> <li>9. Direct and Indirect</li> <li>10. Preparation of Coomb's Control Cells.</li> <li><b>11. Compatibility Testing</b></li> <li>12. Selection of blood</li> <li>13. <b>Crossmatching Technique</b> – Major, Minor, Saline, Albumin,</li> <li>14. Emergency –Cross matches</li> <li>15. Blood Collection</li> <li>16. Donor selection</li> <li>17. Blood collection [Phlebotomy]</li> <li>18. Post-donation Care</li> <li>19. Preservation and Storage of blood</li> <li><b>20. Preparation and Storage of Blood Components</b></li> <li>21. Packed Cells, Fresh Frozen plasma [FFP], Platelet Concentrate, Cryoprecipitate</li> <li>22. Component transfusion – selection of blood group</li> <li>23. Cross matching in Special Situations</li> <li>24. Exchange transfusion – selection of blood group</li> <li>25. Autoimmune haemolytic anaemia</li> <li>26. Investigation of Blood Transfusion reaction</li> <li>27. <b>Testing for transfusion Transmitted Diseases</b> Elisa-HIV, HBsAg, HCV, VDRL Test, Malaria</li> <li><b>28. Quality control – Methods</b></li> </ol>	<b>128</b>		



	i. Reagents ii. Test methods iii. Products iv. Documents v. Equipment 29. Apheresis procedures - Types of pheresis, Machines, and Techniques. 30. Biomedical Waste Management – Demonstration 31. Record keeping – To be observe 32. Documentation			
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**TEXTBOOKS:**

1. **T1:**Mollison’s blood transfusion in clinical medicine, Harvey G. Klein MD Chief, Department of Transfusion Medicine 12th edition
2. **T2:**Modern blood banking &Transfusion Practices Sixth edition
3. **T3:**Transfusion medicine technical manual directorate General of health services ministry of health and Family Welfare Government of India, New Delhi Second Edition 2003

**REFERENCE BOOKS:**

1. **R1:** Blood banking and transfusion medicine, basic principles and practice, hullyersilbersteines Anderson Roback 2nd edition

**OTHER LEARNING RESOURCES:**

1. <https://www.ncbi.nlm.nih.gov/books/NBK233081/>
2. <https://www.ncbi.nlm.nih.gov/books/NBK499824/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understand the basics of Immuno- Hematology, Blood groups, and genetics	<b>1,2,3,4,</b>
<b>2</b>	Explain the types of blood components and their indications for transfusion, evaluate hemapheresis.	<b>1,2,3,4,7,8</b>
<b>3</b>	Understand, evaluate, demonstrate, and classify the different types of Antigen-antibody reactions in Immuno-hematological testing	<b>2,3,4,5,6,8</b>

<b>4</b>	Understand the basic knowledge about Anticoagulants used to store blood, quality assurance in blood centers.	<b>2,3,4,8</b>
<b>5</b>	Elaborate on Blood group systems -ABO system, Rh, MNS, Bombay blood group, understand and apply the laws and orders concerning blood transfusion.	<b>1,2,7,8</b>

<b>Course Title</b>	<b>MEDICAL MICROBIOLOGY</b>								
<b>Course code</b>	<b>23MMLT216R</b>	<b>Total credits: 8</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
		<b>Total hours: 64T+128P</b>	<b>4</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>MMLT</b>								
<b>Semester</b>	<b>THIRDSEMESTER</b>								
<b>Course Objectives (Minimum 3)</b>	1. The students will understand and study about bacteria and virology 2. The student will be taught in detail about parasitological and mycology 3. The students will understand the depth knowledge on Quality control in microbiology								
<b>CO1</b>	Analyze the epidemiology, pathogenesis, antigenic characteristics, and laboratory diagnosis of diseases caused by bacteria.								
<b>CO2</b>	Classify and understand different types of viruses.								
<b>CO3</b>	Evaluate the characteristics and laboratory diagnosis of diseases caused by parasites								
<b>CO4</b>	Demonstrate comprehensive knowledge about mycology.								
<b>CO5</b>	Apply in-depth knowledge to assess and implement quality control in microbiology.								
<b>Unit- No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>				<b>KL</b>		
<b>I</b>	<b>BACTERIOLOGY:</b> The epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused by: -Vibriosis, Aeromonas, Plesiomonas -Campylobacter, H.pylori and Spirillum. Pseudomonas, Stenotrophomonas, Burkholderia. -Haemophilus and Bordetella. -Brucella. -Mycobacteria. -Spirochaetes,- Actinomycetes, Nocardia-Mycoplasma.- Rickettsiae.-Chlamydia	<b>20</b>	Describe, illustrate and explain epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused by bacteria.				1,2		
<b>II</b>	<b>VIROLOGY</b> -Poxviruses, -Herpes viruses, -Influenza virus -Adenoviruses	<b>10</b>	Describe, illustrate and explain different types of viruses.				1,2		
<b>III</b>	<b>PARASITOLOGY</b> Protozoan parasites of medical importance: Entamoeba, Giardia, Trichomonas, Leishmania, Trypanosome, Plasmodium, Cryptosporidium, Balantidium, Isospora.	<b>15</b>	Describe, illustrate and explain laboratory diagnosis of disease caused by parasites				1,2		
<b>IV</b>	<b>MYCOLOGY</b> -Themorphology and reproduction of fungi and anti mycotic agents -Contaminant and opportunistic fungi -Fungi causing superficial mycoses and subcutaneous mycoses Fungi causing systemic infections	<b>15</b>	Describe, illustrate and explain comprehensive knowledge about mycology				1,2		
<b>V</b>	<b>QUALITY CONTROL IN MICROBIOLOGY</b>	<b>4</b>	Describe, illustrate and explain on Quality control in microbiology				1,2		

<b>Practical</b>	Slide culture technique, germ tube test, LPCB. -Tests for beta-lactamase including ESBLs. -Nugent's Score for Bacterial vaginosis-MRSA detection methods-Special staining for Protozoan and Helminths identification. -Biofilm detection by Congo Red agar, Tube adherence method, Microtiter plate method.	<b>128</b>	Student will be made to learn and understand slide culture, LPCB, MRSA, Biofilm detection etc.	1,2,3,4
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### TEXT BOOKS:

1. T1: Textbook of Microbiology by CP Baveja, 7<sup>th</sup> edition.

### REFERENCE BOOKS:

1. R1: Reference: Textbook of microbiology and immunology by S.C. Parija
2. R2: Microbiology by Prescott, Harley, Kleis
3. R3: Textbook of Microbiology by Ananthanarayan and Paniker.

### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Analyze the epidemiology, pathogenesis, antigenic characteristics, and laboratory diagnosis of diseases caused by bacteria.	1,2
2	Classify and understand different types of viruses.	1,2,4
3	Evaluate the characteristics and laboratory diagnosis of diseases caused by parasites	1,2,3,4
4	Demonstrate comprehensive knowledge about mycology.	1,2
5	Apply in-depth knowledge to assess and implement quality control in microbiology.	1,2,3,4

SEMESTER – III									
Course Title	DIAGNOSTIC MICROBIOLOGY AND CLINICAL IMMUNOLOGY								
Course code	22MMLT217R	Total credits: 8 Total hours: 64T+128P	L	T	P	S	R	O/F	C
			4	0	8	0	0	0	8
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master in Medical Laboratory Technology								
Semester	Fall/ 3 <sup>rd</sup> semester of the programme								
Course Objectives (Minimum 3)	1. Students will be taught about the Structure and function of the immune system. 2. Summarizing about the Transplant Immunity & Tumor immunity. 3. The student will have comprehensive knowledge on Parasitology, Collection and processing in mycology, Identification and isolation of possible fungal pathogens from clinical samples.								
CO1	Explain the structure and function of the immune system.								
CO2	Summarize the principles of Transplant Immunity and Tumor Immunity.								
CO3	Demonstrate knowledge and understanding of viruses and their infections.								
CO4	Discuss about various chronic illness and its management.								
CO5	Summarize the key concepts in Entomology.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Structure and function of the immune system:</b> -The human immune response -Cells and tissues of the immune system, T and B cell development lymphocyte trafficking -TCR genes, gene products and co-Receptors -Antigens and antigen presentation, super antigens -Cytokines ,cellular adhesion and interactions -Immune regulation <b>Host defense mechanisms and Inflammation:</b> -Immunoglobulin function -Regulatory and effect or functions of CD4+ T lymphocyte -Cytotoxic T cell function, cytotoxic Function of macrophages, NK cell function, Mucosal defense Mechanisms -Function of phagocytes, mast cells, basophil and eosinophil.	20	Describe, illustrate and explain about the Structure and function of the immune system.					1,2	
II	<b>Transplant Immunity &amp;Tumor immunity.</b> - Concepts and challenges in transplantation	15	Describe, illustrate and explain about the Transplant Immunity &Tumor immunity					1,2	

	-The HLA. Major histocompatibility complex -HLA classes, MHC, HLA typing, MHC restriction.			
<b>III</b>	<b>VIROLOGY.</b> -Paramyxoviridae -Enteroviruses: Polio, Echo, Coxsackie viruses -Oncogenic viruses -Viruses of gastroenteritis.	<b>10</b>	Describe, illustrate and explain Knowledge and Understanding about Viruses and their infections.	1,2
<b>IV</b>	<b>PARASITOLOGY</b> Helminthology: <b>Cestodes:</b> Diphyllbothrium, Taenia, Echinococcus, Hymenolepis. <b>Trematoda:</b> Schistosomes, Fasciola, Paragonimus, Clonorchis, Opisthorchis. <b>Nematodes:</b> Trichuris, Trichinella, Strongyloides, Enterobius, Filarial worms	<b>15</b>	Describe, illustrate and explain the comprehensive knowledge about Parasitology	1,2
<b>V</b>	<b>ENTOMOLOGY:</b> Ectoparasites: Common arthropods and other vectors viz., Mosquito, Sand fly Ticks, Mite, and Cyclops	<b>4</b>	Describe, illustrate and explain about Entomology	1,2
<b>Practical</b>	<b>BACTERIOLOGY:</b> Sample collection and selection in microbiology. Selection of media for culture. Pure culture of bacteria: Identification procedure of the given bacteria up to species and subspecies level. a) Escherichia coli b) Klebsiella species c) Vibrio cholera d) Pseudomonas species e) Staphylococcus species f) Streptococcus species g) Corynebacterium diphtheria h) Salmonella species Mixed cultures: Samples: a) Urine b) Pus c) Blood d) CSF e) Stool f) Body Fluids	<b>128</b>	Describe, illustrate and explain staining techniques and microscopic examination.	1,2, 3,4

	<p><b>Evaluating immunological functions:</b> Blood grouping Widal qualitative and quantitative analysis. VDRL, RPR qualitative and quantitative analysis. Detection of specific antibodies and antigens. ELISA In-vitro toxigenicity tests–Elek test, Nagler’s reaction.</p> <p><b>MYCOLOGY:</b> Sample collection and processing in mycology: Identification and isolation of possible fungal pathogens from clinical samples:</p> <ol style="list-style-type: none"> <li>a) CSF</li> <li>b) Urine</li> <li>c) Blood</li> <li>d) Hair, nail, skin scrapings</li> <li>e) Sputum.</li> </ol> <p><b>Disposal of contaminated material like cultures.</b> <b>Maintenance of stock culture.</b> <b>Examination of feces for parasite</b> -Microscopic examination -Concentration method</p>			
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**TEXT BOOKS:**

1. Textbook of Microbiology by C.P Baveja 5<sup>th</sup> Edition
2. Textbook of Microbiology Immunology by Subash Chandra Parija 2<sup>nd</sup> edition.

**REFERENCE BOOKS:**

1. Textbook of Medical Lab Technology– Praful B. Godkar, Darshan P. Godkar 3<sup>rd</sup> edition
2. Ananthanarayan and Paniker, “Textbook of Microbiology 8<sup>th</sup> edition.
3. Textbook of Essentials Microbiology Apurba Sankar Sastry Sandhya Bhat 4<sup>th</sup> edition.

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Explain the structure and function of the immune system.	<b>1,2</b>
<b>2</b>	Summarize the principles of Transplant Immunity and Tumor Immunity.	<b>1,2, 4</b>
<b>3</b>	Demonstrate knowledge and understanding of viruses and their infections.	<b>1, 7</b>
<b>4</b>	Discuss about various chronic illness and its management	<b>1,6,7</b>
<b>5</b>	Summarize the key concepts in Entomology.	<b>4,6,7</b>



**SEMESTER – III**

<b>Course Title</b>	<b>Lab Management(Techno professional skills)</b>								
<b>Course code</b>	<b>22MMLT211R</b>	<b>Total credits: 2</b> <b>Total hours: 64P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>R</b>	<b>O/F</b>	<b>C</b>
			<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Pre-requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>						
<b>Programme</b>	<b>MMLT</b>								
<b>Semester</b>	<b>Fall/ III semester of the programme</b>								
<b>Course Objectives (Minimum 3)</b>	1. Understanding the principles and applications of total quality management, emphasizing its relevance in laboratory settings. 2. To learn the importance of precision and adherence to established standards while executing laboratory processes. 3. Implement and manage quality assurance practices to ensure consistency and excellence in laboratory operations.								
<b>CO1</b>	Understanding of the total quality management framework, emphasizing its core principles and applications.								
<b>CO2</b>	Executing quality laboratory processes, emphasizing precision and adherence to established standards.								
<b>CO3</b>	Implement and manage quality assurance practices, ensuring consistency and excellence in processes.								
<b>CO4</b>	Systemic evaluation and assessment of quality standards, ensuring adherence and continual improvement.								
<b>CO5</b>	Elaborate on Blood group systems- ABO systems, Rh, MNS, Bombay blood group.								
<b>Unit-No.</b>	<b>Content</b>	<b>Contact Hour</b>	<b>Learning Outcome</b>					<b>KL</b>	
<b>I</b>	<b>Lab Managements</b> Introduction, definition and branches of clinical laboratory Level of Managements, Lab management input Administrative Function	<b>18</b>	Describe, illustrate and explain medical laboratories and basics of the important of administrative function.					1,2	
<b>II</b>	<b>Introduction to common laboratory instruments</b> Identification, principle, applications, handling, care and precautions of common laboratory equipment.	<b>14</b>	Describe, illustrate and explain common laboratory instruments.					1,2,3	
<b>III</b>	<b>Quality Control</b> Definition and Importance Quality control Methods for laboratory instruments Levey Jenning Chart(LJ)	<b>12</b>	Describe, illustrate and explain about quality assurance of laboratory instruments.					2,3,4	
<b>IV</b>	<b>Basic Laboratory safety</b> Introduction and its important, Laboratory safety rule, Biological, Hazard.	<b>10</b>	Describe, illustrate and explain Basic Laboratory safety and its important					3,4	
<b>V</b>	<b>Biomedical waste management</b> Definition and its important various type of biomedical waste Segregation of waste, Waste treatment and disposal Waste management Programme	<b>10</b>	Describe, illustrate and explain on Biomedical waste management					3,4,5	

**TEXT BOOKS:**

A textbook of microbiology by Dr.CP Baveja

**REFERENCE BOOKS:**

1. .A text book of microbiology by Dr.CPBaveja
2. Clinical chemistry technique,principles correlation– by MichealL Bishop, EdwardP Fody6<sup>th</sup>edition 2010

**OTHER LEARNING RESOURCES:**

Improving laboratory quality and capacity through leadership and management training: Lessons from Zambia 2016–2018 - PMC (nih.gov)

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding of the total quality management framework, emphasizing its core principles and applications.	<b>1,2,3,4,8</b>
<b>2</b>	Executing quality laboratory processes, emphasizing precision and adherence to established standards	<b>2,3</b>
<b>3</b>	Implement and manage quality assurance practices, ensuring consistency and excellence in processes.	<b>2,3,7</b>
<b>4</b>	Systemic evaluation and assessment of quality standards, ensuring adherence and continual improvement.	<b>2,3,4,6</b>
<b>5</b>	Elaborate on Blood group systems- ABO systems, Rh, MNS, Bombay blood group.	<b>1,2,3</b>

SEMESTER – III									
Course Title	Mini research (survey/experiments) R3								
Course code	22MMLT212R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 32	0	0	6	4	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MEDICAL LABORATORY TECHNOLOGY								
Semester	Fall/ III semester of the programme								
Course Objectives (Minimum 3)	<ol style="list-style-type: none"> <li>To have a basic knowledge and understanding of surveys and experiments in clinical practice.</li> <li>To learn to review and assess scientific literature critically.</li> <li>To write and present an overview of the relevant literature for a specific research topic</li> </ol>								
CO1	Understanding of how survey /experiments can provide useful causal inferences.								
CO2	Knowledge of how to design and analyze simple and complex experiments/ surveys								
CO3	Ability to evaluate experimental research / surveys and apply these methods in their own research.								
CO4	Acquire basic knowledge and understanding in undertaking surveys and experiments into their clinical practice								
CO5	Develop new skills and strategies in designing their survey/Experiments which can be implemented in patient care.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to Surveys as Research Methodology: What is survey research ,Survey strengths, Survey weakness	37	Describe and explain survey strength and weakness .					1,2	
II	Survey Process: Survey design, sample selection, sample size, degree of precision, statistical power, effect size as a determinant of power, survey instrument development, Types of Survey	37	Describe, illustrate and explain survey process required for the research					2,3	
III	Qualitative Methods: Unstructured & Semi- structured Interviewing; Coding Responses to Open-Ended Questions	37	Describe and explain the methods and response to open ended questions					3,4	
IV	Survey Data Processing and Basic Data Analysis	39	Describe and explain the Survey Data Processing and Basic Data Analysis					2,3	
V	Submission for publications	5	Describe, illustrate and explain for publications					3,4, 5	

**TEXT BOOKS:**

T1: McGuire, W. G. (1997). Creative hypothesis generating in psychology: Some useful heuristics. Annual Review of Psychology, 48, 1-30.

**REFERENCE BOOKS:** R1: Fink, A. (2019). Conducting research literature reviews: From the internet to paper. Sage publications.

R2: Cooper, H. (1998). Cooper, Harris, Synthesizing Research: A Guide for Literature Reviews, Thousand Oaks, CA: Sage, 1998.

R3: Hart, C. (2018). Doing a literature review: Releasing the research imagination.

**OTHER LEARNING RESOURCES:****RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Understanding of how survey /experiments can Provide useful causal inferences.	<b>1,2,4,7,8</b>
<b>2</b>	Knowledge of how to design and analyze simple and complex experiments/ surveys	<b>1,2,3,4,7,8</b>
<b>3</b>	Ability to evaluate experimental research / surveys and apply these methods in their own research.	<b>1,2,3,4,7,8</b>
<b>4</b>	Acquire basic knowledge and understanding in undertaking surveys and experiments into their clinical practice	<b>1,2,3,4,7,8</b>
<b>5</b>	Develop new skills and strategies in designing their survey/Experiments which can be implemented in patient care.	<b>1,2,3,4,7,8</b>

SEMESTER – IV									
Course Title	CLINICAL POSTING								
Course code	22MMLT221R	Total credits: 8 Total hours: 128 P	L	T	P	S	R	O/F	C
			0	0	16	0	0	0	8
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MASTER IN MEDICAL LABORATORY TECHNOLOGY								
Semester	Fall/ End semester of the programme								
Course Objectives (Minimum 3)	1. To apply theoretical knowledge acquired in academic coursework to practical scenarios within a diagnostic laboratory setting. 2. To develop and enhance hands-on skills in laboratory techniques, equipment operation, and sample analysis applicable to diagnostic testing. 3. To gain a thorough understanding of the workflow within a diagnostic laboratory, encompassing sample collection, processing, analysis, and result reporting 4. To implement and adhere to quality control measures to ensure the accuracy, precision, and reliability of diagnostic test results.								
<b>CO1</b>	Applied Theoretical Knowledge								
<b>CO2</b>	Practical Laboratory Skills								
<b>CO3</b>	Understanding Laboratory Workflow								
<b>CO4</b>	Ensured Quality Control Practices								
<b>CO5</b>	Collaboration in a Team Environment								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
<b>I</b>	Basic Principles of Diagnostic Testing Interpretation of Laboratory Results Path physiology and its Impact on Diagnostic Results Current Trends in Diagnostic Technologies Case Studies in Diagnostic Medicine	<b>128</b>	Describe, illustrate and explain theoretical knowledge to interpret laboratory results accurately.					1,2	
<b>II</b>	<b>Practical Laboratory Skills:</b> Handling and Operation of Laboratory Equipment. Sample Collection and Preparation Techniques Standard Operating Procedures (SOPs) for Common Tests Safety Protocols in the Laboratory Troubleshooting and Maintenance of Laboratory Instruments		Describe, illustrate and explain collection and preparation following standard protocols.					3,4	
<b>III</b>	<b>Laboratory Workflow:</b> Laboratory Workflow Management Specimen Processing and Management Data Entry and Record-Keeping Practices Turnaround Time Optimization Communication within the Laboratory		Describe, illustrate and explain Process specimens efficiently from collection to result reporting.					2,3	

	Team			
<b>IV</b>	<b>Ensured Quality Control Practices:</b> Quality Control (QC) and Quality Assurance (QA) Principles Implementing QC Procedures in the Laboratory Calibration and Validation of Laboratory Equipment Error Identification and Corrective Actions		Describe, illustrate and explain Identify and rectify errors to maintain high standards of quality.	3,4
<b>V</b>	<b>Collaboration in a Team Environment:</b> Roles and Responsibilities of Laboratory Personnel Effective Communication Skills Collaborative Problem-Solving Techniques		Describe, illustrate and explain perform individual roles within the team framework.	2,3

**TEXT BOOKS**

**T1** Leach DL, Ryman D. Clinical laboratory science: the basics and routine techniques. Clinical Laboratory Science. 2000 Jul 1;13(3):172.

**T2** McPherson RA, Pincus MR. Henry's clinical diagnosis and management by laboratory methods E-book. Elsevier Health Sciences; 2021 Jun 9.

**REFERENCE BOOKS:**

**R1** Estridge BH, Reynolds AP. Basic clinical laboratory techniques. (No Title). 2012.

**R2**Varnadoe LA. Medical laboratory management and supervision. Lionel Varnadoe; 2008.

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/books/NBK535358/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

**CO PO Mapping**  
**SEMESTER – IV**

<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Applied Theoretical Knowledge	<b>1,2</b>
<b>2</b>	Practical Laboratory Skills	<b>2,3</b>
<b>3</b>	Understanding Laboratory Workflow	<b>5,6,7</b>
<b>4</b>	Ensured Quality Control Practices	<b>1,2</b>
<b>5</b>	Collaboration in a Team Environment	<b>5,6,7,8</b>

Course Title	Elective course I (Quality control in Diagnostic Lab)								
Course code	22MMLT222R	Total credits: 3 Total hours: 48 P	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MASTER IN MEDICAL LABORATORY TECHNOLOGY								
Semester	Fall/ End semester of the programme								
Course Objectives (Minimum 3)	1. To understand the needs of the quality control Programme. 2. To improve the quality of the laboratory reports. 3. To adopt such practices in day-to-day laboratory practice. 4. To avail global quality control practices for patient safety								
CO1	Preface of Quality control and types.								
CO2	To ascertain sources of various errors in laboratory.								
CO3	Understanding control charts.								
CO4	Outline the basic concepts of Quality circles.								
CO5	Illustrating over all knowledge of Total Quality Management.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction of Quality Control:		10	Describe, illustrate and explain to learn importance of quality control and Types.				1, 2	
	<ul style="list-style-type: none"> <li>Internal quality control</li> <li>External quality control</li> </ul>								
II	Sources of Laboratory errors:		10	Describe, illustrate and explain the different errors and sources.				3, 4	
	<ul style="list-style-type: none"> <li>Pre-analytical phase</li> <li>Analytical phase</li> <li>post analytical phase</li> </ul>								
III	Control charts:		9	Describe, illustrate and explain about control charts.				3, 4	
	<ul style="list-style-type: none"> <li>X-chart and R-chart</li> <li>Control chart for attributes</li> </ul>								
IV	Quality Circles:		9	Describe, illustrate and explain understand quality circles.				3, 4	
	<ul style="list-style-type: none"> <li>Benefits of Quality circle</li> </ul>								
V	Total Quality Management		10	Describe, illustrate and explain to learn economic Improvements.				1, 2	

## TEXT BOOKS

- T1.**Haider SI, As if SE. Quality control training manual: comprehensive training guide for API, finished pharmaceutical and biotechnologies laboratories. CRC Press; 2016 Apr 19.
- T2.**Dasgupta A, Wahed A. Clinical chemistry, immunology and laboratory quality control: a comprehensive review for board preparation, certification and clinical practice.

## REFERENCE BOOKS:



1. **R1.**Gras JM. Laboratory quality control and patient safety. Walter de Gruyter GmbH & Co KG; 2017 Mar 6.
2. **R2.**Bruce AW. Basic quality assurance and quality control in the clinical laboratory. (No Title). 1984.

**OTHER LEARNING RESOURCES:**

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2556587/#:~:text=The%20purpose%20of%20a%20QC,thenthey%20should%20review%20it.>

<https://www.ncbi.nlm.nih.gov/books/NBK305273/>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	To understand the needs of the quality control Programme.	<b>1,2</b>
<b>2</b>	To as certain sources of various errors in laboratory.	<b>2,3</b>
<b>3</b>	Understanding control charts.	<b>1,2</b>
<b>4</b>	Outline the basic concepts of Quality circles.	<b>5,6</b>
<b>5</b>	Illustrating over all knowledge of Total Quality Management.	<b>1,2,3,5,6</b>

SEMESTER – IV									
Course Title	Elective course II (Efficient Teaching Skill)								
Course code	22MMLT223R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 48 P	3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MASTER IN MEDICAL LABORATORY TECHNOLOGY								
Semester	Fall/ End semester of second year of the programme								
Course Objectives (Minimum 3)	1. To understand the concepts of teaching. 2. To learn how to work collaboratively with students. 3. To adopt effective and unique teaching skills.								
CO1	Understand the concept of teaching.								
CO2	Enumerate the importance of group discussion and working as a team with students.								
CO3	Compute the quality of question based learning and lesson plans.								
CO4	Construct the art of teaching and strategies.								
CO5	Explain the important skills in language, communication and contemplate brain storming.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	<b>Concept of teaching</b> <ul style="list-style-type: none"> <li>o Method of teaching</li> <li>o Skill of teaching</li> <li>o Style of teaching</li> </ul>	9	Describe, illustrate and explain the methods, skills and different styles of teaching.					1,2	
II	<b>Teaching skills</b> <ul style="list-style-type: none"> <li>o Practice explicit teaching</li> <li>o Create lesson plans</li> <li>o Question based learning</li> <li>o Classroom discussion</li> </ul>	10	Describe, illustrate and explain how to make lessons and be creative with it.					1, 2,3	
III	<b>Collaborative learning</b> <ul style="list-style-type: none"> <li>o Group discussion</li> <li>o Team work</li> <li>o Team goals</li> </ul>	10	Describe, illustrate and explain how to work as a team with students.					3,4	
IV	<b>Language skills</b> <ul style="list-style-type: none"> <li>o Communication</li> <li>o Learning directly or indirectly</li> </ul>	9	Describe, illustrate and explain the different communication skills.					3,4	
V	<b>Class room culture</b> <ul style="list-style-type: none"> <li>o Insight regarding the level of students</li> <li>o Students will be able to contemplate</li> <li>o Brain storming sessions</li> </ul>	10	Describe, illustrate and explain how to Communicated spite the language barriers					2,3,4	

### TEXT BOOKS

1. T1: Toward G, Henley C, Cope A. The Art of Being a Brilliant Classroom Assistant:(The Art of Being Brilliant series). Crown House Publishing; 2016 Feb 26.
2. T2: Prasad GR. INFORMATIVE LANGUAGE TEACHING: AN INTRODUCTION.

### REFERENCE BOOKS:

1. R1: Stronge JH. Qualities of effective teachers. Ascd; 2018 Mar 21
2. R2: Shukla D, Dungsungnoen AP. Student's Perceived Level and Teachers' Teaching Strategies of Higher Order Thinking Skills: A Study on Higher Educational Institutions in Thailand. Journal of education and Practice. 2016;7(12):211-9.

### OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3724377/>

### RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the concept of teaching.	1,2
2	Enumerate the importance of group discussion and working as a team with students.	2,5,6
3	Compute the quality of question based learning and lesson plans.	1,2
4	Construct the art of teaching and strategies.	1,2

<b>5</b>	Explain the important skills in language, communication and contemplative brain storming.	<b>2,5,6</b>
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	<b>SEMESTER – IV</b>
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MINI-RESEARCH ( Research /Data analysis/documentation-R4)									
Course code	22MMLT224R	Total credits: 3 Total hours: 48 P	L	T	P	S	R	O/F	C
			0	0	0	4	16	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	MASTER IN MEDICAL LABORATORY TECHNOLOGY								
Semester	Fall/ End semester of second year of the programme								
Course Objectives (Minimum 3)	1 Toacquire statistical analysis skills, and enhance data interpretation capabilities for effective analysis. 2 ToConduct in-depth discussions and critical evaluations, and acquire techniques for clear articulation of feature scope. 3 ToUse professional approaches to present the final thesis effectively.								
CO1	Discuss the process of understanding and acquiring statistical analysis skills.								
CO2	Describe methods to enhance data interpretation capabilities for effective analysis.								
CO3	Discuss strategies for conducting in-depth discussions and critical evaluations.								
CO4	Acquire techniques for clear articulation of feature scope.								
CO5	Describe approaches for professionally presenting the final thesis.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Statistical analysis -Introduction to Statistical Concepts	9	Describe, illustrate and explain Implement qualitative, quantitative, and mixed-methods research projects.					1, 2	
II	Data interpretation -Parametric and Non-Parametric Tests: t-tests, ANOVA Chi-square tests - Interpretation of Results: Drawing meaningful conclusions	11	Describe, illustrate and explain data using statistical software, drawing meaningful conclusions.					1, 2,3	
III	Discussion -Implications of findings Addressing limitations	8	Describe, illustrate and explain research findings effectively					3,4	
IV	Future scope of the study - Research Design and Methodology -Emerging Trends in Research -Collaboration and Interdisciplinary Research	11	Describe, illustrate and explain research processes and results clearly and ethically.					3,4	
V	Final presentation of the thesis - Scientific Writing - Effective Oral Presentation - Ethical Considerations in Research Communication	9	Describe, illustrate and explain the final thesis, effectively communicating research objectives, methodology, analysis, and conclusions.					2,3,4	

## **TEXT BOOKS**

T1: Hitchcock JH, Onwuegbuzie AJ, editors. The Routledge handbook for advancing integration in mixed methods research. London: Routledge; 2022 May 10.

## **REFERENCE BOOKS:**

R1: Marder MP. Research methods for science. Cambridge University Press; 2011 Jan 27.

**OTHER LEARNING RESOURCES:**

<https://yocket.com/blog/how-to-write-dissertation>

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

<b>CO PO Mapping</b>		
<b>SN</b>	<b>Course Outcome (CO)</b>	<b>Mapped Program Outcome</b>
<b>1</b>	Discuss the process of understanding and acquiring statistical analysis skills.	<b>1,2,3,4,5,6,7,8</b>
<b>2</b>	Describe methods to enhance data interpretation capabilities for effective analysis.	<b>1,2,3,4,5,6,7,8</b>
<b>3</b>	Discuss strategies for conducting in-depth discussions and critical evaluations.	<b>1,2,3,4,5,6,7,8</b>
<b>4</b>	Acquire techniques for clear articulation of feature scope.	<b>1,2,3,4,5,6,7,8</b>
<b>5</b>	Describe approaches for professionally presenting the final thesis.	<b>1,2,3,4,5,6,7,8</b>

**MAPPING TABLE:**

S.No	Subject Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	22MMLT111R	3	2.00	2.00					
2	22MMLT113R	3.00	2.00	2.00					
3	22MMLT112R	3.00	2.00	2.00					
4	22MMLT114R	3.00	2.00	2.00					
5	22UMFS111R	2.00	2.00		3.00				
6	22MMLT115R	2.00	2.00		3.00			2.00	1.00
7	22MMLT123R	3.00	2.00	2.00					
8	22MMLT126R	2.00	3.00	1.00					
9	22MMLT125R	3.00		2.00	2.00				
10	22UMRM121R	2.00	2.00		3.00				
11	22MMLT121R	3.00	2.00	3.00		2.00	2.00		
12	22MMLT122R	3.00	2.00	2.00					
13	22MMLT124R	3.00	2.00	2.00					
14	22UUHV101R		2.00			3.00	3.00	3.00	
15	22MMLT127R	2.00	3.00		3.00			2.00	1.00
16	22UMRE211R		2.00		2.00			3.00	
17	22MMLT214R	3.00	2.00	3.00					
18	22MMLT211R	2.00	2.00			3.00		2.00	
19	22MMLT215R	3.00	2.00	2.00					
20	22MMLT216R	3.00	2.00	2.00					
21	22MMLT217R	3.00	2.00	3.00					
22	22MMLT127R	2.00	3.00		3.00	3.00	2.00	2.00	1.00
23	22MMLT222R	2.00	3.00	2.00		2.00	2.00		
24	22MMLT223R	1.00	2.00			3.00	3.00		
25	22MMLT221R	2.00	3.00	3.00		2.00	2.00	2.00	
26	22MMLT224R	2.00	2.00	3.00	3.00	2.00	2.00	2.00	2.00



