



Assam down town University

Curriculum and Syllabus

Bachelor of Dialysis Technology

**OUTCOME BASED EDUCATION FRAMEWORK
CHOICE BASED CREDIT SYSTEM**

Version: 2.2

**FACULTY OF PARAMEDICAL
SCIENCES**

July, 2024

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 Board of Studies (BOS) meeting of the Faculty of Paramedical Sciences held on dated 20/06/2024 and approved by the 51st Academic Council (AC) meeting held on dated 26/07/2024.



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 multi disciplinary 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 inter disciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stake holders 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 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:

The curriculum provides skill enhancement and value-added courses along with the core papers.

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 Specific Outcomes (PSOs):

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.

V. Program Outcome (POs):

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.

VI. Total Credits to be Earned: 133

VII. Career Prospects:

The Bachelor of Dialysis Technology ProgramME 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 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 ME coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the Program ME 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 me 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 ProgramME follow a unique pattern and the total marks is 60

Table 1: Question paper pattern for End semester examination

S.N.	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 Programme 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 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^{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.

Breakdown of Credits

Sl. No	Category		Total number of Credits
1	University Core (UC)	Skill Enhancement Course (SEC)	0
		Ability Enhancement Course (AEC)	2
		Field Training	0
		Discipline Specific Elective (DSE)	0
		Value Added Course (VAC)	0
2	University Elective (UE)	Multidisciplinary Course (MDC)	8
		Value Added Course (VAC)	6
3	Programme Core (PC)	Discipline Specific Core (DSC)	80
		Field Training	1
		Research /Industry Internship	6
		Summer Internship	4
4	Programme Elective (PE)	Discipline Specific Elective (DSE)	20
		Value Added Course (VAC)	0
5	Faculty Core (FC)	Skill Enhancement Course (SEC)	6
		Ability Enhancement Course (AEC)	0
Total			133

Breakdown by categories of courses

S.N.	Category	Credits	%
1	Paramedical Sciences	129	97%
2	Engineering	1	0.75%
3	Humanities and Social Sciences	3	2.25%
Total		133	100%

SEMESTER WISE COURSE DISTRIBUTION

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
Semester I	1	24BDIT1101R	Human Anatomy & Physiology -I	DSC (Major)	4	0	4	4	0	0	6	40	60	100	200
	2	24BDIT1101R	General Biochemistry-I	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3	24BDIT1102R	Basic Principles of Hospital Practice & Patient Care	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
	4	24BDIT1103R	Basic Communicative English	AEC	0	0	2	0	0	0	1	0	0	100	100
	5	24UBPD1101R	Clinical Dialysis-I	SEC	0	0	2	0	0	0	1	0	0	100	100
	6	24BDIT1105R	Communication Skills for University Success	VAC	2	0	0	0	0	0	2	0	0	100	100
	7	24BDIT1101M	Medical Psychology	MDC	3	0	0	0	0	0	3	40	60	0	100
	8	24BDIT1104R	Extra-Curricular Activities	Extra-Curricular	0	0	0	4	0	0	1	0	0	100	100
	Total				14	0	10	8	0	0	20	160	240	600	1000
Semester II	1	24BDIT1201R	Human Anatomy & Physiology - II	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200
	2	24BDIT1202R	Biochemistry : Biomolecules And their metabolism	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3	24BDIT1203R	Fundamentals of patient Care And Safety	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
	4	24UBPD1202R	Functional English	AEC	0	0	2	0	0	0	1	0	0	100	100
	5	24BDIT1204R	Self-Study Seminar	AEC	0	0	2	0	0	0	1	0	0	100	100
	6	24BOTT2105R	Infection Control and Sterile Technique Procedure	MDC	3	0	0	0	0	0	3	40	60	0	100
	7	24UBES1201R	Environmental Studies	VAC	2	0	0	0	0	0	2	40	60	0	100
	8	24UBCC1201	Co-Curricular	Co-Curricular	0	0	0	4	0	0	1	0	0	100	100
	Total				14	0	10	4	0	0	20	200	300	500	1000

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
1	24BDIT2101R	Applied Anatomy	DSC (Major)	4	0	0	0	0	0	0	4	40	60	0	100
2	24BDIT2102R	Applied Physiology	DSC (Major)	4	0	0	0	0	0	0	4	40	60	0	100
3	24BDIT2103R	Pathology	DSC (Minor)	2	0	4	0	0	0	0	4	40	60	100	200
4	24BDIT2104R	Pharmacology	DSC (Minor)	4	0	0	0	0	0	0	4	40	60	0	100
5	24BCIC2206R	Patient Safety and quality Care	MDC	1	0	0	0	0	0	0	1	40	60	0	100
6		DISA	SEC	0	0	2	0	0	0	0	1	0	0	100	100
7	24UBPD2101R	Executive English	AEC	0	0	2	0	0	0	0	1	0	0	100	100
8	24UDLS201R	Digital Literacy	VAC	0	0	2	0	0	0	0	1	0	0	100	100
9	24UULS2102R	Basic Acclimatizing Skills (BAS)	MDC	0	0	2	0	0	0	0	1	0	0	100	100
10	24BDIT2105R	Field Training	FT	0	0	0	0	0	0	8	1	0	0	100	100
11	24BDIT1204R	Clinical Dialysis- II	SEC	0	0	2	0	0	0	0	1	0	0	100	100
Total				15	0	14	0	0	0	8	23	200	300	700	1200

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
1	24BDIT2201R	Applied Pharmacology	DSC (MAJOR)	4	0	0	0	0	0	0	4	40	60	0	100
2	24BDIT2202R	Basic of Dialysis Technology	DSC (MAJOR)	2	0	4	0	0	0	0	4	40	60	100	200
3	24B DIT2203R	Applied Dialysis Technology- I	DSC (MAJOR)	2	0	4	0	0	0	0	4	40	60	100	200
4	24BDIT2204R	Concept of Renal Disease	DSC (MAJOR)	2	0	0	0	0	0	0	2	40	60	0	100
5	24BDIT2205R	Nutrition in Dialysis	DSC (MAJOR)	2	0	0	0	0	0	0	2	40	60	0	100
6	24UBPD2202R	Enhanced Professional Skills	AEC	0	0	2	0	0	0	0	1	0	0	100	100
7	24UUFL2201R	Financial Literacy	MDC	0	0	2	0	0	0	0	1	0	0	100	100
8	24UULS2201R	Basic Life Support Skills (BLSS)	VAC	0	0	2	0	0	0	0	1	0	0	100	100
9	24BDIT2206R	Clinical Dialysis III	SEC	0	0	4	0	0	0	0	2	0	0	100	100
10	24BDIT2207R	Self-Study Seminar	AEC	0	0	2	0	0	0	0	1	0	0	100	100
Total				12	0	20	0	0	0	0	22	200	300	700	1200

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
Semester V	1	24BDIT3101R	Clinical Observation I	DSC (Major)	0	0	0	24	0	0	4	0	0	100	100
	2	24BDIT3102R	Clinical Observation II	DSC (Major)	0	0	0	24	0	0	4	0	0	100	100
	3	24BDIT3103R	Clinical Observation III	DSC (Major)	0	0	0	24	0	0	4	0	0	100	100
	4	24BDIT3104R	Case Study Report	DSC (Major)	0	0	0	32	0	0	4	0	0	100	100
	5	24BDIT3105R	Summer Internship	Internship	0	0	2	0	0	24	4	0	0	100	100
	6	24BDIT3107R	Research	Research	0	0	0	0	18	0	2	0	0	100	100
	Total				0	0	2	104	18	24	22	0	0	600	600
Semester VI	1	24BDIT3201R	Applied Dialysis Technology II	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200
	2	24BDIT3202R	Applied Dialysis Technology III	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200
	3	24BDIT3203R	Renal Transplant	DSC (Major)	3	0	0	0	0	0	3	40	60	0	100
	4	24BDIT3204R	Medical Ethics in Dialysis	DSC (Major)	3	0	0	0	0	0	3	40	60	0	100
	5	24BDIT3105R	Advanced Emergency Management Skills in Dialysis Care	SEC	0	0	6	0	0	0	3	0	0	100	100
	6	24BDIT3206R	Comprehensive Research in Dialysis and Renal Care	Research	0	0	4	0	24	0	4	0	0	100	100
	7	24BDIT3201R	Finishing School	AEC	0	0	4	0	0	0	2	0	0	100	100
	Total				12	0	22	0	24	0	25	160	240	500	900

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

Semester – I									
Course Title	Human Anatomy and Physiology-I								
Course Code	24BDIT1101R	Total Credits: 6	L	T	P	S	R	O/F	C
		Total Hours: 90T+60P	6	0	4	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	1. To study the basic anatomical structure of the human body. 2. To learn about the anatomical positions and gross and microscopic structure of the organs and skeleton in the human body. 3. To assist students in developing a better grasp of the anatomical structure and basic physiological functions of various body regions.								
CO1	Able to explain the normal position, functional, and cross-sectional anatomy of various structures of the body.								
CO2	Able to explain the cell, organs, and organ system and their function.								
CO3	Learn about the different blood cells, different types of blood groups, and blood coagulating factors.								
CO4	Apply knowledge of the gross structure of the digestive, respiratory, and cardiovascular systems.								
CO5	Demonstrate a comprehensive understanding of the gross structure of Musculo– the skeletal-system and bones in the body.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Introduction To Anatomical Terms, Basic Structure and Function of Cell Level of Organization – Body Parts and Areas, Planes and Sections. Common anatomical terminology Structure and Function of Cell Membrane, Cellular Transport	7	Describe, illustrate, and explain the organization of the human body's anatomical terms, basic structure, and cell function.				1,8		
II	Musculo – Skeletal -System and Bones Bones: Classification& types, according to morphology. Tissue and its types, Cartilage Joints: definition, classification, and movements of joints. Muscle and its types for Specific Programmes- Radiology: Importance of different bones of the human body.	10	Describe, illustrate, and explain the Musculo skeletal system.				1,8		
III	Digestive System- Anatomy of the gastrointestinal tract and accessory organs of the digestive system. Composition and functions of gastric, pancreatic, intestinal, and biliary secretion.	8	Describe, illustrate, and explain the digestive system.				1,8		

IV	Respiratory System- Anatomy of the respiratory tract Mechanisms and Regulation of respiration. Gaseous exchange in lung and tissues. Lung volumes and capacities. Respiratory abnormalities: Hypoxia, cyanosis, dyspnoea, Asphyxia, hyperventilation, hypoventilation, tachypnea and bradypnea Specific Programme ECC: Intrapleural and intrapulmonary Pressures and their changes with respiration, Hypoxia. For Specific Programmes- ECC: Description of the larynx, trachea, and respiratory centers	10	Describe, illustrate and explain the Respiratory system.	1,8
V	Cardiovascular System and Blood: Mediastinum–division Structure of heart and blood vessels. Systemic circulation, pulmonary circulation, and coronary circulation. Cardiac output, cardiac cycle, conducting system of the heart. Heart sounds, pulse, blood pressure, and their regulation. Composition and functions of blood, Plasma, and body fluids. Functions of RBC, WBC, and platelets. Hemoglobin. Blood hemostasis Blood groups	10	Describe, illustrate, and explain the basic knowledge of the cardiovascular system and blood.	1,8
Practical	Study of Skull Vertebrae, Ribs and bones of upper limb. Study of compound Microscope. Measurement of blood pressure, Arterial pulse Bleeding time (BT), Clotting time (CT), Hemoglobin estimation	60	Describe, illustrate explain, and apply anatomical plans, position, and study the bones of the human body.	1,8

TEXT BOOKS:

- T1: Fundamentals of Anatomy By Pamela K Levangie, Cynthia C Norkin, JP Bros Medical Publishers, New Delhi.
T2: Fundamentals of Medical Anatomy by Duane Knudson, 2nd ed. 2007 Publisher Springer
T3: A book of Physiology, Dr, Khurana Medical Physiology, Guyton and Hall

REFERENCE BOOKS:

- R1: Medical anatomy, JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997.
R2: Clinical Anatomy, JP Bros Medical Publishers, Bangalore, 5th Ed 1996, 1st Indian Ed1998.
R3: Review of Medical Physiology–Ganong William F. Physiological basis of medical practice– Best & Taylor

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMM OUTCOMES (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the normal position, functional, and cross-sectional anatomy of various structures of the body.	1,8
2	Able to explain the cell, organs, and organ system and their function.	1,8
3	Learn about the different blood cells, different types of blood groups, and blood coagulating factors.	1,8
4	Apply knowledge of the gross structure of the digestive system, respiratory, and cardiovascular systems.	1,8
5	Demonstrate a comprehensive understanding of the gross structure of Musculo– the skeletal-system and bones in the body.	1,8

Semester – I									
Course Title	General Biochemistry								
Course Code	24BDIT1102R	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	Bachelor of Dialysis Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	1.To impart knowledge in the technical aspects of biochemical studies especially focusing on the clinical findings in various body metabolites. 2.To explain the energy flow in the form of ATP in the human body and cells. 3.To demonstrate practical knowledge of the qualitative determination of carbohydrates, proteins, and lipids.								
CO1	Able to explain carbohydrates, their types, and various roles in the human body and health.								
CO2	Able to explain the proteins.								
CO3	Learn the basic knowledge of lipids.								
CO4	Apply knowledge of the nucleic acid.								
CO5	Demonstrate a comprehensive understanding of acid-base balance.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	CARBOHYDRATES: <ul style="list-style-type: none"> Definition and classification of carbohydrates Example of some common Carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) their sources and structure. Biological significance of Carbohydrate 	8	Describe, illustrate, and explain the carbohydrates					1,2	
II	PROTEINS: <ul style="list-style-type: none"> Definition of Proteins along with biological significance, Amino acids and their, classification Essential and non-essential amino acids. 	7	Describe, illustrate, and explain the basic knowledge of proteins					1,2	
III	LIPIDS: <ul style="list-style-type: none"> Definition and classification of lipids. Classification of Fatty Acids. Examples and functions of some common lipids (Phospholipids, Glycolipids, Steroids). 	7	Describe, illustrate, and explain the lipids					1,2	
IV	NUCLEICACIDS: <ul style="list-style-type: none"> Basic idea of the structure of DNA and RNA. Function of DNA and RNA. 	8	Describe, illustrate, and explain the nucleic acids					1,2	
V	ACID-BASEBUFFERS: <ul style="list-style-type: none"> Basic idea of acids, bases, pH, pOH, pKa, and Buffer. Acid-base balance. 	8	Describe, illustrate, and explain the acid-base buffers					1,2	

Practical	<ul style="list-style-type: none"> • To identify and demonstration of biochemistry laboratory glassware's and apparatus. • To identify and demonstration of biochemistry laboratory instruments (Principle and Applications) • To perform Fehling's test for determination of reducing and non- reducing sugar in an unknown sample. • To perform Benedict's test for determination of reducing and non-reducing sugar in an unknown sample. • To perform Molisch's test for determination of sugar in an unknown sample. 	22	Demonstration of biochemistry laboratory glassware's and apparatus, Principle and Applications, Benedict's test, and Molisch's test.	1,8
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TEXT BOOKS:

T1: Lehninger Principles of Biochemistry by David L Nelson and Michael M Cox.

T2: Biochemistry by U Satyanaryana and U Chakrapani.

REFERENCE BOOKS:

R1: Haper's Illustrated Biochemistry by Robert Murray, Daryl K Granner et al.

R2: Biochemistry by Lubert Stryer, Jeremy M Berg, et al.

R3: Biochemistry by David E Metzler.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the carbohydrates, its types and various roles in the human body and health.	1,8
2	Able to explain the proteins.	1,8
3	Learn the basic knowledge of lipids.	1,8
4	Apply knowledge of the nucleic acid.	1,8
5	Demonstrate a comprehensive understanding of acid – base balance.	1,8

Semester – I									
Course Title	Basic Principle of Hospital Practice and Patient Care								
Course Code	24BDIT1103R	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 Dialysis Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	1. To impart the knowledge in patient 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 of medical profession, and hyper and hypoglycaemia.								
CO1	Able to explain the basic knowledge on hospital records and reports.								
CO2	Able to explain the medical professional and legal hazards of medical profession.								
CO3	Learn the basic knowledge of maintenance of hygiene								
CO4	Apply knowledge of the about safety in the laboratory.								
CO5	Demonstrate a comprehensive understanding about the vital signs of patients.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Hospital records & reports: Definition and functions of Hospitals, Classification, Organization and Departments of Hospitals. Management of Hospital. 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 and reports		6	Describe, illustrate and explain the basic knowledge of hospital records and reports.				1,2	
II	Medical Professional and Legal Hazards of Medical Profession First aid Aims & objectives of first aid Priorities of first aid. Golden rules of first aid qualities & responsibilities of the first aider. Simple first aid measures in selected conditions like– Food poisoning, Snakebite, Scorpion bite, Dog bite, Foreign bodies in various organs, Burns & scalda Hemorrhage		10	Describe, illustrate and explain basic knowledge of Hospital And Records & Reports.				1,2	
III	Hygiene and Basic Care Needs of Patients Personal Hygiene and Maintenance of Hygiene Maintaining therapeutic environment. Safety factors for patients such as safety from Mechanical injury, thermal and chemical injury, radiation & bacteriological injury, safety from allergens. Different positions of the body: Supine position, Prone Position, Cardiac position, Lateral Position, Fowler’s position		8	Describe, illustrate and explain the basic knowledge of medical professional and legal hazards of medical profession.				1,2	
IV	Safety in the Laboratory <ul style="list-style-type: none"> • Common laboratory accidents from • Physical injuries • Electrical shock 		8	Learn the comprehensive knowledge of Hygiene And Basic Care Needs Of Patients Personal				1,2	

	<ul style="list-style-type: none"> • Chemical injury • Bleeding • Burn • Eye accidents Biological hazards.		Hygiene And Maintenance.	
V	Vital signs of Patients: <ul style="list-style-type: none"> • Body temperature • Maintenance of body temperature • Factors influencing body temperature • Different types of fever • Stages of rigor • Management of pyrexia Pulse <ul style="list-style-type: none"> • Common pulse sites • Factors influencing pulse rate • Characteristics of Pulse • Abnormal pulses • Reading of pulse Blood Pressure <ul style="list-style-type: none"> • Definition • Factors influencing B.P. • Abnormalities of B.P. • Recording of B.P. Respiration <ul style="list-style-type: none"> • Regulation of respiration • Factors causing variation in respiration • Abnormal respirations • Reading of respiratory rate. • Different methods of Artificial Respiration 	8	Describe, illustrate and explain the Safety in The Laboratory.	1,2

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 PROGRAMME OUTCOMES (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge on hospital records and reports.	1, 3, 5, 8
2	Able to explain the medical professional and legal hazards of medical profession.	1, 2, 3, 5, 6, 8
3	Learn the basic knowledge of maintenance of hygiene	1, 2, 8
4	Apply knowledge of the about safety in the laboratory.	1, 8
5	Demonstrate a comprehensive understanding about the vital signs of patients.	1, 2, 8

Semester – I									
Course Title	Basic Communicative English								
Course Code	24UBPD1101R	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 Dialysis Technology								
Semester	Fall/ 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 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	Grammar i. 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				1,2	
II	Grammar i. Determiners ii. 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. Types of sentences (Assertive, Imperative etc.)				1,2	
III	Building Vocabulary i. Synonyms ii. Antonyms		8	Learn the comprehensive knowledge of Synonyms and Antonyms				1,2	
IV	Speaking Skills i. Introduction and greetings ii. Pronunciation iii. Asking and offering in formation iv. Video Recording for self-analysis		6	Able to apply the speaking skills.				1,2	
V	Communication Skills i. Introduction to Communication, ii. Importance of Communication Skills, iii. Purpose of Communication, iv. Types of Communication, v. Barriers to Communication, How to improve/tips to improve Communication skills		8	Describe, illustrate and explain the Communication skills.				1,2	

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 Chandand 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:

Topic related journals from PubMed, Google Scholar, etc.

Youtube videos

E-learning materials

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the application of grammatical rules will enable the students to improve the speaking and writing skills.	1, 7, 8
2	Able to explain the language effectively.	1, 7, 8
3	Apply the basic knowledge of both listening and speaking skills.	1, 7,8
4	Able to apply their vocabulary and use of words.	1, 7, 8
5	Demonstrate a comprehensive understanding the concept of communication, its importance and barriers.	1, 7, 8

Semester – I									
Course Title	Clinical Dialysis-I								
Course code	24BDIT1105R	Total Credits: 1 Total Hours: 15P	L	T	P	S	R	O/F	C
			0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	1. Understand kidney function, renal failure, and dialysis needs. 2. Compare and differentiate between hemodialysis and peritoneal dialysis. 3. Learn the components and operation of hemodialysis machines and dialyzers.								
CO1	Understand how the kidneys work, what causes kidney failure, and why dialysis is needed.								
CO2	Describe the differences between hemodialysis and peritoneal dialysis and know when each type is used.								
CO3	Identify the main parts of a dialysis machine and learn how to set it up and operate it.								
CO4	Check patients' vital signs, and fluid levels, and provide care after dialysis, including educating patients.								
CO5	Practice good hand hygiene, wear protective gear (PPE), and follow safety procedures to prevent infections in the dialysis unit.								
Unit- No.	Content		Contact Hours	Learning Outcome				KL	
I	Introduction to Dialysis: <ul style="list-style-type: none"> Overview of kidney function and failure. Concepts of acute and chronic renal failure. 		4	Describe, illustrate, and explain basic knowledge of dialysis.				1,8	
II	Types of Dialysis: <ul style="list-style-type: none"> Comparisons between hemodialysis and peritoneal dialysis. 		2	Describe, illustrate and explain the basic knowledge of types of dialysis.				1,8	
III	Hemodialysis Machine & Equipment: <ul style="list-style-type: none"> Hemodialysis machine components: Pumps, monitors, and alarms. Dialyzer membranes and types. 		4	Learn the comprehensive knowledge of hemodialysis machines & equipment.				1,8	
IV	Basic Patient Care During Dialysis: <ul style="list-style-type: none"> Patient assessment: Vital signs, fluid status, and blood tests. Post-dialysis care and patient education. 		3	Able to apply basic patient care during dialysis.				1,7,8	
V	Infection Control and Safety in Dialysis: <ul style="list-style-type: none"> Hand hygiene and PPE protocols. 		2	Describe, illustrate, and explain the infection control and safety in dialysis.				1,7,8	

TEXT BOOKS:

T1: Handbook of Dialysis" by John T. Daugirdas, Peter G. Blake, and Todd S. Ing

T2: Core Curriculum for Nephrology Nursing" by Caroline S. Counts

T3: Clinical Dialysis" by Allen R. Nissenson and Richard N. Fine

T4: The Essentials of Hemodialysis" by Norbert Lameire and Raymond Vanholder

T5: Principles and Practice of Dialysis" by William L. Henrich

**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES
(PO)**

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Understand how the kidneys work, what causes kidney failure, and why dialysis is needed.	1,2,3,4, 8
2	Describe the differences between hemodialysis and peritoneal dialysis and know when each type is used.	1,2,3,4, 8
3	Identify the main parts of a dialysis machine and learn how to set it up and operate it.	1,2,3,4, 8
4	Check patients' vital signs, and fluid levels, and provide care after dialysis, including educating patients.	1,2,3,4, 8
5	Practice good hand hygiene, wear protective gear (PPE), and follow safety procedures to prevent infections in the dialysis unit.	1,2,3,4, 8

Semester – I											
Course Title	Medical Psychology										
Course Code	24BDIT1101M	Total Credits: 3			L	T	P	S	R	O/F	C
		Total Hours: 45P			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite			Nil						
Programme	Bachelor of Dialysis Technology										
Semester	Fall/ I Semester of First Year of the Programme										
Course Objectives	<ol style="list-style-type: none"> 1. Aims to provide students with a comprehensive understanding of human behaviour and mental processes. 2. Explore various psychological domains such as cognitive, developmental, social, and abnormal psychology, gaining insights into how individuals think, feel, and act. 3. To be equipped with critical thinking skills and an appreciation for the complexities of human behaviour, enabling them to apply psychological concepts to real-world situations. 										
CO1	Understand the significance, history, scope and branches of psychology.										
CO2	Discuss the biology of human behavior and sensation.										
CO3	Identify the different stages of human growth and development and the factors influencing it.										
CO4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.										
CO5	Apply skills to assess mental health and identify the warning signs of poor mental health.										
Unit-No.	Content	Contact Hours	Learning Outcome				KL				
I	Introduction to Psychology <ul style="list-style-type: none"> • Definition of psychology • Evolution of modern psychology • Branch of psychology 	7	Introduces the knowledge of psychology its evolution in modern world and different branches of it.				1,2				
II	Biology of Behavior <ul style="list-style-type: none"> • Body mind relationship modulation process in health and illness • Brain and behavior: nervous system, neurons and synapse, Association cortex, Right and Left hemispheres. 	10	Explains the biology of behaviour the mindset and all the complex function.				2,3				
III	Growth and Development <ul style="list-style-type: none"> • Life span: different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age) • Heredity and environment: role of heredity and environment in physical and psychological development. 	10	Describes the growth and development of a person.				2,3				
IV	Motivation and Emotional Processes <ul style="list-style-type: none"> • Motivation: meaning, concepts, types, theories, motives and behavior. • Emotion: definition, components, changes in emotions, theories, emotional adjustments, emotions in health and illness. • Stress: stressors, cycle, effects, adaptation & coping and management. 	8	Explains the techniques of keeping one motivated and maintaining emotional processes.				2,3				

	Conflicts and frustration, conflict resolution.			
V	<p>Mental Hygiene and Mental Health</p> <ul style="list-style-type: none"> • Concepts of mental hygiene and mental health. • Characteristics of mentally healthy person • Warning signs of poor mental health, • Promotive and preventive mental health – strategies and services. <p>Guidance counselling and Rehabilitation.</p>	10	Explain the warning sign of poor mental health ways of preventing it and characteristics of a healthy person.	2,3

TEXT BOOKS:

T1: Introduction to Psychology" by Atkinson and Hilgard

T2: Fundamentals of Psychology" by Michael W. Eysenck

T3: Abnormal Psychology" by Ronald J. Comer

T4: Development Through the Lifespan" by Laura E. Berk

T5: Biological Psychology" by James W. Kalat

T6: Health Psychology: Biopsychosocial Interactions" by Edward P. Sarafino and Timothy W. Smith

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the significance, history, scope and branches of psychology.	1, 8
2	Discuss the biology of human behavior and sensation.	1, 8
3	Identify the different stages of human growth and development and the factors influencing it.	1, 8
4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.	1, 8
5	Apply skills to assess mental health and identify the warning signs of poor mental health.	1, 8

SEMESTER – I									
Course Title	Extra-Curricular								
Course Code	24UBEC1101	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 Dialysis Technology								
Semester	Fall / I 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	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
	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 students 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.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	7
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	7
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	7
4	Explore new platform to learn from invited experts in their respective fields.	7
5	Evaluate overall growth alongside academic development.	7

Semester – II									
Course Title	Human Anatomy and Physiology-II								
Course Code	24BDIT1201R	Total Credits: 6	L	T	P	S	R	O/F	C
		Total Hours: 60T+30P	4	0	4	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Spring/ II Semester of the Second Year of the Programme								
Course Objectives	1. To study the basic anatomical structure of the human body. 2. To provide a comprehensive concept of the human body's anatomical position and physiological function. 3. To understand the underlined mechanism and regulation of the human body.								
CO1	Able to explain the urinary system.								
CO2	Able to explain the nervous system.								
CO3	Learn the comprehensive knowledge of lymphatic and immunological systems.								
CO4	Apply knowledge of the reproductive system.								
CO5	Demonstrate a comprehensive understanding of the endocrine system.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Urinary System Structure of kidney, ureter, urinary bladder, male and female urethra. Functions of kidneys, nephron. Urine formation.	7	Describe, illustrate, and explain the urinary system.	1,2					
II	Nervous System Classification of Nervous system. Central Nervous system–Brain and Spinal cord, the blood supply of brain. Cranial nerves and spinal nerves Introduction of the motor system, sensory system and Autonomic Nervous System. Functions of the brain, and spinal cord Synapse, reflex arc cerebro spinal fluid Sensory Organs: Skin, Ear, Nose, Tongue Eye	12	Describe, illustrate and explain the pelvis and reproductive system.	1,2					
III	Lymphatic and Immunological System Structure of lymphatic system and functions. Immunity–Antigen, Antibody, and Immune response. Acquired immunity	8	Describe, illustrate and explain the nervous system.	1,2					
IV	Reproductive System Structure of male and female reproductive organs. Structure of breast Changes during puberty Ovulation, Menstrual cycle Pelvic cavity with its boundaries and contents.	10	Describe, illustrate and explain the sensory organ.	1,2					
V	Endocrine System Different endocrine glands Hormones and functions of endocrine glands Regulation of secretion hormones.	10	Describe, illustrate and explain the lymphatic system.	1,2					

Practical	Study of pelvic bones and bones of lower limbs of human body, organs: Brain, heart, lung, liver, kidney, blood group, DLC, total count of RBC and WBC	30	Describe, illustrate, and explain the human bones, human organs, Brain, heart, Lung, liver, kidney, and Spleen, blood group, DLC, the total count of RBC and WBC	1, 8
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TEXT BOOKS:

T1: Text Book of Anatomy and Physiology By Ross and Wilson

REFERENCE BOOKS:

R1: Anatomy and Physiology By Inderbir Singh

OTHER LEARNING RESOURCES:

<https://www.khanacademy.org/science/biology/human-biology>

<https://open.oregonstate.edu>

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the urinary system.	1, 8
2	Able to explain the nervous system.	1,8
3	Learn the comprehensive knowledge of lymphatic and immunological system.	1,8
4	Apply knowledge of reproductive system.	1,8
5	Demonstrate a comprehensive understanding the endocrine system.	1,8

SEMESTER – II									
Course Title	Biochemistry: Biomolecules and its Metabolism								
Course Code	24BDIT1202R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 60T+30P	3	0	2	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Spring/ II Semester of Second 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 about the energy flow in the form on ATP in the human body and cells. 3.To provide information and understanding on the basic idea about the enzymes, nomenclature functions, regulations and their significance in biological processes.								
CO1	Able to explain the enzymes.								
CO2	Able to explain the carbohydrate and enzymes.								
CO3	Learn the basic knowledge of the protein 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. Basics of co-enzyme, iso-enzyme. Mechanism of enzyme Action. Factors affecting enzyme action	8	Describe, illustrate and explain basic knowledge of enzymes.					1,2	
II	Carbohydrates Metabolism: <ul style="list-style-type: none"> • Glycolysis • Kreb’s Cycle • Gluconeogenesis • Glycogenesis • Glycogenolysis 	7	Describe, illustrate and explain the basic knowledge of carbohydrates metabolism					1,2	
III	Protein Metabolism: <ul style="list-style-type: none"> • Transamination • Deamination • Urea Cycle and its Significance RFT (Renal Function Tests)	7	Learn the comprehensive knowledge of protein metabolism.					1,2	
IV	Lipid Metabolism: <ul style="list-style-type: none"> • β-oxidation of Fatty Acids. • Ketone bodies • Ketosis and keto acidosis • LFT (Liver Function Tests) 	9	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.	12	Describe, illustrate and explain the vitamins and minerals	1,2
Practical	To perform precipitation test to determine the presence of proteins in an unknown urine sample. To perform heat and acetic acid test to determine the presence of proteins in an unknown urine sample To perform Heller's test to determine the presence of proteins in an unknown urine sample To perform lipid solubility test.	5	Describe, illustrate and explain and apply the knowledge of monodi- saccharides, proteins, precipitation reaction, lipids and heller's test, heat and acidic test.	1,8

TEXT BOOKS:

T1: Lehninger Principles of Biochemistry” by David L Nelson and Michael M Cox Biochemistry”
by U Satyanaryana and U Chakrapani

REFERENCE BOOKS:

R1: 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the enzymes.	1,8
2	Able to explain the carbohydrate and enzymes.	1,8
3	Learn the basic knowledge of the protein metabolism.	1,8
4	Apply knowledge of lipid metabolism.	1,8
5	Express a comprehensive understanding the vitamins and minerals.	1,8

Semester – II									
Course Title	Fundamental of Patient care and Safety								
Course Code	24BDIT1203R	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 Dialysis Technology								
Semester	Spring/ II Semester of Second Year of the Programme								
Course Objectives	1. The study of HDPC is aimed at imparting a knowledge in providing patientcare, 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.								
CO1	Able to explain the basic knowledge of poisoning.								
CO2	Able to explain the medical professional and legal hazards of medical profession.								
CO3	Learn the basic knowledge of shock.								
CO4	Apply knowledge of hyperglycemia and hypoglycaemia.								
CO5	Demonstrate a comprehensive understanding the laboratory investigation and laboratory setup.								
Unit- No.	Content				Contact Hour	Learning Outcome			KL
I	Poisoning: Definition Causes of poisoning Sources of Poisoning Symptoms of poisoning First aid & Management Antidotes Common drugs poisoning, Carbon monoxide poisoning				4	Describe, illustrate and explain basic knowledge of poisoning.			1,2
II	Medical Professional and legal Hazards Of Medical profession: 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.				12	Describe, illustrate and explain the basic knowledge of medical professional and legal hazards of medical profession.			1,2
III	Shock: Definition Types of shock General Features of shock Investigations of shock, Initial management & first aid of shock				8	Learn the comprehensive knowledge of shock.			1,2
IV	Hyperglycemia And Hypoglycemia: Definition Clinical features Diabetes laboratory tests for diabetes Different types of glycosuria Ketone bodies. Glucose tolerances. Definition, Etiology, Clinical Features, Investigation and Management for Hypoglycemia				12	Describe, illustrate and explain the hyperglycemia and hypoglycemia.			1,2

V	Laboratory investigation and laboratory Setup: Preparation of patients and equipment's <ul style="list-style-type: none"> • 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. Characteristics of Pulse 	12	Describe, illustrate and explain the laboratory investigation and laboratory setup.	1,2
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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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge of poisoning.	c
2	Able to explain the medical professional and legal hazards of medical profession.	1, 5, 8
3	Learn the basic knowledge of shock.	1, 8
4	Apply knowledge of hyperglycemia and hypoglycaemia.	1, 8
5	Demonstrate a comprehensive understanding the laboratory investigation and laboratory setup.	1, 3, 5, 8

SEMESTER – II									
Course Title	Functional English								
Course Code	24UBPD1201R	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 Dialysis Technology								
Semester	Spring/ II Semester of Second 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	Able to explain the basic knowledge of grammar.								
CO2	Able to explain the vocabulary.								
CO3	Learn the basic knowledge of reading skills.								
CO4	Apply knowledge of conflicts management.								
CO5	Demonstrate a comprehensive understanding the time management skills.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Grammar: Inter change of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences Types of Tenses Common Errors		6	Describe, illustrate and apply the techniques in language use.				1,2	
II	Vocabulary: Homonyms Homophones		6	Describe, illustrate and explain the basic knowledge of Communication and be have oral skills will boost their self-reliance.				1,2	
III	Reading Skills: Techniques of Effective Reading Gathering ideas and information from a text.		8	Learn the comprehensive knowledge of the effective and efficient utilization of the time.				1,2	
IV	Conflict Management: Definition Type of conflict management effects of conflict management		6	Describe, illustrate and explain the strengthen their vocabulary and use of words.				1,2	
V	Time-Management Skills: Introduction to time Management, Basic tips to maintain time.		8	Describe, illustrate and explain the concept of communication, its importance and barriers.				1,2	

TEXT BOOKS:

T1: Wren, P. C and Martin, H.1995.High School English Grammar and Composition, SC hand 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>
- <https://www.peoplehum.com/glossary/conflict-management>

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme 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

SEMESTER – II									
Course Title	Self-Study Seminar/ Presentation								
Course Code	24BDIT1204R	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 Dialysis Technology								
Semester	Spring/ II Semester of First Year of the Programme								
Course Objectives	1. Develop Independent Learning Skills – Enhance self-motivation, time management, and research abilities to explore topics independently. 2. Improve Research and Analytical Abilities – Strengthen the ability to gather, analyse, and synthesize information from various sources critically. 3. Enhance Presentation and Communication Skills– Develop written and verbal communication skills through reports, discussions, and presentations								
CO1	Develop the ability to learn independently, manage time effectively, and explore topics with minimal guidance.								
CO2	Strengthen research and analytical skills by gathering, evaluating, and synthesizing information from credible sources.								
CO3	Enhance written and oral communication skills through structured reports, presentations, and discussions.								
CO4	Improve critical thinking and problem-solving abilities by analyzing complex issues and proposing logical solutions.								
CO5	Learn to how to make presentation.								
S.N.	CONTENT								
1.	Reflex actions and their significance.								
2.	Effect of hormonal imbalance in the body.								
3.	DNA replication: How genetic information is copied.								
4.	Importance of hygiene and infection control in hospitals.								
5.	Use of personal protective equipment (PPEs) in patients' care.								
6.	Enzymes: Mechanism of Action and Regulation.								
7.	Gene Regulation and Expression								
8.	Cellular Respiration and ATP Production								
9.	Biochemical Basis of Diabetes Mellitus								
10.	Liver Function Tests and Their Biochemical Basis								
11.	Renal Function Tests and Clinical Significance								
12.	Biochemistry of Anemia and Hemoglobinopathies								
13.	Skeletal System: Bones, Joints, and Their Functions								
14.	Muscular System: Types of Muscles and Their Movements								
15.	Cardiovascular System: Anatomy of the Heart and Blood Circulation								

16.	Respiratory System: Anatomy of Lungs and Mechanism of Breathing
17.	Digestive System: Structure and Function of Major Organs
18.	Urinary System: Anatomy of Kidneys and Excretion Process
19.	Endocrine System: Glands and Hormonal Regulation
20.	Anatomy of the Human Brain and Cranial Nerves
21.	Lymphatic System and Immunity
22.	Anatomy of the Eye and Visual Pathway
23.	Anatomy of the Ear and Mechanism of Hearing
24.	Anatomy of the Skin and Its Functions
25.	Types of Bones and Bone Formation (Ossification)
26.	Functional Areas of the Brain and Their Roles
27.	Reflex Actions and Neural Pathways
28.	Spinal Cord: Anatomy and Functions
29.	Structure of Arteries, Veins, and Capillaries
30.	Heart Valves and Blood Flow Through the Heart
31.	Blood Composition and Functions
32.	Lymphatic Circulation and Its Role in Immunity
33.	Lungs and Their Lobes: Structure and Function
34.	Mechanism of Gas Exchange in the Lungs
35.	Control of Breathing by the Brain
36.	Structure and Function of the Diaphragm
37.	Oxygen Transport in Blood and Tissue Respiration
38.	Role of Salivary Glands and Digestion of Food
39.	Small Intestine: Structure and Absorption of Nutrients
40.	Large Intestine and the Process of Waste Elimination
41.	Nephron: Structure and Function in Urine Formation
42.	Adrenal Glands and Their Hormonal Functions
43.	Thyroid Gland: Anatomy and Hormonal Regulation
44.	Pituitary Gland: Master Gland of the Body
45.	Male vs Female Reproductive Anatomy
46.	Anatomy of the Tongue and Sense of Taste
47.	Olfactory System: Anatomy of the Nose and Sense of Smell
48.	Structure of the Retina and Vision Processing
49.	Anatomy of the Ear: Hearing and Balance Mechanism

50.	Skin Receptors and the Sense of Touch
51.	Roles and Responsibilities of Healthcare Professionals in a Hospital
52.	Basic Patient Care Skills: Hygiene, Mobility, and Nutrition
53.	Effective Communication with Patients and Families
54.	Infection Control and Hospital Hygiene Practices
55.	Medical Ethics and Patient Rights in Healthcare
56.	Hospital Waste Management and Biohazard Disposal
57.	Vital Signs Monitoring and Interpretation
58.	Handling Patients in Shock and Trauma Cases
59.	Intensive Care Unit (ICU) Patient Management
60.	Hospital Acquired Infections (HAIs) and Their Prevention
61.	Body Fluid Compartments and Electrolyte Balance
62.	Acid-Base Balance and Its Regulation
63.	Synaptic Transmission and Neurotransmitters
64.	Heart Sounds and ECG Interpretation
65.	Microcirculation and Capillary Exchange
66.	Shock and Its Physiological Mechanisms
67.	Role of Enzymes in Digestion and Absorption
68.	Liver Physiology and Detoxification
69.	Renal Clearance and Glomerular Filtration Rate (GFR)
70.	Adrenal Gland Hormones and Their Effects
71.	Physiology of Growth Hormone and Development
72.	Menstrual Cycle and Hormonal Regulation
73.	Lipoproteins and Their Role in Atherosclerosis
74.	Allosteric Enzymes and Their Regulation
75.	Glycogen Metabolism: Glycogenesis and Glycogenolysis
76.	Ketogenesis and Its Role in Starvation and Diabetes
77.	Electron Transport Chain and Oxidative Phosphorylation
78.	Lipid Profile and Its Clinical Significance
79.	General Management and First Aid for Poisoning Cases
80.	Medical Negligence and Malpractice: Causes, Consequences, and Prevention
81.	Occupational Hazards in Hospitals: Safety and Legal Considerations
82.	Essentials of Setting Up a Clinical Laboratory
83.	Good Laboratory Practices (GLP) and Quality Control

84.	Laboratory Accreditation and Certification Standards (NABL, CAP, ISO 15189)
85.	Waste Disposal and Biohazard Management in Laboratories
86.	Chemical Spill Management and Emergency Protocols
87.	Consumer Protection Act and Its Impact on Medical Laboratories
88.	Pulse Rate and Its Variations: Normal vs. Abnormal Conditions
89.	Ketone Bodies: Formation, Functions, and Role in Diabetes
90.	Diabetic Ketoacidosis (DKA): Causes, Symptoms, and Treatment
91.	Diabetes Mellitus: Definition, Causes, and Risk Factors
92.	Management and Treatment Strategies for Hypoglycemia
93.	Essential Minerals in Human Nutrition: Macro and Microminerals
94.	Deficiency Disorders Related to Vitamins and Minerals
95.	Vitamin A: Functions, Deficiency Disorders, and Sources
96.	Vitamin D: Role in Bone Health and Calcium Absorption
97.	Vitamin E: Antioxidant Properties and Health Benefits
98.	Vitamin K: Role in Blood Clotting and Bone Metabolism
99.	Role of Vitamins and Minerals in Preventing Chronic Diseases
100.	Dietary Sources and Bioavailability of Vitamins and Minerals
101.	Vitamin and Mineral Deficiencies in Special Populations (Pregnancy, Elderly, Athletes)

Semester – II									
Course Title	Infection Control and Sterile Technique								
Course Code	24UICSI201R	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 Dialysis Technology								
Semester	Spring/ II Semester of First Year of the Programme								
Course Objectives	1. Understand the knowledge of infection control. 2. Apply knowledge on understand aseptic and sterile techniques. 3. Learn about disinfection, sterilization, and waste management in healthcare settings.								
CO1	Understand basic infection control principles.								
CO2	Learn proper hand hygiene and use of PPE.								
CO3	Understand aseptic and sterile techniques.								
CO4	Learn about disinfection, sterilization, and waste management.								
CO5	Understand infection prevention in healthcare settings.								
Unit- No.	Content	Contact Hours	Learning Outcome					KL	
I	Introduction to Infection Control <ul style="list-style-type: none"> • Definition and importance • Modes of infection transmission • Healthcare-associated infections (HAIs) • Standard precautions 	4	Describe, illustrate, and explain basic knowledge on infection control.					1,3	
II	Hand Hygiene and Personal Protective Equipment (PPE) <ul style="list-style-type: none"> • Handwashing techniques • Types of PPE (gloves, masks, gowns, etc.) • Proper donning and doffing of PPE 	2	Describe, illustrate and explain the basic knowledge of hand hygiene and personal protective equipment (PPE).					1,3	
III	Aseptic and Sterile Techniques <ul style="list-style-type: none"> • Difference between medical and surgical asepsis • Maintaining a sterile field • Sterile gloving and gowning 	4	Learn the comprehensive knowledge of aseptic and sterile techniques.					1,3	
IV	Disinfection, Sterilization, and Waste Management <ul style="list-style-type: none"> • Cleaning vs. disinfection vs. sterilization • Methods of sterilization (autoclaving, chemicals, etc.) • Biomedical waste disposal 	4	Able to apply the knowledge of disinfection, sterilization, and waste management.					1,3	
V	Infection Control in Healthcare Settings <ul style="list-style-type: none"> • Infection control in hospitals and dialysis units • Prevention of common infections (UTIs, pneumonia, etc.) • Role of infection control teams 	2	Describe, illustrate, and explain the infection control in healthcare settings.					1,3	

TEXT BOOKS:

T1: Handbook of Dialysis" by John T. Daugirdas, Peter G. Blake, and Todd S. Ing

T2: Core Curriculum for Nephrology Nursing" by Caroline S. Counts

T3: Clinical Dialysis" by Allen R. Nissenson and Richard N. Fine

T4: The Essentials of Hemodialysis" by Norbert Lameire and Raymond Vanholder

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Understand basic infection control principles.	1, 8
2	Learn proper hand hygiene and use of PPE.	1, 8
3	Understand aseptic and sterile techniques.	1, 8
4	Learn about disinfection, sterilization, and waste management.	1, 8
5	Understand infection prevention in healthcare settings.	1, 8

Semester – II									
Course Title	Environmental Studies								
Course Code	24UBES1201R	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 Dialysis Technology								
Semester	Fall/ II semester of second year of the programme								
Course Objectives	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.				1,2		
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, renewable and non renewable energy sources, use of alternate energy sources. Case studies.	10	Describe, illustrate and apply the knowledge of natural resources				1,2		

	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.			
III	<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) 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; India 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.</p>	8	Describe, illustrate and apply the knowledge of ecosystem	1,2
IV	<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 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.</p>	8	Describe, illustrate and apply the knowledge of environmental pollution	1,2
V	<p>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.</p>	4	Describe, illustrate and apply the knowledge of field trip	1,2

	Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)			
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TEXT BOOK:

T1: Textbook of environmental studies by Erach Bharucha, UGC

T2: A textbook of environmental studies by DKA sthana, Meera Asthana, S Chand.

REFERENCE BOOKS:

R1: Environmental studies by RB Singh, Dr. DK Thakur and Dr. JPS Chauhan.

R2: Perspective in environmental studies by Anubha Loushik, CP Kaushik

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme 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

SEMESTER – II									
Course Title	Co-Curricular								
Course Code	24UBCC1201	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 Dialysis Technology								
Semester	Spring/ 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"> 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	
	<ul style="list-style-type: none"> These activities are aimed to develop the social and soft skills and promote a holistic development of the learners. 								
	<ul style="list-style-type: none"> 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. 								
	<ul style="list-style-type: none"> The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies. 								
	<ul style="list-style-type: none"> The student members of the club are trained represent AdtU in various inter University student and national level competitions 								
	<ul style="list-style-type: none"> 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	7
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	7
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	7
4	Explore new platform to learn from invited experts in their respective fields.	7
5	Evaluate overall growth alongside academic development.	7

SEMESTER – III									
Course Title	Applied Anatomy								
Course Code	24BDIT2101R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 60P	4	0	0	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	1. Able to apply the knowledge of applied anatomy is aimed at imparting a knowledge in anatomy and its clinical importance's. 2. Able to explain the microscopic structure and histology of kidney. 3. Apply knowledge of peritoneum with its anatomical distribution and abdominal hernias.								
CO1	Able to explain the basic knowledge of anatomy of urinary system gross structural anatomy of kidney ureter, `bladder, urethra, prostate.								
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. Surface marking of Kidney and Abnormalities of Kidney.	12	Describe, illustrate and explain basic knowledge of anatomy of urinary system gross structural anatomy of kidney ureter, bladder, and urethra, prostate.					1,8	
II	Microscopic structure and histology of kidney.	12	Describe, illustrate and explain the basic knowledge of microscopic structure and histology of kidney.					1,8	
III	Blood supply of kidney	12	Learn the comprehensive knowledge of blood supply of kidney					1,8	
IV	Peritoneum with its anatomical distribution and abdominal hernias.	12	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. Lower limb vessels: Femoral triangle and contents, Femoral vessels: origin, branches, course, distribution and abnormalities (sites of)	12	Describe, illustrate and explain the anatomy of cardiovascular system anatomy of heart (in detail) areas of auscultation.					1,8	

TEXT BOOKS:

T1: Fundamentals of Anatomy By Pamela K Levangie, Cynthia C Norkin, JP Bros Medical Publishers, New Delhi.

T2: Fundamentals of Medical Anatomy by [Duane Knudson](#), 2nd ed. 2007 Publisher Springer

REFERENCE BOOKS:

R1: Medical anatomy, JP Bros Medical Publishers, Bangalore, 1st Indian Ed 1997.

R2: Clinical Anatomy, JP Bros Medical Publishers, Bangalore, 5th Ed 1996, 1st Indian Ed 1998.

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme 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, 8

SEMESTER – III									
Course Title	Applied Physiology								
Course Code	24BDIT2102R	Total Credits: 3 Total Hours: 60P	L	T	P	S	R	O/F	C
			4	0	0	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	1. Able to apply the knowledge of physiology is aimed at imparting a knowledge in renal physiology and fluid homeostasis. 2. Able to explain the basic knowledge of renal circulation. 3. Able to explain the mechanisms of urine formation and micturition,								
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 Autoregulation of renal circulation.		12	Describe, illustrate and explain basic knowledge of renal circulation				1,2	
II	Mechanisms of Urine Formation and Micturition –Factors affecting urine formation Glomerular Filtration (GFR),		12	Describe, illustrate and explain the basic knowledge of Mechanisms of Urine Formation and Micturition.				1,2	
III	Physiology Values: Composition of Urine and 24 hours indices – urea, creatinine electrolytes, calcium, magnesium. Values of Urea, creatinine, electrolytes, calcium, phosphorous, uric acid, magnesium, glucose in blood. Clearance Studies.		12	Learn the comprehensive knowledge of physiology values				1,2	
IV	Hemostasis: Coagulation cascade, coagulation factors, autoregulation, BT, CT, PT, PTT, Thrombine time.		12	Describe, illustrate and explain the haemostasis				1,2	
V	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.		12	Describe, illustrate and explain the basic principles of Acid base balance and physiological effects.				1,2	

TEXT BOOKS:

T1: A book of Physiology, Dr. Khurana
T2: Medical Physiology, Guyton and Hall

REFERENCE BOOKS:

R1: Review of Medical Physiology–Ganong William F.
R2: Physiological basis of medical practice–Best & Taylor.

OTHER LEARNING RESOURCES:

Topic related journals from PubMed, Google Scholar, etc.
Youtube videos
E-learning materials

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge of renal circulation.	1, 8
2	Able to explain the mechanisms of urine formation and micturition,	1, ,8
3	Learn the basic knowledge of physiology values.	1, 8
4	Apply knowledge of haemostasis.	1, 8
5	Demonstrate a comprehensive understanding the basic principles of acid base balance and physiological effects.	1, 8

SEMESTER – III									
Course Title	Pathology								
Course Code	24BDIT2103R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 30T+60P	2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	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 haemodynamic 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 Chronic Inflammation, Systemic Effects of Inflammation, Consequences of Defective or Excessive Inflammation	6	Describe, illustrate and explain basic knowledge of pathology cellular adaptation. cell injury & cell death	1,2					
II	Hemodynamic Disorder, Thromboembolic Disease Shock: Hyperemia/Ischemia and Hemorrhage Edema Thrombosis and Emboli Infraction Shock	6	Describe, illustrate and explain the basic knowledge of hemodynamic disorder, thrombo-embolic disease shock	1,2					
III	Neoplasia: Nomanclature Carcinogenic Agents Tumors Grading Staging	6	Learn the comprehensive knowledge of neoplasia	1,2					

IV	<p>Renal Function Test: Overview of kidney function of kidney indication of renal function test based on glomerular filtration rate.</p> <p>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</p>	6	Describe, illustrate and explain the renal function test	1,2
V	<p>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 Introduction to Glassware's, plastic wares and laboratory wares</p> <p>Introduction on Microscope</p> <p>Hemoglobin Estimation</p> <p>Analysis of normal urine</p> <p>Routine and Microscopical examination of Urine Sample</p> <p>Kidney function Test</p>	6	Students will understand blood bank operations, use of laboratory wares, hemoglobin estimation, and kidney function tests to diagnose renal disorders and other health conditions.	1,8

TEXT BOOKS:

T1: Text book pathology – Harsh Mohans Basic Pathology – Edward Arnold

T2: Pathologic Basis of Disease-Robbin Text books

T3: Text book pathology – Harsh Mohans Basic Pathology – Edward Arnold Pathologic Basis of Disease-Robbina and Cotran

REFERENCE BOOK

R1: Handbook of Pathology For Postgraduate Students, 2 Nd Edition by Sandhya Sundaram, CBS Publishers and Distributors

R1: Comprehensive Pathology by Parmeshwar Goswami (Author),Anand Raj Kalla (Author), Kishore Khatri (Author), Scientific Publishers (India)

OTHER LEARNING RESOURCES:

ERP notes

Online study materials

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge of pathology cellular adaptation. cell injury & cell death	1, 8
2	Able to explain the Haemodynamic disorder, thromboembolic disease shock	1, .8
3	Learn the basic knowledge of neoplasia	1, 8
4	Apply knowledge of renal function test	1, 8
5	Demonstrate a comprehensive understanding the basic principles of blood bank.	1, 8

SEMESTER – III									
Course Title	Pharmacology								
Course Code	24BDIT2104R	Total Credits: 4 Total Hours: 60T	L	T	P	S	R	O/F	C
			4	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	1. To have a comprehensive knowledge of pharmacological intervention in dialysis and its clinical importance's. 2. To gather a specific knowledge on different diuretics and its pharmacodynamics 3. To enrich the specific knowledge about the diuretics.								
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.								
CO5	Apply knowledge on peritoneal dialysis solutions.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Introduction to basic pharmacology.	12	Describe, illustrate and explain basic knowledge of pharmacology				1,2		
II	IV Fluid Therapy with special emphasis in renal diseases.	12	Describe, illustrate and explain the basic knowledge of IV Fluid therapy with special emphasis in renal diseases.				1,2		
III	Diuretics: Classification. Actions. Side effects. Contraindications	12	Learn the comprehensive knowledge of diuretics				1,2		
IV	Antihypertensives: Classification, Actions and dosage	12	Describe, illustrate and explain the antihypertensives				1,2		
V	Peritoneal Dialysis Solution	12	Describe, illustrate and explain the peritoneal dialysis solution.				1,2		

TEXT BOOKS:

T1: Textbook of Modern Pharmacology 3rd Edition by Muniappan M, CBS Publishers

T2: Basic and Clinical Pharmacology 15 Ed, Mcgraw-Hill

REFERENCE BOOK:

R1: Essential of Pharmacology by K. D Tripathi

R2: Pharmacology for Allied Health Science by Padmaja Uday Kumar

OTHER LEARNING RESOURCES:

ERP notes

Online study materials

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge of pharmacology.	1, 8
2	Able to explain the IV Fluid therapy with special emphasis in renal diseases.	1, ,8
3	Learn the basic knowledge of diuretics.	1, 8
4	Apply knowledge of antihypertensive.	1, 8
5	Able to explain the basic knowledge of pharmacology.	1, 8

SEMESTER – III									
Course Title	Executive English								
Course Code	24UBPD2101R	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 Dialysis Technology								
Semester	Fall/ III Semester of Second 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 for time consuming to ascertain.								
CO1	Able to explain the basic knowledge of develop their writing skills through various techniques of language use.								
CO2	Able to explain the mechanisms of learners to manage behaviours, thoughts, and emotions in a conscious and productive way.								
CO3	Develop their critical thinking ability and develop an independency in their professional career.								
CO4	Able to express ideas clearly, participate in discussions, and give presentations with appropriate pronunciation and into nation.								
CO5	Demonstrate a comprehensive understanding the main ideas, details, and implied meanings in conversations, lectures, and video materials.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Grammar: Use of Prepositions Tag questions		6	Describe, illustrate and explain basic knowledge of renal circulation				1,2	
II	Grammar: Active and Passive Voice Direct and Indirect Speech		6	Describe, illustrate and explain the basic knowledge of Mechanisms of Urine Formation and Micturition.				1,2	
III	Writing Skills: The Basics of Writing; avoid ambiguity and vagueness Paragraph Writing Resume, CV and Cover Letter		6	Learn the comprehensive knowledge of physiology values				1,2	
IV	Self-Management Skills: SWOT Analysis Goal Setting Personal Hygiene		6	Describe, illustrate and explain the haemostasis				1,2	
V	Non-Verbal Communication-Sciences of Body Language: What is Non-Verbal Communication & Body Language, Types of Body Language, Importance and Impact of Body Language, Types of Communication through Body Language, Body Language Do's and Don'ts, Doubt Clearing Session Basic Tips to Maintain Time.		6	Describe, illustrate and explain the basic principles of Acid base balance and physiological effects.				1,2	

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 Nonfiction, Harper Perennial
- R2: Lacinai, Antonio. (2016) UnderstandingBodyLanguage:51gestures and what they signal, Bookson 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge of develop their writing skills through various techniques of language use.	1, 8
2	Able to explain the mechanisms of learners to manage behaviour's, thoughts, and emotions in a conscious and productive way.	1, 8
3	Develop their critical thinking ability and develop an independency in their professional career.	1, 8
4	Able to express ideas clearly, participate in discussions, and give presentations with appropriate pronunciation and intonation.	1,7, 8
5	Demonstrate a comprehensive understanding the main ideas, details, and implied meanings in conversations, lectures, and video materials.	1, 8

SEMESTER – III									
Course Title	Digital Literacy								
Course Code	24UDLS201R	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 Dialysis Technology								
Semester	Fall / III Semester of Second Year of the Programme								
Course Objectives	1. Students will be able to identify and analyse computer hardware, software and their uses. 2. Students will be able to use MS-Office suite for various purposes. 3. Students will be able 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	Apply MS-Office to solve basic information Management issues.								
CO3	Operate the Internet, social media and e-commerce sites efficiently and ethically.								
CO4	Analyse the cybercrimes on digital payments application.								
CO5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI.								
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. Lab Experiment: <ul style="list-style-type: none"> Identify the Components of a Computer and their Functions and different types of Computers and their Applications. Demonstrate the usage of various storage devices and identify various operating system file management commands 		4	Explain the fundamental of computer systems.				1,2	
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. Lab Experiment: <ul style="list-style-type: none"> Demonstrate how a document to be prepared and formatted in MS Word. Create casual applications for 3 days leave because of family marriage ceremony using Word Processor. Create a curriculum vitae using MS- Word. Creating a time table with MS – Word. Design PPT on Computer Components using different effects such as Insert, Design, Record etc., on slides. Design PPT on Computer Components using different effects such as Transitions, Animations etc., on slides. Creating the time table with MS-Excel. 		12	Describe the functions on different tools of Microsoft Office like MS-Excel, MS-Word, etc.				1,2	

	<ul style="list-style-type: none"> Creating the 10 student's Mark sheet include total, grade, percentage and results using MS-Excel's formulas 			
III	<p>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. Lab Experiments:</p> <ul style="list-style-type: none"> Creating a professional Google account and use various products of Google like drive, photos. Study of computer network and internet and Demonstrate how to search information using keywords in different search engines. 	6	Explain the importance and use of internet along with its adverse side.	1,2
IV	<p>Introduction to social media: The Power of social media, Relevance of social media in present scenario. Creating accounts and using some popular social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, and LinkedIn. Social Media Etiquettes. Lab Experiments:</p> <ul style="list-style-type: none"> Creating an account of some popular social media portals and Apps like LinkedIn, Facebook, Twitter and Instagram. Creating an accounts of digital payment systems like credit cards, debit cards, net banking 	4	Explain the power of social media their relevance and adverse effects to over using it.	1,2
V	<p>Introduction to Digital Payment Systems. Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, UPI. Lab Experiments:</p> <ul style="list-style-type: none"> Create online Google form and learn how to Give online test. Creating an account of Online Shopping sites like Amazon, flip kart, eBay etc. Understand the Journey of customer to buy and sell on online shopping sites. 	4	Illustrate the types of digital payment and their risks.	1,2

TEXT BOOKS:

T1: Sinha Pradeep K. and Priti Sinha "Computer Fundamentals: Concepts Systems & Applications" 3rd Edition

T2: Goel A "Computer Fundamentals" 2010

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Understanding of Computer Hardware, Software and Computer handling.	2,7
2	Apply MS-Office to solve basic information Management issues.	2,7
3	Operate the Internet, social media and e-commerce sites efficiently and ethically.	2,7
4	Analyse the cybercrimes on digital payments application.	2,7
5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI.	2,7

SEMESTER – III									
Course Title	Basic Acclimatizing Skills								
Course Code	24UULS2102R	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 Dialysis Technology								
Semester	Fall / III Semester of Second Year of the Programme								
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'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 household's amenities for day-to-day use.								
CO5	Students will develop an understanding of personal financial management and budgeting skills.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to Accommodation Management <ul style="list-style-type: none"> Telephone handling technique Organizing of Rooms. Cleaning agents. Cleaning equipment's and uses. Bed making Process. 	8	Explains the techniques of accommodation management.					1,2	
II	Fundamentals of Cooking <ul style="list-style-type: none"> Definition of cookery–Aim & Objectives of cooking. Use of basic Cooking equipment's Personal Hygiene and Safety Use of Fire & Fuels 	8	Introduces the fundamentals of cooking including efficient and safety methods.					1,2	
III	Methods of Cooking <ul style="list-style-type: none"> Different Cuts. Use of Herbs and Spices. Basic Food and Beverage Preparation. Regional food Habits 	6	Illustrates different methods of cooking.					1,2	
IV	Forms & Format's <ul style="list-style-type: none"> C –form Reservation form Registration form Passport Application form Legal Rent Agreement 	8	Explains and illustrates various formats of writing forms like reservation, passport, etc.					1,2	

TEXT BOOKS:

T1: Arora K “Theory of cookery” 2011

T2: Bruce H. Axler, Carol A. Litrides “Food and Beverage Service” 2010, Vol-1

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Students will have basic knowledge of cooking methods.	7
2	Students will gain the knowledge of organizing & Cleaning of Rooms.	6,7
3	Students will be able to gain the travel management concept.	7
4	Students will be able to acquire the knowledge of basic household's amenities for day- to-day use.	7
5	Students will develop an understanding of personal financial management and budgeting skills.	7

Semester – IV									
Course Title	Applied Pharmacology								
Course Code	24BDIT2201R	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 Dialysis Technology								
Semester	Spring/ IV Semester of Second Year of the Programme								
Course Objectives	1. To impart the knowledge in the technical aspects of pharmacological studies. 2. To gain knowledge on the common medications used in the management dialysis patients. 3. Able to apply knowledge on hemodialysis concentrates.								
CO1	Able to explain the drugs & dialysis Dose								
CO2	Able to explain the erythropoietin								
CO3	Apply the basic knowledge of heparin								
CO4	Able to apply antiseptic & disinfectants								
CO5	Demonstrate a comprehensive understanding the hemodialysis 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. Dialysable drugs Phenobarbitone, Lithium, Methanol, etc. Methanol, etc.	14	Describe, illustrate and explain basic knowledge of drugs & dialysis dose				1,2,8		
II	Erythropoietin Indications Side effects, Preparations & dosage.	10	Describe, illustrate and explain the basic knowledge of erythropoietin				1,2,8		
III	Heparin: Indications, Side effects, Dosage, Antagonists	10	Learn the comprehensive knowledge of heparin				1,2,4,8		
IV	Antiseptic & disinfectants Formalin, sodium hypochlorite, Hydrogen peroxide. Role as disinfectant. Residual effects.	12	Able to apply the antiseptic & disinfectants				1,2,4,8		
V	Hemodialysis Concentrates Acetate & bicarbonates Composition & dilution Peritoneal dialysis fluid (hypertonic solutions). Composition - Potassium exchange Resins- Mode of action, use, side effects.	14	Describe, illustrate and explain the hemodialysis concentrates				1,2,4,8		

TEXT BOOKS:

T1: Textbook Of Modern Pharmacology 3rd Edition By Muniappan M, CBS Publishers

T2: Basic and Clinical Pharmacology 15Ed, Mcgraw-Hill

REFERENCE BOOK:

R1: Essential of Pharmacology By K. D Tripathi

R2: Pharmacology for Allied Health Science by Padmaja Uday Kumar

OTHER LEARNING RESOURCES:

ERP notes

Online study materials

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the drugs & dialysis dose	1, 2, 8
2	Able to explain the It enables to erythropoietin	1,2, 8
3	Apply the basic knowledge of heparin	1, 2,4,8
4	Able to apply antiseptic & disinfectants	1, 2,4,8
5	Demonstrate a comprehensive understanding the haemodialysis concentrates	1, 2,4,8

Semester – IV									
Course Title	Basic of Dialysis Technology								
Course Code	24BDIT2202R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 30T+60P	2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Spring/ IV Semester of Second Year of the Programme								
Course Objectives	1. To have a comprehensive perception about working principle and mechanism of dialysis machines 2. Students will get a clear concept about the patient monitoring and specific clinical care 3. To provide adequate knowledge on hemodialysis.								
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 dialyzer reuse.								
CO5	Demonstrate a comprehensive understanding the monitoring of patients during dialysis.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	Introduction to Dialysis <ul style="list-style-type: none"> Definition, indications, and types of dialysis. Principles of dialysis. 		8	Describe, illustrate and explain basic knowledge of dialysis.					1,2,3
II	Haemodialysis Apparatus <ul style="list-style-type: none"> Introduction to the haemodialysis machine. Common complications during haemodialysis. 		10	Describe, illustrate and explain the functioning of haemodialysis apparatus.					1,2,3
III	Preparation and Access <ul style="list-style-type: none"> Types of priming for dialysis apparatus. Vascular access in haemodialysis. 		10	Learn the comprehensive knowledge preparation for dialysis.					1,2
IV	Dialyzer Maintenance <ul style="list-style-type: none"> Reuse of dialyzers: Principles, methods, and safety considerations. 		8	Able to apply the dialyzer reuse					1,3
V	Monitoring in Dialysis <ul style="list-style-type: none"> Monitoring and management of patients during dialysis. Addressing emergencies and troubleshooting during the procedure. 		12	Describe, illustrate and explain the monitor patients during dialysis.					1,3
Practical	Familiarization with Equipment <ul style="list-style-type: none"> Understanding parts and functions of a haemodialysis machine. Demonstration of machine setup. 		60	Able to demonstrate proficiency in operating haemodialysis equipment, including machine setup, priming techniques, vascular access management, dialyzer reuse procedures, and effective patient monitoring during dialysis sessions. They will also be					1,2,3
	Priming Techniques <ul style="list-style-type: none"> Step-by-step process of priming dialysis apparatus. 								
Vascular Access <ul style="list-style-type: none"> Hands-on practice with vascular access techniques. Care and maintenance of access points. 									

	<p>Dialyzer Reuse</p> <ul style="list-style-type: none"> • Demonstration of dialyzer cleaning and preparation for reuse. <p>Patient Monitoring</p> <ul style="list-style-type: none"> • Role-playing scenarios for monitoring patients. <p>Handling dialysis-related emergencies.</p>			
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TEXT BOOKS:

- T1: Daugirdas, J. T., Blake, P. G., & Ing, T. S. (Latest Edition). Handbook of Dialysis. Lippincott Williams & Wilkins.
- T2: Nissenson, A. R., & Fine, R. N. (Latest Edition). Clinical Dialysis. McGraw-Hill Education. T3: American Nephrology Nurses Association (ANNA). (Latest Edition). Core Curriculum for Nephrology Nursing. ANNA Publications.
- T4: Guest, S. (Latest Edition). Handbook of Peritoneal Dialysis. Springer.
- T5: Henrich, W. L. (Latest Edition). Principles and Practice of Dialysis. Lippincott Williams & Wilkins.
- T6: Feehally, J., Floege, J., & Johnson, R. J. (Latest Edition). Textbook of Clinical Nephrology. Elsevier.
- T7: El Kossi, M., & Blagg, C. R. (Latest Edition). The Essentials of Hemodialysis. Springer.

OTHER LEARNING RESOURCES:

Online resources Google scholar, PubMed, You tube, etc.

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme 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

Semester-IV									
Course Title	Applied Dialysis Technology I								
Course Code	24BDIT2203R	Total Credits: 4 Total Hours: 30T+60P	L	T	P	S	R	O/F	C
			2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Spring/ IV Semester of Second Year of the Programme								
Course Objectives	<ol style="list-style-type: none"> To provide a comprehensive understanding of the principles and practices of peritoneal dialysis. To train students in handling peritoneal dialysis equipment, solutions, and procedures. To prepare students to address special scenarios, including pediatric and high-risk populations. 								
CO1	Able to explain the principles and techniques of peritoneal dialysis.								
CO2	Able to explain the Gain proficiency in catheter care, PD exchanges, and monitoring patient outcomes.								
CO3	Apply the comprehensive knowledge of complications and special scenarios effectively.								
CO4	Able to apply the familiarize with advanced PD technologies and patient-centered care approaches.								
CO5	Develop skills for patient training and home-based PD Programmes.								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	Overview of peritoneal dialysis (PD): <ul style="list-style-type: none"> Historical background and development. Anatomy and physiology of the peritoneal membrane: <ul style="list-style-type: none"> Mechanism of solute transport and ultrafiltration. Factors influencing PD efficiency. Indications and contraindications for PD. Types of peritoneal dialysis: <ul style="list-style-type: none"> Continuous Ambulatory Peritoneal Dialysis (CAPD). Continuous Cycling Peritoneal Dialysis (CCPD). 		10	Describe, illustrate and explain basic knowledge of principles and techniques of peritoneal dialysis.			1,2,3		
II	Peritoneal Dialysis Solutions and Equipment: <ul style="list-style-type: none"> Composition of PD solutions: <ul style="list-style-type: none"> Dextrose-based, icodextrin based, and amino acid-based solutions. Adjusting solutions for ultrafiltration and clearance. Dialysis equipment: <ul style="list-style-type: none"> Cycler machines for CCPD. Accessories and consumables. Preparation and storage of PD solutions. Selecting appropriate solutions based on patient conditions. 		10	Describe, illustrate and explain the basic knowledge of peritoneal dialysis solutions and equipment.			1,2,3		

III	Catheter Insertion, Maintenance, and Complications: <ul style="list-style-type: none"> ▪ Peritoneal dialysis catheter: <ul style="list-style-type: none"> ▪ Types and placement techniques. ▪ Post-insertion care. ▪ Preventing and managing complications: <ul style="list-style-type: none"> ▪ Infection: peritonitis, exit site, and tunnel infections. ▪ Mechanical issues: leaks, obstructions, hernias. ▪ Catheter maintenance: <ul style="list-style-type: none"> ▪ Cleaning techniques and dressing protocols. ▪ Monitoring and troubleshooting common problems. 	5	Learn the comprehensive knowledge of catheter insertion, maintenance, and complications.	1,2,3
IV	Peritoneal Dialysis Procedure and Monitoring: <ul style="list-style-type: none"> • Steps in performing PD exchanges: <ul style="list-style-type: none"> ▪ Manual and automated exchanges. ▪ Connection, dwell, and drainage phases. • Monitoring patient outcomes: <ul style="list-style-type: none"> ▪ Assessing fluid balance, clearance, and ultrafiltration. ▪ Laboratory tests: Kt/V, creatinine clearance, glucose absorption. • Managing acute and chronic complications: <ul style="list-style-type: none"> ▪ Peritonitis protocols. ▪ Fluid overload and ultrafiltration failure. 	10	Able to apply the knowledge of peritoneal dialysis procedure and monitoring.	1,2,3
V	Special Scenarios and Innovations in Peritoneal Dialysis: <ul style="list-style-type: none"> • PD in special populations: <ul style="list-style-type: none"> ▪ Pediatric and elderly patients. ▪ Patients with diabetes and cardiovascular conditions. ▪ Pregnant patients. • Innovations in PD: <ul style="list-style-type: none"> ▪ Use of advanced biomaterials for PD catheters. ▪ New PD solutions and technologies. ▪ Portable and wearable PD systems. • Patient training and home-based PD: <ul style="list-style-type: none"> ▪ Techniques for effective patient education. ▪ Psychosocial aspects and caregiver support. 	10	Describe, illustrate and explain the special scenarios and innovations in peritoneal dialysis.	1,2,3
Practical	<ul style="list-style-type: none"> • Demonstrating PD catheter types and placements. • Performing PD setup for CAPD and APD • Preparing and testing PD solutions. • Setting up and operating a PD cyclor machine. • Storage and handling of PD solutions and equipment • Demonstrating catheter insertion techniques (simulation). • Cleaning and maintaining catheter exit sites. • Identifying and addressing catheter-related complications • Hands-on training for CAPD and APD exchanges. • Monitoring patient parameters during PD. • Case-based simulations for managing complications • Training patients and caregivers for home-based PD. • Simulated scenarios for pediatric and elderly PD management. • Exploring advanced PD technologies and equipment 	60	Apply the basic knowledge of principles and techniques of peritoneal dialysis, peritoneal dialysis solutions and equipment, technique of catheter insertion, maintenance, and complications, peritoneal dialysis procedure and monitoring, special scenarios and innovations in peritoneal dialysis.	1,2,3

TEXT BOOKS:

T1: Handbook of Dialysis-Jon T Daugirdas T2: Textbook of Dialysis Therapy-Nissenson

T3: Textbook Peritoneal Dialysis-Ram Gokal NANT and Oxford-Textbook of Dialysis for Technologist

REFERENCE BOOKS:

R1: The Essentials of Clinical Dialysis by Hideki Kawanishi (Editor), Yong-Lim Kim (Editor), Springer, USA

R2: Essentials of Nephrology 3ed By Visweswaran RK (Author, CRS Publication, New Delhi, India

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the principles and techniques of peritoneal dialysis.	1,2,8
2	Able to explain the Gain proficiency in catheter care, PD exchanges, and monitoring patient outcomes.	1,2,3,4,6, 8
3	Apply the comprehensive knowledge of complications and special scenarios effectively.	1,2,3,4,6, 8
4	Able to apply the familiarize with advanced PD technologies and patient-centered care approaches.	1,2,3,4,6, 8
5	Develop skills for patient training and home-based PD Programmes.	1,2,3,4,6, 8

Semester – IV									
Course Title	Concept of Renal Disease								
Course Code	24BDIT2204R	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 Dialysis Technology								
Semester	Spring/ IV Semester of Second Year of the Programme								
Course Objectives	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, tumors of kidney. Pregnancy associated renal diseases.								
CO5	Demonstrate a comprehensive understanding the renal vascular disorders.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Acute and Chronic Renal failure. Nephrotic Syndrome.	6	Describe, illustrate and explain basic knowledge of				1,2		
II	Urinary Tract Infection. Asymptomatic Urinary Abnormalities.	6	Describe, illustrate and explain the basic knowledge of Urinary Tract Infection. Asymptomatic Urinary Abnormalities.				1,2		
III	Renal Stone Diseases. Obstructive Uropathies	6	Learn the comprehensive knowledge of renal stone diseases. obstructive uropathies				1,2		
IV	Congenital Renal Diseases. Tumors of Kidney. Pregnancy associated renal diseases.	6	Able to apply the Congenital Renal Diseases. Tumours of Kidney				1,2		
V	Renal Vascular Disorders. Renal diseases due to hypertension.	6	Describe, illustrate and explain the renal vascular disorders				1,2		

TEXT BOOKS:

T1: Clinical text of Nephrology by John Fegally

T2: Text book of Nephrology- Oxford and Brenner Recto

REFERENCES BOOKS:

R1: Chronic renal disease, paull. Kimmel, marke. Rosenberg

R2: Chronic Kidney Disease, Dialysis, and Transplantation by Brenner and Rector, Academic Publishers, USA

OTHER LEARNING RESOURCES:

Online resources Google scholar

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the acute and chronic renal failure. nephrotic syndrome.	1, 8
2	Able to explain the It enables to urinary tract infection, asymptomatic urinary abnormalities.	1, 8
3	Apply the basic knowledge of renal stone diseases, obstructive uropathies.	1, 8
4	Able to apply congenital renal diseases, tumors of kidney. pregnancy associated renal diseases.	1, 8
5	Demonstrate a comprehensive understanding the renal vascular disorders.	1, 8

Semester – IV									
Course Title	Nutrition in Dialysis								
Course Code	24BDIT2205R	Total Credits: 2	L	T	P	S	R	O/F	C
		Total Hours: 30T+30P	2	0	0	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Spring/ IV Semester of Second Year of the Programme								
Course Objectives	1. To understand the dietary considerations for dialysis patients. 2. To provide knowledge for protein intake, fluid management, electrolytes balance. 3. Able to understanding the specific dietary strategies to support the overall health of dialysis patients.								
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 dialyzer reuse.								
CO5	Demonstrate a comprehensive understanding the monitoring of patients during dialysis.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to basic knowledge of the importance of nutrition in dialysis management, and anthropometric assessment.		2	Describe, illustrate and explain basic knowledge of dialysis.				1,8	
II	Protein Requirements in Dialysis Patients: Recommended Dietary Allowances Dietary sources		5	Describe, illustrate and explain the functioning of haemodialysis apparatus.				1,8	
III	Electrolytes Balance: RDA of sodium, potassium, and phosphorus Dietary restriction on high-phosphorus foods.		9	Learn the comprehensive knowledge preparation for dialysis.				1,8	
IV	Calcium Intake, Vitamin-D Supplementation Fluid Management		10	Able to apply the dialyser reuse				1,8	
V	Monitoring Blood Sugar Levels in dialysis patients.		4	Describe, illustrate and explain the monitor patients during dialysis.				1,8	

TEXT BOOKS:

T1: Laura D. Byham-Gray, Jerrilynn D. Burrowes, and Glenn M. Chertow.

T2: Additional articles and resources are provided throughout the course.

OTHER LEARNING RESOURCES:

Online resources Google scholar etc.

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the indications. types of dialysis. principles of dialysis.	1,8
2	Able to explain the hemodialysis apparatus	1,8
3	Apply the basic knowledge of type of priming of dialysis apparatus, vascular access in haemodialysis.	1,8
4	Able to apply dialyser reuse.	1,8
5	Demonstrate a comprehensive understanding the monitoring of patients during dialysis.	1,8

SEMESTER – V									
Course Title	Clinical Observation I								
Course code	24BDIT3101R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 360S	0	0	0	24	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ V Semester of Third Year of the Programme								
Course Objectives	1. Able to apply the skills, and competencies necessary to effectively provide and manage hemodialysis therapy. 2. Able to apply the vascular access management in dialysis patients. 3. Able to apply the dialyzer reprocessing in dialysis unit.								
CO1	Able to explain the basic knowledge of hemodialysis.								
CO2	Able to apply the Technique of Dialysis Evaluation								
CO3	Learn the basic knowledge of vascular access for hemodialysis.								
CO4	Apply knowledge of arteriovenous fistula in dialysis.								
CO5	Demonstrate a comprehensive understanding about dialyzer reprocessing.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Basic of Hemodialysis <ul style="list-style-type: none"> Types of Hemodialysis Principles of Hemodialysis Types of Hemodialysis Machine Hemodialysis Prescription 		360	Describe, illustrate and explain basic knowledge of basic knowledge of hemodialysis				1,2	
II	Technique of Dialysis Evaluation <ul style="list-style-type: none"> Pre-Treatment Patient Evaluation Treatment Evaluation Pre-dialysis dialyzer Inspection Procedure of Priming a Dialyzer Monitoring of Intradialytic Complication Termination of the Dialysis Treatment 			Describe, illustrate and explain the basic knowledge of technique of dialysis evaluation				1,2	
III	Vascular Access for Hemodialysis <ul style="list-style-type: none"> Types of Vascular Access Location of Arteriovenous Fistula creation Timing of maturation of the AVF Surgical technique of anastomosis creation Femoral Triangle technique 			Learn the comprehensive knowledge of vascular access for hemodialysis				1,2	
IV	Arteriovenous Fistula in dialysis <ul style="list-style-type: none"> Physiology of arteriovenous fistula. Preparation and assessment of AV Fistula Procedure of first cannulation Cannulation techniques Arteriovenous Fistula care Complications related to Arteriovenous Fistula 			Describe, illustrate and explain the arteriovenous fistula in dialysis				1,2	
V	Dialyzer Reprocessing <ul style="list-style-type: none"> Guidelines for dialyzer reprocessing Dialyzer cleaning and disinfection processes Sterilization Techniques for Dialyzer Dialyzer Reprocessing Equipment and Technology Measurement of the dialyzer reprocessing Documentation and record keeping 			Describe, illustrate and explain the dialyzer reprocessing				1,2	

TEXT BOOKS:

- T1: Handbook of Dialysis-Jon T Daugirdas
T2: Textbook of Dialysis Therapy-Nissenson
T3: Textbook Peritoneal Dialysis-Ram Gokal
T4: NANT and Oxford-Textbook of Dialysis for Technologists

REFERENCE BOOKS:

- R1: The Essentials of Clinical Dialysis by Hideki Kawanishi (Editor), Yong-Lim Kim (Editor), Springer, USA
R2: Essentials Of Nephrology 3ed By Visweswaran R K (Author, CRS Publication, New Delhi, India
R3: Hard cover by Matthew R. Weir Edgar L. Lerma ,Austin, Texas ,USA

OTHER LEARNING RESOURCES:

Youtube, Google scholars

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge of hemodialysis.	1, 2,3,4,8
2	Able to apply the Technique of Dialysis Evaluation	1, 2, 3,4, 8
3	Learn the basic knowledge of vascular access for hemodialysis.	1,2, 3, 4, 8
4	Apply knowledge of arteriovenous fistula in dialysis.	1, 2,3, 4, 8
5	Demonstrate a comprehensive understanding about dialyzer reprocessing.	1, 2, 3, 4,8

SEMESTER – V									
Course Title	Clinical Observation II								
Course Code	24BDIT3102R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 260S	0	0	0	24	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ V Semester of Third Year of the Programme								
Course Objectives	1. Able to apply the knowledge, and skills that are required to provide patients receiving peritoneal dialysis therapy all of the care they need. 2. Able to understand the comprehensive about psychosocial and quality of life considerations. 3. Able to apply the knowledge of assessing dialysis adequacy.								
CO1	Able to explain the basic knowledge of peritoneal dialysis.								
CO2	Able to explain the complications and treatments of peritoneal dialysis.								
CO3	Learn the basic knowledge of education and training in peritoneal dialysis.								
CO4	Apply knowledge of psychosocial and quality of life considerations.								
CO5	Demonstrate a comprehensive understanding the assessing dialysis adequacy.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Basic knowledge of Peritoneal Dialysis <ul style="list-style-type: none"> • Physiology of Peritoneal cavity • Peritoneal Equilibrium Test • Types of Peritoneal Dialysis Catheters • Peritoneal Dialysis Solutions • Peritoneal Dialysis Technique 	360	Describe, illustrate and explain basic knowledge of peritoneal dialysis	1,2					
II	Complications and treatments of Peritoneal Dialysis <ul style="list-style-type: none"> • Pathogenesis • Signs & Symptoms • Differential Diagnosis of Cloudy Effluent • Treatment of PD complications • Indication for catheter removal for PD-related infections 		Describe, illustrate and apply the complications and treatments of peritoneal dialysis	1,2					
III	Education and Training in Peritoneal Dialysis <ul style="list-style-type: none"> • Introduction • Assessment • Implementation • Evaluation • Retraining & Home Visits 		Learn the comprehensive knowledge of education and training in peritoneal dialysis	1,2					
IV	Psychosocial and Quality of Life Considerations <ul style="list-style-type: none"> • Psychological impact of peritoneal dialysis on patients and families • Patient education and self-care skills training • Quality of Life assessment and interventions 		Describe, illustrate and explain the psychosocial and quality of life considerations	1,2					
V	Assessing Dialysis Adequacy <ul style="list-style-type: none"> • Importance of Dialysis Adequacy • Measures of Dialysis Adequacy • Techniques for assessing Dialysis Adequacy 		Describe, illustrate and explain the assessing dialysis adequacy	1,2					

TEXT BOOKS:

- T1: Handbook of Dialysis-Jon T Daugirdas
T2: Textbook of Dialysis Therapy-Nissenson
T3: Textbook Peritoneal Dialysis-Ram Gokal
T4: NANT and Oxford-Textbook of Dialysis for Technologists

REFERENCE BOOKS:

- R1: The Essentials of Clinical Dialysis by Hideki Kawanishi (Editor), Yong-Lim Kim (Editor), Springer, USA
R2: Essentials Of Nephrology 3ed By Visweswaran R K (Author, CRS Publication, New Delhi, India

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge of peritoneal dialysis.	1,2,3,4,8
2	Able to explain the complications and treatments of peritoneal dialysis.	1,2,3,4,8
3	Learn the basic knowledge of education and training in peritoneal dialysis.	1,2,3,4,8
4	Apply knowledge of psychosocial and quality of life considerations.	1,2,3,4,8
5	Demonstrate a comprehensive understanding the assessing dialysis adequacy.	1,2,3,4,8

SEMESTER – V									
Course Title	Clinical Observation III								
Course Code	24BDIT3103R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 360S	0	0	0	824	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Dialysis Technology								
Semester	Fall/ V Semester of Third Year of the Programme								
Course Objectives	1. Able to apply the knowledge, information, abilities, and competencies needed to handle hemodialysis patients' water treatment 2. Able to understand the comprehensive about bicarbonate delivery, and safety monitoring 3. Able to apply the anticoagulant therapy, and medication.								
CO1	Able to apply the knowledge of reverse osmosis water in hemodialysis.								
CO2	Able to apply the knowledge delivery systems for bicarbonate hemodialysis								
CO3	Able to learn about the management of safety monitors on hemodialysis machines.								
CO4	Able to apply the management of anticoagulation for hemodialysis.								
CO5	Demonstrate an exposure the pharmacotherapy in dialysis patients.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Reverse Osmosis Water in Hemodialysis <ul style="list-style-type: none"> Different Types of filters Functions of Reverse Osmosis water Monitoring of Reverse Osmosis Water Loop Disinfection 	360	Describe, illustrate and explain basic knowledge of Reverse Osmosis Water in Hemodialysis	1,2					
II	Delivery Systems for Bicarbonate Hemodialysis <ul style="list-style-type: none"> Types of Hemodialysis Fluid Techniques of Bicarbonate Hemodialysis Complications of Bicarbonate Hemodialysis 		Describe, illustrate and apply the Delivery Systems for Bicarbonate Hemodialysis.	1,2					
III	Management of Safety Monitors on Hemodialysis Machines <ul style="list-style-type: none"> The Dialysate Circuit The Blood Circuit 		Learn the comprehensive knowledge of Management of Safety Monitors on Hemodialysis Machines	1,2					
IV	Management of Anticoagulation for Hemodialysis <ul style="list-style-type: none"> Monitoring test for Anticoagulation Heparinization Protocols Protocols with Other Agents 		Describe, illustrate and explain the Management of Anticoagulation for Hemodialysis	1,2					
V	Pharmacotherapy in Dialysis Patients <ul style="list-style-type: none"> Pharmacokinetic Drug dosing adjustments in dialysis patients Common medications used in dialysis 		Describe, illustrate and apply the Pharmacotherapy in Dialysis Patients	1,2					

TEXT BOOKS:

T1: Handbook of Dialysis-Jon T Daugirdas

T2: Textbook of Dialysis Therapy-Nissenson

T3: Textbook Peritoneal Dialysis-Ram Gokal

T\$: NANT and Oxford-Textbook of Dialysis for Technologists

REFERENCE BOOKS:

R1: The Essentials of Clinical Dialysis by Hideki Kawanishi (Editor), Yong-Lim Kim (Editor), Springer, USA

R2: Essentials Of Nephrology 3ed By Visweswaran R K (Author, CRS Publication, New Delhi, India

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to apply the knowledge of reverse osmosis water in hemodialysis.	1, 2,3,4,8
2	Able to apply the knowledge delivery systems for bicarbonate hemodialysis	1, 2, 3,4, 8
3	Able to learn about the management of safety monitors on hemodialysis machines.	1,2, 3, 4, 8
4	Able to apply the management of anticoagulation for hemodialysis.	1, 2,3, 4, 8
5	Demonstrate an exposure the pharmacotherapy in dialysis patients.	1, 2, 3, 4,8

Semester-VI									
Course Title	Applied Dialysis Technology II								
Course Code	24BDIT3201R	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 Dialysis Technology								
Semester	Spring/ VI Semester of Second Year of the Programme								
Course Objectives	1. To impart the basic knowledge of dialysis special situations and clinical evaluation of patients with renal disease. 2. To gather knowledge on special dialysis procedures. 3. To gather knowledge on trained dialysis technicians who provide strong paramedical support system to hospitals for providing specialized care to renal failure patients.								
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	Introduction to Dialysis: <ul style="list-style-type: none"> • Basic principles of dialysis • Indications for dialysis (Acute vs chronic kidney disease) • Types of dialysis: Hemodialysis and Peritoneal Dialysis • Dialysis modalities and advancements in technology 	9	Describe, illustrate and explain basic knowledge of principles of dialysis	1,2					
II	Dialysis in Special Situations: <ul style="list-style-type: none"> • Congestive Cardiac Failure (CCF) <ul style="list-style-type: none"> ○ Impact of dialysis on cardiac failure ○ Fluid management and monitoring during dialysis • Advanced Liver Disease <ul style="list-style-type: none"> ○ Hepatorenal syndrome and dialysis ○ Management strategies • HIV, HBsAg & HCV Positive Patients <ul style="list-style-type: none"> ○ Dialysis considerations and infection control ○ Antiviral therapy and dialysis coordination • Failed Kidney Transplants <ul style="list-style-type: none"> ○ Re-initiation of dialysis post-transplant failure ○ Considerations in managing transplant-related complications • Poisoning Cases <ul style="list-style-type: none"> ○ Dialysis in acute poisoning (e.g., methanol, lithium, theophylline) ○ Clinical decision-making in poisoning-related dialysis • Pregnancy <ul style="list-style-type: none"> ○ Dialysis during pregnancy: Risk assessment and management Effects of pregnancy on dialysis and vice versa	10	Describe, illustrate and explain the basic knowledge of dialysis in special patient populations	1,2,3					

III	Dialysis in Infants and Children: <ul style="list-style-type: none"> • Pediatric dialysis considerations • Dialysis techniques in children Management of pediatric dialysis complications	7	Learn the comprehensive knowledge of dialysis procedures for infants and children	1,2,3,
IV	Special Dialysis Procedures: <ul style="list-style-type: none"> • Continuous Renal Replacement Therapies (CRRT) <ul style="list-style-type: none"> ○ Indications, principles, and types of CRRT (SLED, CVVH, etc.) • Peritoneal Dialysis (PD) <ul style="list-style-type: none"> ○ Different PD modalities: CAPD, APD ○ Indications, procedure, and complications • Hemodiafiltration (HDF) & Hemoperfusion <ul style="list-style-type: none"> ○ Clinical applications and benefits ○ Protocols and monitoring • MARS-Type Dialysis <ul style="list-style-type: none"> ○ Advanced dialysis for liver failure Membrane types and use	9	Able to apply the knowledge of Evaluate and select advanced dialysis techniques	1,2,3,
V	Special Problems in Dialysis Patients: <ul style="list-style-type: none"> • Diabetes Management <ul style="list-style-type: none"> ○ Insulin use in dialysis patients ○ Dialysis and glucose control • Hypertension Management <ul style="list-style-type: none"> ○ Dialysis and blood pressure control ○ Pharmacologic and non-pharmacologic approaches • Infection Control in Dialysis Patients <ul style="list-style-type: none"> ○ Types of infections in dialysis patients ○ Prevention and treatment protocols • Bone Diseases and Renal Osteodystrophy <ul style="list-style-type: none"> ○ Dialysis-related bone mineral disease ○ Treatment options for bone disease in dialysis patients • Psychology and Rehabilitation <ul style="list-style-type: none"> ○ Emotional support and coping mechanisms for dialysis patients ○ Rehabilitation strategies to improve quality of life • Aluminium Toxicity and Renal Anaemia Management <ul style="list-style-type: none"> ○ Dialysis-associated aluminum toxicity Treatment of renal anaemia in chronic dialysis	10	Describe, illustrate and explain the common clinical problems in dialysis patients	1,2,3
Practical	<ul style="list-style-type: none"> • Hands-on demonstration of hemodialysis and peritoneal dialysis techniques • Setting up and monitoring machines for different dialysis types (Hemodialysis, CRRT, etc.) • Troubleshooting common issues in dialysis machines • Practical training in CRRT, SLED, and hemodiafiltration • Use of MARS-type dialysis systems • Managing dialysis in critically ill patients • Dialysis in special populations (e.g., pregnant patients, pediatric patients) • Managing dialysis in liver disease, diabetes, and hypertension • Infection control practices in dialysis settings • Training on patient education and support 	60	Perform dialysis procedures proficiently, Execute advanced dialysis therapies, Manage dialysis in special cases, Provide patient care and education	1,2,3

	<ul style="list-style-type: none"> • Home dialysis training and patient self-management • Simulation of dialysis setup and patient monitoring Psychological support and counselling for dialysis patients			
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TEXT BOOKS:

T1: Handbook of Dialysis-Jon T Daugirdas

T2: Textbook of Dialysis Therapy-Nissenson

T3: Textbook Peritoneal Dialysis-Ram Gokal NANT and Oxford-Textbook of Dialysis for Technologist

REFERENCE BOOKS:

R1: The Essentials of Clinical Dialysis by Hideki Kawanishi (Editor), Yong-Lim Kim (Editor), Springer, USA

R2: Essentials of Nephrology 3ed By Visweswaran RK (Author, CRS Publication, New Delhi, India

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the use of dialysis in special situations.	1,2,8
2	Able to explain the basic knowledge of dialysis in infants and children.	1,2,3,4,6, 8
3	Apply the comprehensive knowledge of special dialysis procedures.	1,2,3,4,6, 8
4	Able to apply the plasmapheresis procedures.	1,2,3,4,6, 8
5	Understanding a comprehensive of the special problems in dialysis patients.	1,2,3,4,6, 8

SEMESTER – VI									
Course Title	Applied Dialysis Technology III								
Course Code	24BDIT3202R	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 Dialysis Technology								
Semester	Spring/ VI Semester of Third Year of the Programme								
Course Objectives	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. 2. Able to understand comprehensive about peritoneal access. 3. Able to apply the telemedicine.								
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	
II	Peritoneal access devices: types of catheter, insertion technique & associated complications. Peritonitis & exit site infection	15	Describe, illustrate and explain the basic knowledge of peritoneal access					1,2	
III	Complications of dialysis: Hemodialysis: acute & long-term complications. Peritoneal dialysis: Mechanical & metabolic complications	10	Learn the comprehensive knowledge of complication of dialysis					1,2	
IV	Recent advances and research in Hemodialysis. Nocturnal dialysis Online dialysis. Daily dialysis.	6	Describe, illustrate and explain the recent advances and research in hemodialysis					1,2	
V	Telemedicine in dialysis practice complications.	6	Describe, illustrate and explain the telemedicine in dialysis practice.					1,2	
Practical	Reuse of dialysis apparatus. Isolated ultrafiltration. Performance of peritoneal dialysis exchange manually. Setting up of automated peritoneal dialysis equipment. First assistant in minor procedures. Skin suturing. CPR demonstrations 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).	60	Able to apply the reuse of dialysis apparatus, isolated ultra-filtration, performance of peritoneal dialysis exchange manually, setting up of automated peritoneal dialysis equipment, first assistant minor procedures, skin suturing.					1,2	

TEXT BOOKS:

T1: Handbook for Dialysis Technician Dr Anjani Sharma (Author), Faswal Pichan (Author)

T2: Textbook on Renal Dialysis Technology By Dr. B.C. Bhagavan. New Delhi, India

REFERENCE BOOKS:

R1: Davidson's Principles and Practice of Medicine/24 the 2nd Edition New York USA.

R2: Henrich's Principles and Practice of Dialysis, 5/e Hard cover by Matthew R. Weir Edgar L. Lerma, Austin, Texas, USA

OTHER LEARNING RESOURCES:

Youtube, Google scholar

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge of vascular access for hemodialysis and associated complications.	1, 2,3,4,8
2	Able to explain the peritoneal access.	1, 2, 3,4, 8
3	Learn the basic knowledge of complication of dialysis.	1,2, 3, 4,8
4	Apply knowledge of recent advances and research in hemodialysis.	1, 2,3, 4, 8
5	Demonstrate a comprehensive understanding the telemedicine in dialysis practice.	1, 2, 3, 4,8

SEMESTER – VI									
Course Title	Renal Transplantation								
Course Code	24BDIT3203R	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 Dialysis Technology								
Semester	Spring/ VI Semester of Third Year of the Programme								
Course Objectives	1. Able to learn about the transplantation. 2. Able to learn the various forms of renal replacement therapy and successful performance of the same in patients with renal failure. 3. Able to learn about the different types of graft.								
CO1	Able to explain the basic knowledge of kidney transplant.								
CO2	Able to explain the history of transplantation.								
CO3	Learn the basic knowledge of types of graft and rejection.								
CO4	Apply knowledge of tissue matching and investigation to transplant								
CO5	Able to understand the live donor and cadaver donor in renal transplant.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Introduction to kidney transplantation immunology, procedure and Immunosuppressive medications	9	Describe, illustrate and explain the basic knowledge of kidney transplant.				1,2		
II	History of transplantation What is renal transplantation? Indications. Contraindication	9	Describe, illustrate and explain the history of transplantation				1,2		
III	Transplantation Descriptive terms. Types of grafts. Graft rejection. Types of tissue and organs transplanted	9	Learn the comprehensive knowledge of types of graft and rejection.				1,2		
IV	Tissue matching and other relevant investigation to transplant Prevention & treatment of rejection. dialysis. Daily dialysis.	9	Describe, illustrate and explain the tissue matching and investigation to transplant				1,2		
V	Live donor and cadaver transplantation, paired exchange transplantation and ABO Incompatible, transplantation, transplant in sensitized recipients	9	Describe, illustrate and explain the live donor and cadaver donor in renal transplant.				1,2		

TEXT BOOKS:

T1: Handbook for Dialysis Technician Dr Anjani Sharma (Author), Faswal Pichan (Author)

T2: Textbook on Renal Dialysis Technology By Dr. B.C. Bhagavan. New Delhi, India

REFERENCE BOOKS:

R1: Davidson's Principles And Practice Of Medicine/24th 2nd Edition new York USA.

R1: Henrich's Principles and Practice of Dialysis, 5/e Hard cover by Matthew R. Weir Edgar L. Lerma, Austin, Texas, USA

OTHER LEARNING RESOURCES:

Youtube, Google scholar

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Able to explain the basic knowledge of kidney transplant.	1,8
2	Able to explain the history of transplantation.	1,8
3	Learn the basic knowledge of types of graft and rejection.	1,8
4	Apply knowledge of tissue matching and investigation to transplant	1,8
5	Able to understand the live donor and cadaver donor in renal transplant.	1,8

SEMESTER – VI									
Course Title	Medical Ethics in Dialysis								
Course Code	24BDIT3204R	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 Dialysis Technology								
Semester	Spring/ VI Semester of Third Year of the Programme								
Course Objectives	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			9	Describe, illustrate and explain the basic knowledge of Sterilization			1,2	
II	Types of sterilization and details of different types of sterilization.			9	Describe, illustrate and explain the different types of sterilization.			1,2	
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)			9	Learn the comprehensive knowledge of ethics.			1,2	
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. Daily dialysis. Law & Ethics? Medical Ethics- Overall review in Ethicsfor emergency Medical Technician (EMT) (in details)			9	Describe, illustrate and explain the types of law.			1,2	
V	Mandatory Reporting			9	Describe, illustrate and explain the mandatory reporting.			1,2	

TEXT BOOKS:

T1: Textbook of Emergency Care in the Street by Nancy Caroline

REFERENCE BOOKS:

R1: The Essentials of Clinical Dialysis by Hideki Kawanishi (Editor), Yong-Lim Kim (Editor), Springer, USA

R2: Essentials of Nephrology 3 ed By Visweswaran RK (Author, CRS Publication, New Delhi, India

OTHER LEARNING RESOURCES:

ERP contents, Online resources

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme 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



Assam down town University

Curriculum and Syllabus

Bachelor of Trauma, Emergency and Disaster Management

**OUTCOME BASED EDUCATION FRAMEWORK
CHOICE BASED CREDIT SYSTEM**

Version: 2.2

**FACULTY OF PARAMEDICAL
SCIENCES**

July, 2024


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 Board of Studies (BOS) meeting of the Faculty of Paramedical Science held on dated 20/06/2024 and approved by the 51st Academic Council (AC) meeting held on dated 26/07/2024.



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 multi-disciplinary 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 inter disciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stake holders 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 Trauma, Emergency, and Disaster Management is a three-year undergraduate program designed to equip graduates with the skills and knowledge to effectively manage emergencies, disasters, and trauma care. The course integrates medical sciences, disaster risk reduction, crisis management, and public health strategies. Through hands-on training, simulations, and case studies, graduates gain expertise in emergency planning, rescue operations, disaster preparedness, and trauma care.

I. Specific Features of the Curriculum

The curriculum provides skill enhancement and value-added courses along with the core papers.

II. Eligibility Criteria:

Minimum 45% in 10+2 with English, Biology & Chemistry. 5% relaxation for SC/ST, EWS, and especially able candidates.

III. 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.

IV. 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.

V. Program Outcome: (POs)

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.

VI. Total Credits to be Earned: 133

VII. Career Prospects:

Graduates with a B.Sc. in Critical and Intensive Care Unit Technology have excellent career prospects in Emergency Medical Technician (EMT), Trauma Care Specialist, Disaster Response Coordinator, Emergency Services Manager, Crisis Management Consultant, Safety Officer, Public Health Emergency Planner.

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

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.:

- Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- Viva-Voice, 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 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

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^{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^{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 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

(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.

2. 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%

3. 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.

Breakdown of Credits

Sl. No.	Category	Total number of Credits
1	DSC Major	70
2	DSC Minor	18
3	Multidisciplinary Course (MDC)	9
4	Ability Enhancement Course (AEC)	8
5	Skill Enhancement Course (SEC)	9
6	Value Added Course (VAC)	6
7	Internship	4
8	Research/Industry Internship	6
9	Field Training	1
10	Co & Extra-Curricular	3
Total:		133

Breakdown by categories of courses

Sl. No.	Category	Credits	%
1	Paramedical Sciences	119	89.47%
2	Science	2	1.50%
3	Engineering	1	0.75%
4	Commerce and Management	2	1.50%
5	CLPPD	6	4.51%
6	Humanities and Social Sciences	3	2.25%
Total :		133	100%

SEMESTER WISE COURSE DISTRIBUTION

	S.N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
Semester I	1	24BEDM1101R	Human Anatomy and Physiology I	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200
	2	24BEDM1102R	General Biochemistry	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3	24BEDM1103R	Basic Principles of Hospital Practice and Patient Care	DSC (Minor)	2	0	0	0	0	0	2	40	60	100	200
	4	24UBPD1101R	Basic Communication English	AEC	0	0	2	0	0	0	1	0	0	100	100
	5	24BEDM1101M	The Art and Science of Relationship: Understanding Human Need	VAC	2	0	0	0	0	0	2	0	100	0	100
	6	24BEDM1104R	Medical Psychology	MDC	3	0	0	0	0	0	3	40	60	0	100
	7	24BEDM1105R	(TPS) Basic Clinical Examination	VAC	0	0	2	0	0	0	1	0	0	100	100
	Total					14	0	10	4	0	0	20	280	340	400
Semester II	S.N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
	1	24BEDM1201R	Human Anatomy and Physiology II	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200
	2	24BEDM1202R	Biochemistry: Biomolecules and its Metabolism	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3	24BEDM1203R	Fundamentals of Patient Care and Safety	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
	4	24UBPD1201R	Functional English	AEC	0	0	2	0	0	0	1	0	0	100	100
	5	24URSH1201R	Radiation Sources & Hazards	MDC	3	0	0	0	0	0	3	40	60	0	100
	6	24UBES1201R	Environmental Studies	VAC	2	0	0	0	0	0	2	40	60	0	100
	7	24BEDM1204R	Self- Study Seminar/Presentation	AEC	0	0	2	0	0	0	1	0	0	100	100
8	24UBCC1201	Co-Curricular	VAC	0	0	0	4	0	0	1	100	0	0	100	
Total					14	0	10	4	0	0	20	300	300	400	1000

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
1	24BEDM2101R	Airway Management and Respiratory Emergencies	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200	
2	24BEDM2102R	Patient Assessment and Drug Administration	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200	
3	24BEDM2103R	Wound Care and Suture Techniques	DSC (Minor)	2	0	2	0	0	0	3	40	60	100	200	
4	24BEDM2104R	Pharmacology	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100	
5	24BEDM2105R	Biomedical Waste	DSC (Minor)	1	0	0	0	0	0	1	40	60	0	100	
6		Radiation Safety & Protection	MDC	1	0	0	0	0	0	1	40	60	0	100	
7		DISA	SEC	1	0	0	0	0	0	1	0	0	100	100	
8	24UBPD2101R	Executive English	AEC	0	0	2	0	0	0	1	0	0	100	100	
9	24UCDL2101R	Digital Literacy	VAC	0	0	2	0	0	0	1	0	0	100	100	
10		BAS	MDC	0	0	2	0	0	0	1	0	0	100	100	
11	24BEDM2106R	First Aid	SEC	0	0	2	0	0	0	1	0	0	100	100	
12	24BEDM2107R	Field Training	FT	0	0	0	0	0	8	1	0	0	100	100	
Total				13	0	18	0	0	0	8	23	240	360	900	1500

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
1	24BEDM2201R	Cardiovascular and Neurological Emergency Management	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200	
2	24BEDM2202R	Mechanical Ventilation	DSC (Major)	2	0	2	0	0	0	3	40	60	100	200	
3	24BEDM2203R	Medical Equipment and Terminologies	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100	
4	24BEDM2204R	Introduction to ambulance operation system	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100	
5	24BEDM2205R	Pharmacology II	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100	
6	24BEDM2206R	Patient Safety and Quality Care	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100	
7	24UBPD2201R	Enhanced Professional Skills	AEC	0	0	2	0	0	0	1	0	0	100	100	
8	24UUFL2202R	Financial Literacy	MDC	0	0	2	0	0	0	1	0	0	100	100	
9	24BEDM2207R	Advanced Cardiac Life Support (ACLS)	SEC	0	0	4	0	0	0	2	0	0	100	100	
10	24UULS2202R	BLSS	VAC	0	0	2	0	0	0	1	0	0	100	100	
11	Self-Study Seminar	24BEDM2208R	AEC	0	0	2	0	0	0	1	0	0	100	100	
Total				13	0	18	0	0	0	22	240	360	700	1300	

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
Semester V	1	24BEDM3101R	Clinical Observation I (Emergency Patient Care)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100
	2	24BEDM3102R	Clinical Observation II (Advanced Concepts and Specialized Care)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100
	3	24BEDM3103R	Clinical Observation III (Communication and Documentation Skills)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100
	4	24BEDM3104R	Case Study Report	SEC	0	0	0	16	0	0	4	0	0	100	100
	5	24BEDM3105R	Summer Internship		0	0	0	0	0	24	4	0	0	100	100
	6	24BEDM3106R	Research	SEC	0	0	2	0	18	0	2	0	0	100	100
	7	24BEDM3101R	Clinical Observation I (Emergency Patient Care)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100
Total				0	0	2	80	18	24	26	0	0	700	700	
Semester VI	1	24BEDM3201R	Trauma Care	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200
	2	24BEDM3202R	Disaster Management in Health Care	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200
	3	24BEDM3203R	Introduction to Emergency Medical Services	DSC (Major)	4	0	0	0	0	0	4	40	60	0	100
	4	24BEDM3204R	Introduction Research Methodology	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100
	5	24BEDM3205R	Research/ Industry Internship	Research	0	0	0	0	24	0	4	0	0	100	100
	6	24BEDM3206R	Techno Professional Skills	SEC	0	0	8	0	0	0	4	0	0	100	100
	7		Finishing School	AEC	0	0	4	0	0	0	2	0	0	100	100
	Total				12	0	20	0	24	0	26	160	240	500	900

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

SEMESTER – I									
Course Title	Human Anatomy and Physiology I								
Course code	23BEDM111R	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 Trauma Emergency and Disaster Management								
Semester	Fall / I semester of first year of the programme								
Course Objectives	1. To learn about the anatomical positions, gross and microscopic structure of the organs and skeleton in the human body. 2. To assist students in developing a better grasp of the anatomical structure and basic Physiological function of various body regions. 3. To study practically the anatomical structures of human body.								
CO1	Discuss the anatomical terms and basic structure and function of cells.								
CO2	Explore knowledge of Musculo skeletal system and bones along with their special features and functions.								
CO3	Describe the composition of the human digestive system and their specific functions.								
CO4	Explain respiratory system and classify various respiratory disorders.								
CO5	Describe the anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body.								
Unit- No.	Content			Contact Hour	Learning Outcome			KL	
I	Introduction To Anatomical Terms, Basic Structure and Function of Cell <ul style="list-style-type: none"> • Level of Organization – Body Parts and Areas, Planes and Sections. Common anatomical terminology • Structure and Function of Cell Membrane, Cellular Transport 			7	Describe the fundamental knowledge of anatomical structures of human bodies and the cellular functions.			1,2	
II	Musculo –Skeletal-System and Bones <ul style="list-style-type: none"> • Bones: Classification & types according to morphology. • Tissue and its types • Cartilage • Joints: definition, classification, and movements of joints. • Muscle and its types For Specific • Programs Radiology: Importance of different bones of human body. 			10	Explain the fundamentals of anatomy of bone, tissue, cartilage, joints, muscle and become thorough on it.			1,2	
III	Digestive System- <ul style="list-style-type: none"> • Anatomy of gastrointestinal tract and accessory organs of digestive system. • Composition and functions of gastric, pancreatic, intestinal, and biliary secretion. 			8	Describe the anatomy and different function of systems in the body.			1,2	
IV	Respiratory System- <ul style="list-style-type: none"> • Anatomy of the Respiratory tract • Mechanisms and Regulation of respiration. 			10	Classify the respiratory system, its			1,2	

	<ul style="list-style-type: none"> • Gaseous exchange in lung and tissues. • Lung volumes and capacities. • Respiratory abnormalities: Hypoxia, cyanosis, dyspnoea, Asphyxia, hyperventilation, hypoventilation, tachypnoea and bradypnea <p>Specific Program</p> <ul style="list-style-type: none"> • ECC: Intra-pleural and intrapulmonary pressures and their changes with respiration, Hypoxia. <p>For Specific programs</p> <p>ECC: Description of larynx, trachea, and respiratory centres</p>		function of different parts of the respiratory system and some respiratory abnormalities.	
V	<p>Cardiovascular System and Blood:</p> <ul style="list-style-type: none"> • Mediastinum– division • Structure of heart and blood vessels. • Systemic circulation, pulmonary circulation, and coronary circulation • Cardiac output, cardiac cycle, conducting system of heart. • Heart sounds, pulse, blood pressure and their regulation. • Composition and functions of blood, Plasma, and body fluids. • Functions of RBC, WBC and platelets • Hemoglobin. • Blood hemostasis • Blood groups 	10	Explain the anatomical structures in the cardiovascular System and their functions also all the components of blood.	1,2
Practical	<ol style="list-style-type: none"> 1. Study of Skull, Vertebrae, Ribs and bones of upper limb. 2. Study of compound microscope. 3. Measurement of blood pressure, Arterial pulse 4. Bleeding time (BT) Clotting time (CT) 5. Haemoglobin estimation 	60		1,2,3,4

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, New Delhi 2nd 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
1	Discuss the anatomical terms and basic structure and function of cells.	1,3
2	Explore knowledge of Musculo skeletal system and bones along with their special features and functions.	1,3,4,6
3	Describe the composition of the human digestive system and their specific functions.	1,3,4,6
4	Explain respiratory system and classify various respiratory disorders.	1,3,4,6
5	Describe the anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body.	1,3,4,6

SEMESTER – I									
Course Title	General Biochemistry								
Course code	24BEDM1102R	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 Trauma Emergency and Disaster Management								
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 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	CARBOHYDRATES <ul style="list-style-type: none"> • Definition and classification of carbohydrates • Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) and their sources • Biological significance of Carbohydrate 		9	Describe the structure, function, and importance of carbohydrates in biological systems.			1,2		
II	PROTEINS <ul style="list-style-type: none"> • Definition of Proteins along with the Biological • Significance • Amino acids and its classification • Essential and Non-essential amino acids 		9	Explain the structure, function, and importance of proteins in biological processes.			1,2		
III	LIPIDS <ul style="list-style-type: none"> • Definition and classification of lipids. • Classification of Fatty Acids • Examples and functions of some common • Lipids (Phospholipids, Glycolipids, Steroids). 		9	Describe the structure, function, and significance of lipids in the human body.			1,2		
IV	Nucleic Acids <ul style="list-style-type: none"> • Basic idea of the structure of • DNA and RNA • Function of DNA and RNA 		9	Describe the structure and function of nucleic acids, including DNA and RNA, and their role in genetic information storage and transmission.			1,2		
V	ACID-BASEBUFFERS: <ul style="list-style-type: none"> • Basics about acids, bases, pH, pOH, pKa and Buffer • Acid base balance 		9	Illustrate the acid buffer that enables one to predict and control the pH levels in chemical solutions.			1,2		

Practical	<ul style="list-style-type: none"> • To identification and demonstration of biochemistry laboratory glassware's and apparatus. • To identification and demonstration of biochemistry laboratory instruments (Principle and Applications) <p>Qualitative test for carbohydrates:</p> <ul style="list-style-type: none"> - To perform Molisch's test for determination of sugar in an unknown sample. - To perform Fehling's test for determination of reducing and non-reducing sugar in an unknown sample. - To perform Benedict's test for determination of reducing and non-reducing sugar in an unknown sample. 	30		1,2,3,4
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TEXT BOOKS:

T1: U Satyanaryana and U Chakrapani 'Biochemistry' 6th Edition

T2: DM Vasudevan 'Text book of Biochemistry for medical students' 7th Edition

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
2	Describe the different composition and functions of the blood.	1,3
3	Understand the process of the digestive system along with the organs involved and their significance.	1,3
4	Explain the mechanism of the respiratory system.	1,3
5	Understand the cardiovascular system along with the human circulatory system.	1,3

SEMESTER – I									
Course Title	Basic principles of hospital practice and Hospital Duty and patient care - I								
Course code	24BEDM1103R	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 Trauma Emergency and Disaster Management								
Semester	Fall / 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	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	Describe vital signs and effectively manage the abnormalities.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Hospital & Records & Reports: <ul style="list-style-type: none"> • 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	Explain how to accurately maintain and analyze hospital records and reports to ensure effective healthcare management.	1,2					
II	Medical Profession AI and Legal Hazards of Medical Profession <ul style="list-style-type: none"> • First aid 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 Scorpion bite Dog bite foreign bodies in various organs Burns & scald Haemorrhage • Hygiene and basic care Needs of patients; personal hygiene and maintenance of hygiene Maintaining therapeutic environment Safety factors for patients such as- • Safety from mechanical injury, thermal & 	10	Defines the legal responsibilities and potential risks associated with practicing medicine.	1,2					

	chemical injury, radiation & bacteriological injury, safety from allergens. Different positions of the body: supine position, prone position, cardiac position, lateral, position, fowlers Position.			
III	Safety In The Laboratory <ul style="list-style-type: none"> • Common laboratory accidents from Physical injuries • Electrical shock • Chemical injury • Bleeding • Burn Eye accidents • Biological hazards 	10	Classify essential safety protocols to prevent accidents and injuries in the laboratory.	1,2
IV	Vital signs Of Patients <ul style="list-style-type: none"> • Body temperature • Maintenance of body temperature • Factors influencing body temperature 	9	Explains how to accurately measure and interpret vital signs in patients.	1,2
V	<ul style="list-style-type: none"> • 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 	9	Defines different diseases and their effects on the human body.	1,2

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.	2,3,6
2	Explain the basic principles; golden rules of First Aid and effectively implement the skills in certain medical emergencies.	2,3,4
3	Apply fundamental knowledge of patient safety and care to ensure basic care needs of patients.	2,3,4,5
4	Assessment of common laboratory accidents and its effective management.	3,4
5	Describe vital signs and effectively manage the abnormalities.	1,2,3,4

SEMESTER – I									
Course Title	Field Visit								
Course code	24BEDM1104R	Total credits: 1	L	T	P	S	R	O/F	C
			0	0	0	0	0	8	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / 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	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.								
CO2	Comprehend the practical applications of theoretical concepts in real-world settings.								
CO3	Exposure to diverse situations to enhance skills in patient management and care.								
CO4	Evaluate the effectiveness of different approaches and methods seen during the field trip.								
CO5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.	1,6
2	Comprehend the practical applications of theoretical concepts in real-world settings.	2,3,5
3	Exposure to diverse situations to enhance skills in patient management and care.	2,3,5,8
4	Evaluate the effectiveness of different approaches and methods seen during the field trip.	3,4,5,8
5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.	2,3,5

SEMESTER – I									
Course Title	Basic Communicative English								
Course code	24UBPD1101R	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 Trauma Emergency and Disaster Management								
Semester	Fall / 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	<ul style="list-style-type: none"> Parts of Speech Articles Auxiliary Verbs Affirmative and Negative Sentences 		6	Defines the parts of speech, articles, auxiliary verbs with affirmative and negative sentences.				1,2	
II	<ul style="list-style-type: none"> Determiners Sentence Construction Types of Sentences (Assertive, Imperative etc.) Degree of Comparison Comprehension Exercises 		6	Explains the use of grammar using determiners, sentence construction, types of sentences and comprehension exercises.				1,2	
III	<ul style="list-style-type: none"> 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 Process 		6	Illustrate the process of listening, difference between listening and hearing any more.				1,2	
IV	<ul style="list-style-type: none"> Introducing yourself Self-discovery Basics of Phonetics, pronunciation Extempore speech Video Recording for Self Reflection 		6	Illustrate self-discovery, performing extempore speech, etc.				1,2	
V	<ul style="list-style-type: none"> Introduction to Communication, Importance of Communication Skills Purpose of Communication Types of Communication Formal and informal communication Importance of Communication Barriers to Communication 		6	Describes the communication skills, types, its importance and the barriers.				1,2	

	<ul style="list-style-type: none"> • How to improve/ tips to improve Communication skills. • Responding to different questions in various situations 			
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TEXT BOOKS:

T1: Debnath, Adhir “A Textbook of English Grammar and Composition” 2018

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.	7
2	Expand their vocabulary and use synonyms and antonyms appropriately.	7
3	Apply grammatical rules to construct grammatically correct sentences and paragraphs.	7
4	Identify different types of communication and strategies to overcome communication barriers.	7
5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.	7

SEMESTER – I									
Course Title	Extra-Curricular								
Course code	24UBEC1101	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 Trauma Emergency and Disaster Management								
Semester	Fall / I 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	AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.		7	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	
	These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.		10					1,2	
	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.		10					1,2	
	The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.		8					1,2	
	The students members of the club are trained represent AdtU in various inter University student and national level competitions.							1,2	
	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.	7
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	7
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	7
4	Explore new platform to learn from invited experts in their respective fields.	7
5	Evaluate overall growth alongside academic development.	7

SEMESTER – II									
Course Title	Human Anatomy and Physiology II								
Course code	24BEDM1201R	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 Trauma Emergency and Disaster Management								
Semester	Fall / II semester of first year of the programme								
Course Objectives	1. To provide a comprehensive concept of all the anatomical position and physiological function of the human body. 2. To understand the underlined mechanism and regulation of the human body. 3. To practically understand the physiologic functions through different tests.								
CO1	Explain the structure and function of excretory system.								
CO2	Describe the sensory organs and nervous system along with their functions.								
CO3	Identify different types of immune cells and lymphatic system in the body.								
CO4	Explain the structure and functions of male and female reproductive system.								
CO5	Describe the endocrine system and their regulation.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Urinary System <ul style="list-style-type: none"> Structure of kidney, ureter, urinary bladder, male and female urethra. Functions of kidneys, nephron. Urine formation 	8	Explain about the urinary system, all the organ related to it and its function.	1,2					
II	Nervous System <ul style="list-style-type: none"> Classification of Nervous system. Central Nervous system – Brain and Spinal cord, blood supply of brain. Cranial nerves and spinal nerves Introduction of motor system, sensory system and Autonomic Nervous System. Functions of brain, and spinal cord Synapse, reflex arc Cerebrospinal fluid Sensory Organs: Skin, Ear, Nose, Tongue Eye 	12	Describe the nervous system of human body, its classification including different functions of different parts of the nervous system.	1,2					
III	Lymphatic and <ul style="list-style-type: none"> Immunological System Structure of lymphatic system and functions. Immunity – Antigen, Antibody, and Immune response. Acquired immunity 	5	Explain about the immunologic system along with lymphatic system of the body.	1,2					
IV	Reproductive System <ul style="list-style-type: none"> Structure of male and female reproductive organs. Structure of breast Changes during puberty Ovulation, Menstrual cycle Pelvic cavity with its boundaries and contents 	10	Illustrate the reproductive system, organs related to it and all the changes take place during menstrual cycle.	1,2					

V	Endocrine System <ul style="list-style-type: none"> • Different endocrine glands • Hormones and functions of endocrine glands • Regulation of secretion hormones. 	10	Explain the endocrine system of the human body including function of different glands.	1,2
Practical	<ul style="list-style-type: none"> • Study of pelvic bones and bones of lower limbs of human body. • Study of organs: Brain, heart, lung, liver, kidney. • Blood group • DLC • Total count of RBC and WBC 	30		1,2,3,4

TEXT BOOKS:

T1: Pamela K Levangie “Fundamentals of Anatomy” JP Bros Medical Publishers, New Delhi

T2: Duane Nudson “Fundamentals of Medical Anatomy” 2nd ed. 2007 Publisher Springer

T3: Ross and Wilson “Ross and Wilson Anatomy and Physiology” 8th Edition.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain the structure and function of excretory system.	1,3
2	Describe the sensory organs and nervous system along with their functions.	1,3,4,5
3	Identify different types of immune cells and lymphatic system in the body.	1,3,4,5
4	Explain the structure and functions of male and female reproductive system.	1,3,4,5
5	Describe the endocrine system and their regulation.	1,3,4,5

SEMESTER– II									
Course Title	BIOCHEMISTRY: Biomolecules and its Metabolism								
Course code	24BEDM1202R	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 Trauma Emergency and Disaster Management								
Semester	Fall / 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 explain about the energy flow in the form on ATP in the human body and cells. 3. To provide information and understanding on the basic idea about the enzymes, nomenclature functions, regulations and their significance in biological processes.								
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: <ul style="list-style-type: none"> • Definition and classification of enzyme. • Basic idea of co-enzyme, iso-enzyme. • Mechanism of enzyme Action. • Factors affecting enzyme action 	10	Describe, classify and explain the types of enzymes along with the factors affecting their actions				1,2		
II	Carbohydrates Metabolism <ul style="list-style-type: none"> • Glycolysis • Kreb's Cycle • Gluconeogenesis • Glycogenesis • Glycogenolysis 	10	Describe and explain the mechanism of carbohydrates in the body				1,2		
III	Protein Metabolism <ul style="list-style-type: none"> • Transamination • Deamination • Urea Cycle and its Significance • LFT (Liver Function Tests) • RFT (Renal Function Tests) 	10	Describe, illustrate and explain the metabolism of protein and their significance.				1,2		
IV	Lipid Metabolism, Clinical Biochemistry <ul style="list-style-type: none"> • β oxidation of Fatty Acids. • Ketone bodies • Ketosis and ketoacidosis 	10	Define and explain the metabolism of lipids along with the clinical diagnostic tests and their significance.				1,2		
V	Vitamins And Minerals: <ul style="list-style-type: none"> • Definition and classification of vitamins according to solubility. • Sources and functions of individual vitamins. • Deficiency. 	16	Describe, explain and classify the different types of vitamins and minerals along with their sources and functions.				1,2		

	<ul style="list-style-type: none"> Individual minerals (calcium, phosphorus, iron, magnesium flu slide, copper, selenium, molybdenum etc) – their sources, function and properties 			
Practical	<ul style="list-style-type: none"> To perform precipitation test to determine the presence of proteins in an unknown urine sample. To perform heat and acetic acid test to determine the presence of proteins in an unknown urine sample To perform Heller’s test to determine the presence of proteins in an unknown urine sample To perform lipid solubility test 	30		1,2,3,4

TEXT BOOKS:

T1: U Satyanaryana and U Chakrapani “Biochemistry”

T2: Shruti Mohanty “Practical Clinical Biochemistry” 1st Edition

T3: Prem Prakash Gupta “Essentials of Practical Biochemistry” 1st Edition

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.	1,3
2	Define the mechanism of carbohydrate metabolism in the body.	1,3
3	Explain the metabolism of protein and its significant effects on different organs of body.	1,3
4	Describe the process of Lipids metabolism and associated clinical conditions.	1,3
5	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body.	1,3

SEMESTER – II									
Course Title	Fundamentals of Patient Care and Safety								
Course code	24BEDM1203R	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 Trauma Emergency and Disaster Management								
Semester	Fall / II semester of first year of the programme								
Course Objectives	1. To teach the measures of the health services and high-quality health care 2. To understand whether the health care delivery system is providing high-quality health care and whether quality is changing over time. 3. To understand different laboratory functions in hospital.								
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	Determine the signs and symptoms of hyperglycaemia and hypoglycaemia and its immediate management.								
CO5	Proficient in performing quality laboratory investigation process and laboratory management.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Poisoning: <ul style="list-style-type: none"> • Definition • Causes of poisoning • Sources of Poisoning • Symptoms of poisoning • First aid & Management • Antidotes • Common drugs poisoning • Carbon monoxide poisoning Legal Responsibility: <ul style="list-style-type: none"> • Act of commission • Act of omission • Act of rashness, negligence & damage • Legal liabilities of medical profession • Advantage & disadvantage of the act. 	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	<ul style="list-style-type: none"> • Malpractice • Civil negligence • Clinical negligence • Corporate negligence • Preparation of patients • Preparation of equipment's • Collection of specimens of urine, stool, sputum, blood, CSF, Pericardial fluid, Peritoneal fluid, Pleural fluid, etc 	5	Describe, illustrate and explain various ethical and legal responsibilities of medical professionals along with the techniques of specimen collection.	1,2					
III	<ul style="list-style-type: none"> • Definition • Types of shock • General Features of shock • Instigations of shock • Initial management & first aid of shock • Definition 	6	Describe, classify and explain shock along with their clinical manifestations, management including the diagnostic tests for	1,2					

	<ul style="list-style-type: none"> ● Clinical features ● Diabetes laboratory tests for diabetes ● Different types of glycosuria ● Ketone bodies ● Glucose tolerance test. ● Definition ● Etiologic & Clinical Features ● Investigations for hypoglycaemia 		diabetes.	
IV	<ul style="list-style-type: none"> ● Definition ● Names & classification of drugs ● Different preparations of drugs ● Effects of drugs ● Adverse effects of drugs ● Tolerance, Abuse, addiction of drug ● Different routes of drug administration ● Storing of medicine ● Units of standard measurement 	4	Describe, classify and explain the different types of emergency drugs along with their mechanism, routes of administration, indications and adverse effects.	1,2
V	<ul style="list-style-type: none"> ● Function of medical Professional ● Qualities of good professional ● Ethics of Medical Profession ● Laboratory designing ● Laboratory management ● Different laboratory ● Functions of receptionist, Head of section, laboratory specialist, business manager, quality officer, safety officer ● 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. 	9	Describe, illustrate and explain medical ethics along with the guidelines and management of different laboratories in the hospital.	1,2

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.	1,2,3,4,5
2	Explain the medical ethics and its importance on the healthcare system.	6
3	Identify the different types of shock along with the management.	1,2,3,4,5
4	Determine the signs and symptoms of hyperglycaemia and hypoglycaemia and its immediate management.	1,2,3,5
5	Proficient in performing quality laboratory investigation process and laboratory management.	3,5,6

SEMESTER – II									
Course Title	Environmental Science								
Course code	24UBES1201R	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 Trauma Emergency and Disaster Management								
Semester	Fall / II semester of first year of the programme								
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 associate problems and which has the knowledge, Skills, attitudes, motivations, and commitment 3. To work individually collectively towards solutions of current problems and prevention of new ones.								
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	
I	Multidisciplinary nature of environmental studies: <ul style="list-style-type: none"> • Definition • Scope and importance • Need for public awareness 		2	Discuss about the multidisciplinary nature of environmental studies.				1,2	
II	Natural Resources: Renewable and non-renewable resources: <ul style="list-style-type: none"> • Forest resources • Water resources • Mineral resources • Food resources • Energy resources • Land resources 		6	Discuss about natural resources, its types and its benefits to the world.				1,2	
III	Ecosystems Concept of an ecosystem: <ul style="list-style-type: none"> • Structure and function-Producers, consumers, and decomposers. • Energy flow • 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 		5	Explains about the different ecosystem present in this world and how it functions and its effectiveness in present world.				1,2	
IV	Biodiversity and its conservation		6	Discuss about the				1,2	

	<ul style="list-style-type: none"> • Introduction – • Definition • Value of biodiversity • Threats to biodiversity • Conservation of biodiversity 		biodiversity of the world along with its risk or threats and how to conserve it.	
V	Environmental Pollution <ul style="list-style-type: none"> • Definition Cause, effects, and control measures of: -Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards • Solid waste management • Disaster management 	6	Explain the different types and levels of pollution the present world and its management.	1,2

TEXT BOOKS:

T1: Harucha E. B “Textbook of Environmental Studies”

T2: Chatwal G. R. &Sharma H. “Environmental Studies”

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Discuss the importance of Environment Studies and the need for public awareness.	8
2	Identify natural resource, its importance, and its impacts on the environment.	8
3	Explore in-depth knowledge on concept of ecosystem.	8
4	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.	8
5	Explain various environmental pollution and its impact on human and ecosystem.	8

SEMESTER – II									
Course Title	Field Training								
Course code	24BEDMFT102	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 1200	0	0	0	0	0	8	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	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	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.								
CO2	Comprehend the practical applications of theoretical concepts in real-world settings.								
CO3	Exposure to diverse situations to enhance skills in patient management and care.								
CO4	Evaluate the effectiveness of different approaches and methods seen during the field trip.								
CO5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.	1,6
2	Comprehend the practical applications of theoretical concepts in real-world settings.	2,3,5
3	Exposure to diverse situations to enhance skills in patient management and care.	2,3,5
4	Evaluate the effectiveness of different approaches and methods seen during the field trip.	3,4,5
5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.	2,1,2

SEMESTER – II									
Course Title	Functional English								
Course code	24UBPD1201R	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	Fall / II semester of first year of the programme								
Course Objectives	1. To introduce the types of sentences and their significance. 2. To strengthen the vocabulary of the students to enhance student' vocabulary to enhance their speaking and writing skills it the importance of dress codes in various organisations. 3. To introduce the 3P's (Planning, prioritizing & performing) of Time Management.								
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.								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	Grammar <ul style="list-style-type: none"> Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences Types of Tenses Common Errors 		3	Explain the use of tenses different types of sentences, some common errors.			1,2		
II	Vocabulary <ul style="list-style-type: none"> Synonyms Antonyms Homonyms 		3	Enhance the vocabulary skills.			1,2		
III	Reading Skills <ul style="list-style-type: none"> Techniques of Effective Reading Gathering ideas and information from a text The SQ3R Technique Interpret the text 		3	Enhance the reading skills by effective reading, gathering information etc.			1,2		
IV	Conflict Management <ul style="list-style-type: none"> Definition Type of Conflict Management Effects of Conflict Management Methods to deal with Conflicts (Negative) 		3	Discuss the techniques of conflict management and the effect of conflicts.			1,2		
V	Time Management Skills <ul style="list-style-type: none"> Introduction To Time Management Purpose And Importance of Time Management Basic Tips to Maintain Time. 		3	Enhance the time management skills by learning some basic techniques.			1,2		

TEXT BOOKS:

T1: Wren, P.C and Martin “High School English Grammar and Composition”

T2: Barrett, Grant “Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking”

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
2	Demonstrate proficiency in recognizing and using homonyms and homophones accurately in language contexts.	7
3	Summarize paragraphs, stories, or articles effectively, refining pronunciation skills for clearer communication.	7
4	Implement time management strategies to organize daily tasks, categorize them using the Time Management Matrix, and solve problems efficiently.	7
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

SEMESTER – II									
Course Title	Co-Curricular								
Course code	24UBCC1201	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 Trauma Emergency and Disaster Management								
Semester	Fall/ 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"> 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					
	<ul style="list-style-type: none"> These activities are aimed to develop the social and soft skills and promote a holistic development of the learners. 								
	<ul style="list-style-type: none"> 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. 								
	<ul style="list-style-type: none"> The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies. 								
	<ul style="list-style-type: none"> The student members of the club are trained represent AdtU in various inter University student and national level competitions 								
	<ul style="list-style-type: none"> 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.	7
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	7
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	7
4	Explore new platform to learn from invited experts in their respective fields.	7
5	Evaluate overall growth alongside academic development.	7

SEMESTER – III									
Course Title	Patient Assessment & Drug Administration								
Course code	24BEDM2101R	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 Trauma Emergency and Disaster Management								
Semester	Fall / III semester of second year of the programme								
Course Objectives	1. Introduce the patient assessment identification principles of history taking in the assessment process of individuals. 2. Demonstrate physical examination skills including focused physical, behavioural, psychological, socioeconomic, and environmental assessments of health and illness parameters in patients. 3. Introducing with the type of drug administration and the techniques of venous access.								
CO1	Understand and apply the techniques of assessment for medical and trauma patients.								
CO2	Comprehend the technique of history taking and demonstrate how 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	Develop comprehensive knowledge on the routes of drug administration and utilize skills to perform correct techniques.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Patient assessment <ul style="list-style-type: none"> Medical patient assessment Trauma patient assessment 	4	Discuss briefly about patient assessment techniques including medical and trauma patients.					1,2	
II	History taking <ul style="list-style-type: none"> Techniques of history taking Special assessment challenges Vital signs Head to toe physical examination Limits of physical exam 	4	Explain the techniques of history taking for better analysis of the patient's chief complaint.					1,2	
III	Interpretation & Special Situations <ul style="list-style-type: none"> Concept formation Data interpretation Application of principle Reflection in and on action. Various communication matters. Documentation techniques Verbal and nonverbal skills Special interview situations 	5	Enhance the skill of data interpretation and different vocabulary techniques to use in special situations.					1,2	
IV	Venous access <ul style="list-style-type: none"> Fluid composition & distribution in the body I.V. fluid composition Techniques of I. V access. 	3	Illustrate about different techniques and methods of venous access in human body.					1,2	

V	Medication administration • Routes of medication administration • Calculating fluid infusion rates	4	Explain the procedure of medication preparation for patient administration.	1,2
Practical	1. Checking Vitals 2. Gaining Venous access 3. IV fluids administration 4. Full body Assessment 5. Rapid Assessment	30		1,2, 3,4

TEXT BOOKS:

T1: Nancy Caroline “Textbook of emergency care in the streets” 7th Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand and apply the techniques of assessment for medical and trauma patients.	1,2,3,4,5
2	Comprehend the technique of history taking and demonstrate how to perform head-to-toe examination.	1,2,3,8
3	Apply principles for critical thinking and implement skills on techniques of documentation and communication.	1,2,7
4	Identify the different composition of fluid in the body, different types of IV Fluids, gain IV sites and access.	1,2,3,4
5	Develop comprehensive knowledge on the routes of drug administration and utilize skills to perform correct techniques.	1,2,4

SEMESTER – III										
Course Title	Airway Management & Respiratory Emergencies									
Course code	24BEDM2102R	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 Trauma Emergency and Disaster Management									
Semester	Fall / III semester of second year of the programme									
Course Objectives	1. Introduce the students to basic airway assessment techniques, airway management during emergencies and respiratory failures. 2. To introduce the students on how to assess the patient's airway obstruction. 3. To manage them in the hospital as well as out of hospital settings.									
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	Airway Management Review of Anatomy and Physiology <ul style="list-style-type: none"> • Basic Airway Management • Manual airway manoeuvres • Airway Adjuncts • Continuous Positive Airway Pressure (CPAP) • Supplemental O2 therapy and delivery devices • Suctioning • Assisted and artificial ventilation 			6	Explain the anatomy and physiology of respiratory system and also some basic manoeuvres for airway opening.			1,2		
II	Advanced airway management <ul style="list-style-type: none"> • Endo tracheal intubations • Kings IT Airway • Digital intubations • Laryngeal mask airways and Combitube intubations • Rapid sequence intubations 			10	Discuss about the advanced airway management techniques like using ET tube, King LT, LMA, etc.			1,2		
III	Surgical Airway <ul style="list-style-type: none"> • Surgical and non-surgical airways • Special patient consideration 			5	Explain some methods of different surgical airways.			1,2		
IV	Respiratory emergencies – I <ul style="list-style-type: none"> • Airway problems versus breathing problems 			12	Describe about different respiratory emergencies.			1,2		
V	Respiratory emergencies - II <ul style="list-style-type: none"> • Obstructive airway diseases. • Assessment and management of various respiratory problems. 			12	Describe about different airway emergencies, including its assessment and management.			1,2		

Practical	1.Suctioning Procedure 2.Endo tracheal Intubation 3.Digital Intubation 4.Rapid Sequence Intubation 5.Tracheotomy	30		1,2,3,4
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TEXT BOOKS:

T1: Nancy Caroline “Textbook of emergency care in the streets” 7th 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	1,8
2	Explain advanced airway management techniques and develop the skills necessary for their effective application.	1,3,4,5
3	Classify surgical & non-surgical airways.	1,4,8
4	Identify the symptoms of airway and breathing conditions.	1,8
5	Demonstrate the assessment and management of various respiratory disorders.	2,3,4,5

SEMESTER – III									
Course Title	Psychology								
Course code	24BEDM2103R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / III semester of second year of the programme								
Course Objectives	1. Aims to provide students with a comprehensive understanding of human behaviour and mental processes. 2. Explore various psychological domains such as cognitive, developmental, social, and abnormal psychology, gaining insights into how individuals think, feel, and act. 3. To be equipped with critical thinking skills and an appreciation for the complexities of human behaviour, enabling them to apply psychological concepts to real-world situations.								
CO1	Understand the significance, history, scope and branches of psychology.								
CO2	Discuss the biology of human behaviour and sensation.								
CO3	Identify the different stages of human growth and development and the factors influencing it.								
CO4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.								
CO5	Apply skills to assess mental health and identify the warning signs of poor mental health.								
Unit- No.	Content				Contact Hour	Learning Outcome			KL
I	Introduction to Psychology <ul style="list-style-type: none"> • Definition of psychology • Evolution of modern psychology • Scope of psychology • Branch of psychology 				5	Introduces the knowledge of psychology its evolution in modern world and different branches of it.			1,2
II	Biology of Behaviour <ul style="list-style-type: none"> • Body mind relationship modulation process in health and illness • Brain and behaviour: nervous system, neurons and synapse, Association cortex, Right and Left hemispheres. • Psychology of Sensation: Vision, Hearing, Olfactory, Gustatory and Coetaneous sensation 				10	Explains the biology of behaviour the mindset and all the complex function.			1,2
III	Growth and Development <ul style="list-style-type: none"> • Life span: different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age) • Heredity and environment: role of heredity and environment in physical and psychological development. • Nature v/s Nature controversy 				15	Describes the growth and development of a person.			1,2
IV	Motivation and Emotional Processes <ul style="list-style-type: none"> • Motivation: meaning, concepts, types, theories, motives and behaviour. • Emotion: definition, components, changes in 				5	Explains the techniques of keeping one motivated and maintaining emotional processes.			1,2

	emotions, theories, emotional adjustments, emotions in health and illness. Stress: stressors, cycle, effects, adaptation & coping and management. • Conflicts and frustration, conflict resolution			
V	Mental Hygiene and Mental Health • Concepts of mental hygiene and mental health. • Characteristics of mentally healthy person, • Warning signs of poor mental health, • Primitive and preventive mental health – strategies and services • Psychology of vulnerable individuals. • Guidance counselling and rehabilitation	10	Explain the warning sign of poor mental health ways of preventing it and characteristics of a healthy person.	1,2

TEXT BOOKS:

T1: Jane Ogden “Health Psychology” 3rd Edition

T2: Amanpreet Kaur Jhand “Psychology” 1st Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the significance, history, scope and branches of psychology.	1,8
2	Discuss the biology of human behaviour and sensation.	1,2,7
3	Identify the different stages of human growth and development and the factors influencing it.	1,8
4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.	7
5	Apply skills to assess mental health and identify the warning signs of poor mental health.	2,3,7

SEMESTER – III									
Course Title	Pharmacology I								
Course code	24BEDM2104R	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 Trauma Emergency and Disaster Management								
Semester	Fall / III semester of second year of the Programme								
Course Objectives	1. Basic concepts of Pharmacology including Emergency Medicines and their properties. The student will be able to identify a range of drugs used in medicine and discuss their mechanisms of action. 2. Being able to report the clinical applications, side effects and toxicities of drugs used in medicine. 3. Being able to translate pharmacological principles into clinical decision-making.								
CO1	Develop 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	Understand the different drugs used to treat cardiovascular and respiratory conditions.								
CO5	Identify different types of IV fluids and their preparations as well as antidiabetic drugs.								
Unit- No.	Content				Contact Hour	Learning Outcome			KL
I	General Pharmacology <ul style="list-style-type: none"> • Introduction, definition and classification of drugs • Routes of drug administration • Pharmacokinetics • Pharmacodynamics • Factors modifying drug response • Adverse effects 				7	Explains the general pharmacology including its mechanism of action.			1,2
II	Autonomic Nervous System: <ul style="list-style-type: none"> • General Considerations • Cholinergic and Anti –Cholinergic drugs • Adrenergic and Adrenergic blocking drugs • Skeletal muscle relaxants 				5	Describes the drugs used to manage autonomic nervous system along with mechanism of action.			1,2
III	Neuropharmacology: <ul style="list-style-type: none"> • Sedative – Hypnotic Drugs: Barbiturates, Benzodiazepines • Antiepileptic drugs, narcotic analgesics. 				5	Describes the mechanism of action of some drugs like sedatives, barbiturates, antiepileptic drugs.			1,2
IV	Cardiovascular and Respiratory Pharmacology: <ul style="list-style-type: none"> • Drugs used in heart failure –Digitalis, Diuretics, vasodilators. • Antihypertensive Drugs –ACE inhibitors. • Drugs for ischemic Heart Disease – Nitrates, Beta blockers, Calcium channel blockers. • Vasopressors, Inotropic agents • Anticoagulants and Thrombolytic • Bronchodilators and Mucokinetic agents. 				10	Illustrates the drugs that are used during cardiologic emergencies.			1,2

V	Others: <ul style="list-style-type: none"> • IV Fluids with different preparation. • Anti-Diabetic drugs –Insulin, Steroids 	5	Explains about some other drugs like anti diabetic drugs and preparation of drugs.	1,2
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TEXT BOOKS:

T1: Dr. K D Tripathi “Essentials of Medical Pharmacology”

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop concept of Pharmacology including Emergency Medicines and the routes of administration.	1,8
2	Recognize different drugs that affect the Autonomic Nervous System.	1
3	Classify sedative and antiepileptic drugs along with their mechanism of action.	1
4	Understand the different drugs used to treat cardiovascular and respiratory conditions.	1
5	Identify different types of IV fluids and their preparations as well as anti-diabetic drugs.	1,2,3,4

SEMESTER – III										
Course Title	Wound Care and Suture Techniques									
Course code	24BEDM2105R	Total credits: 4		L	T	P	S	R	O/F	C
		Total hours: 30T+60P		2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite		Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management									
Semester	Fall / III semester of second year of the programme									
Course Objectives	1. To identify and classify different types of wounds. 2. To understanding the process of wound healing 3. To develop proficiency in the principles, techniques, and materials involved in suturing for effective wound closure and management.									
CO1	Understand the anatomy and physiology of the Integumentary system, and the various factors that influence the healing process.									
CO2	Recognize the importance of assessing wound depth, size, and location, as well as evaluate surrounding tissue to facilitate effective wound closure.									
CO3	Develop effective pain management strategies during suturing to ensure patient comfort and cooperation.									
CO4	Demonstrate competency in various suture techniques and selection of appropriate materials for wound closure.									
CO5	Identify and manage complications associated with suturing and wound care effectively.									
Unit-No.	Content		Contact Hour	Learning Outcome				KL		
I	Introduction <ul style="list-style-type: none"> Anatomy and physiology of the Integumentary system. Principle of wound healing: <ul style="list-style-type: none"> Stages of wound healing Factors influencing wound healing 		6	Explains the anatomy and physiology of wound and stages of healing.				1,2		
II	Assessment and preparation for wound closure <ul style="list-style-type: none"> Initial assessment of wound Importance of assessing wound depth, size and location Assessing surrounding tissue 		6	Illustrates the methods of assessment of wound in different parts of the body.				1,2		
III	Patient Preparation: <ul style="list-style-type: none"> Informed consent Preparing the patient psychologically for suturing Local Anaesthesia techniques Understanding pain management during suturing 		6	Describes the procedure of patient preparation for would management.				1,2		
IV	Suture technique and materials: <ul style="list-style-type: none"> Suture materials and Instrument Suture techniques: <ul style="list-style-type: none"> Interrupted Continuous Mattress Subcuticular 		10	Illustrates the techniques of suture including different equipments used for suture.				1,2		

	<ul style="list-style-type: none"> - Horizontal and Vertical suture • Suture removal: - Timing - Proper Techniques 			
V	<p>Complications in suturing and wound care:</p> <ul style="list-style-type: none"> • Identification and management of Infections • Potential complications of local anaesthesia • Hemorrhage: Recognizing and management of excessive bleeding • Allergic reaction to suture mate 	4	Describes the different complications that may arise during suturing.	1,2

TEXT BOOKS:

T1: Nancy Caroline “Textbook of emergency care in the streets” 7th Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the anatomy and physiology of the Integumentary system, and the various factors that influence the healing process.	1,3
2	Recognize the importance of assessing wound depth, size, and location, as well as evaluate surrounding tissue to facilitate effective wound closure.	1,2,3,4,7
3	Develop effective pain management strategies during suturing to ensure patient comfort and cooperation.	1,2,7
4	Demonstrate competency in various suture techniques and selection of appropriate materials for wound closure.	1,2,4
5	Identify and manage complications associated with suturing and wound care effectively.	2,3,4,8

SEMESTER – III									
Course Title	Field Visit								
Course code	24BEDM2106R	Total credits: 1 Total hours: 1200	L 0	T 0	P 0	S 0	R 0	O/F 8	C 1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall/ III semester of second 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	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.								
CO2	Comprehend the practical applications of theoretical concepts in real-world settings.								
CO3	Exposure to diverse situations to enhance skills in patient management and care.								
CO4	Evaluate the effectiveness of different approaches and methods seen during the field trip.								
CO5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.	1,6
2	Comprehend the practical applications of theoretical concepts in real-world settings.	2,3,5
3	Exposure to diverse situations to enhance skills in patient management and care.	2,3,5,8
4	Evaluate the effectiveness of different approaches and methods seen during the field trip.	3,4,5,8
5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.	2,3,5,8

SEMESTER – III									
Course Title	Basic Acclimatizing Skills								
Course code	24UULS2101R	Total credits: 1 Total hours: 30P	L 0	T 0	P 2	S 0	R 0	O/F 0	C 1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / III semester of second year of the programme								
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'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 household's amenities for day-to-day use.								
CO5	Students will develop an understanding of personal financial management and budgeting skills.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Introduction to Accommodation Management • Telephone handling technique • Organizing of Rooms. • Cleaning agents. • Cleaning equipment's and uses. • Bed making Process.	4	Explains the techniques of accommodation management.	1,2					
II	Fundamentals of Cooking • Definition of cookery–Aim & Objectives of cooking. • Use of basic Cooking equipment's • Personal Hygiene and Safety • Use of Fire & Fuels	4	Introduces the fundamentals of cooking including efficient and safety methods.	1,2					
III	Methods of Cooking • Different Cuts. • Use of Herbs and Spices. • Basic Food and Beverage Preparation. • Regional food Habits	3	Illustrates different methods of cooking.	1,2					
IV	Forms & Format's • C –form • Reservation form • Registration form • Passport Application form • Legal Rent Agreement	4	Explains and illustrates various formats of writing forms like reservation, passport, etc.	1,2					

TEXT BOOKS:

T1: Arora K “Theory of cookery” 2011

T2: Bruce H. Axler, Carol A. Litrides “Food and Beverage Service” 2010, Vol-1

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.	7
2	Students will gain the knowledge of organizing & Cleaning of Rooms.	6,7
3	Students will be able to gain the travel management concept.	7
4	Students will be able to acquire the knowledge of basic household’s amenities for day- to-day use.	7
5	Students will develop an understanding of personal financial management and budgeting skills.	7

SEMESTER – III									
Course Title	Executive English								
Course code	24UBPD2101R	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	Fall / III semester of second year of the programme								
Course Objectives	1. Develop Writing Skills: To help students write clear paragraphs and applications. 2. Enhance Grammar: To teach correct preposition use and active/passive voice. 3. Understand Non-Verbal Cues: To provide knowledge on body language types and meanings.								
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.								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	Grammar Use of preposition, Tag Question, Idioms, Phrases and Clauses, Simple, Complex, Compound Sentences		3	Describe and explain about the preposition.			1,2		
II	Grammar Active and Passive Voice, Direct and Indirect Speech		3	Describe, illustrate and explain about the active and passive voice and direct and indirect speech.			1,2		
III	Writing Skills The Basics of writing, avoid ambiguity and vagueness, paragraph writing, Precise writing, Letter writing, resume, CV, Cover Letter		3	Describe , illustrate and apply the basic writing skills like paragraph writing , resume, CV.			1,2		
IV	Self Management Skills SWOT Analysis, Self-Regulation-Goal Setting, Personal hygiene		3	Describe and analyse about self management skills.			1,2		
V	Non-Verbal Communication-Science of Body Language What is Non-Verbal Communication and 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, Introduction to Proxemics, Body Language Do's and Don'ts, Doubt Clearing Sessions		3	Describe, illustrate, explain about non-verbal communication, types of body language, importance and impact of body language and apply planning element and skills assessed.			1,2		

TEXT BOOKS:

T1: Barrett, Grant “Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking” 2016

T2: McDowell, Gayle Laakmann “Cracking the Coding Interview” Indian Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate proficiency in writing structured paragraphs and formal applications.	7
2	Learn the use of prepositions and convert sentences between active and passive voice.	7
3	Identify and interpret various types of body language and their meanings.	7
4	Initiate, participate in, and summarize group discussions effectively.	7
5	Apply writing, grammar, non-verbal communication, and group discussion skills in real-world contexts.	7

SEMESTER – III									
Course Title	Basic Digital Literacy								
Course code	24UCDL2101R	Total credits: 2 Total hours: 60P	L 0	T 0	P 4	S 0	R 0	O/F 0	C 2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / III semester of second year of the programme								
Course Objectives	1. Students will be able to identify and analyze computer hardware, software and their uses. 2. Students will be able to use MS-Office suite for various purposes. 3. Students will be able 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	Apply MS-Office to solve basic information Management issues.								
CO3	Operate the Internet, social media and e-commerce sites efficiently and ethically.								
CO4	Analyse the cybercrimes on digital payments application.								
CO5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI.								
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. Lab Experiment: <ul style="list-style-type: none"> Identify the Components of a Computer and their Functions and different types of Computers and their Applications. Demonstrate the usage of various storage devices and identify various operating system file management commands 				4	Explain the fundamental of computer systems.		1,2	
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. Lab Experiment: <ul style="list-style-type: none"> Demonstrate how a document to be prepared and formatted in MS Word. Create casual applications for 3 days leave because of family marriage ceremony using Word Processor. Create a curriculum vitae using MS- Word. Creating a time table with MS – Word. Design PPT on Computer Components using different effects such as Insert, Design, Record etc., on slides. Design PPT on Computer Components using different effects such as Transitions, Animations etc., on slides. Creating the time table with MS-Excel. Creating the 10 student’s Mark sheet include total, grade, percentage and results using MS-Excel’s formulas 				14	Describe the functions on different tools of Microsoft Office like MS-Excel, MS-Word, etc.		1,2	

III	<p>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.</p> <p>Lab Experiments:</p> <ul style="list-style-type: none"> • Creating a professional Google account and use various products of Google like drive, photos. Study of computer network and internet and • Demonstrate how to search information using keywords in different search engines. 	6	Explain the importance and use of internet along with its adverse side.	1,2
IV	<p>Introduction to social media: The Power of social media, Relevance of social media in present scenario. Creating accounts and using some popular social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, and LinkedIn. Social Media Etiquettes.</p> <p>Lab Experiments:</p> <ul style="list-style-type: none"> • Creating an account of some popular social media portals and Apps like LinkedIn, Facebook, Twitter and Instagram. • Creating an accounts of digital payment systems • like credit cards, debit cards, net banking 	4	Explain the power of social media their relevance and adverse effects to over using it.	1,2
V	<p>Introduction to Digital Payment Systems. Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, UPI.</p> <p>Lab Experiments:</p> <ul style="list-style-type: none"> • Create online Google form and learn how to • Give online test. • Creating an account of Online Shopping sites like Amazon, flip kart, eBay etc. Understand the • Journey of customer to buy and sell on online shopping sites. 	4	Illustrate the types of digital payment and their risks.	1,2

TEXT BOOKS:

T1: Sinha Pradeep K. and Priti Sinha “Computer Fundamentals: Concepts Systems & Applications” 3rd Edition

T2: Goel A “Computer Fundamentals” 2010

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding of Computer Hardware, Software and Computer handling.	2,7
2	Apply MS-Office to solve basic information Management issues.	2,7
3	Operate the Internet, social media and e-commerce sites efficiently and ethically.	2,7
4	Analyse the cybercrimes on digital payments application.	2,7
5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI.	2,7

SEMESTER – III									
Course Title	Extra- Curricular / Co-Curricular								
Course code	24UBEC2101/ 24UBCC2101	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 Trauma Emergency and Disaster Management								
Semester	Fall / III semester of second 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"> 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		
	<ul style="list-style-type: none"> These activities are aimed to develop the social and soft skills and promote a holistic development of the learners. 								
	<ul style="list-style-type: none"> 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. 								
	<ul style="list-style-type: none"> The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies. 								
	<ul style="list-style-type: none"> The student members of the club are trained represent AdtU in various inter University student and national level competitions 								
	<ul style="list-style-type: none"> 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.	7
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	7
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	7
4	Explore new platform to learn from invited experts in their respective fields.	7
5	Evaluate overall growth alongside academic development.	7

SEMESTER – IV										
Course Title	Cardiovascular & Neurological Emergency Management									
Course code	24BEDM2201R	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 Trauma Emergency and Disaster Management									
Semester	Fall / IV semester of second year of the programme									
Course Objectives	1. Develop skills to assess patients and identify cardiovascular and neurological emergencies. 2. To master the techniques used for managing strokes and seizures, including thrombolytic therapy and airway management. 3. To gain practical knowledge on different cardiovascular tests.									
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 anomalies.									
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 conditions.									
Unit-No.	Content			Contact Hour	Learning Outcome				KL	
I	Cardiovascular System <ul style="list-style-type: none"> Review of anatomy and physiology 			3	Discuss about the anatomical structures and physiological function of cardiovascular system.				1,2	
II	Cardiovascular System Assessment and management of <ul style="list-style-type: none"> Coronary artery disease and angina Acute myocardial infarct Congestive heart failure Cardiac tamponade Cardiogenic shock Aortic aneurysm Hypertensive emergencies 			15	Explain about different diseases related to cardiovascular system including its assessment and management.				1,2	
III	ECG <ul style="list-style-type: none"> ECG and arrhythmias 12 lead ECGs Basic and advanced cardiac life support Cardio pulmonary resuscitation (CPR) Defibrillation Cardio version Transcutaneous cardiac pacing Review of pharmacology 			15	Illustrate the ECG lead placement including techniques of delivering BLS and ACLS also using defibrillator.				1,2	
IV	Nervous system – <ul style="list-style-type: none"> Review of anatomy and physiology 			4	Discuss about the anatomy and physiologic function of nervous system.				1,2	
V	Neurological emergencies			8	Discuss about different				1,2	

	Assessment and management of <ul style="list-style-type: none"> • Stroke • TIA • Altered Mental Status • Coma, etc. 		neurological emergencies and their identification including immediate management.	
Practical	4.ECG lead placement 5.ECG rhythm determination 6.Performing CPR 7.Use of defibrillator 8.Identification and management of stroke.	30		1,2,3,4

TEXT BOOKS:

T1: Nancy Caroline “Textbook of emergency care in the Streets” 7th Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge of the human heart and the circulatory system.	1,8
2	Demonstrate skills and techniques to assess and manage any cardiac emergencies.	1,2,3,4,5
3	Apply acquired skills to perform ECG and identify anomalies.	2,3,4,5
4	Develop comprehensive knowledge on the nervous system.	1,8
5	Illustrate the ability to evaluate and treat a variety of neurologic emergencies, including seizures, strokes, and other conditions.	2,3,7

SEMESTER – IV									
Course Title	Mechanical Ventilation								
Course code	24BEDM2202R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 30T+30P	2	0	2	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / IV semester of second year of the programme								
Course Objectives	1. To understand the principles and mechanics of mechanical of ventilation. 2. To learn effectively manage ventilator setting to optimise oxygenation. 3. To develop skills in assessing and responding to changes inpatient condition and ventilator parameters.								
CO1	Demonstrate knowledge on basic concept of ventilation.								
CO2	Apply Knowledge to initiate mechanical ventilation and assess for any respiratory failure.								
CO3	Apply skills on using various modes of ventilation and the timings to be initiated with.								
CO4	Demonstrate skills on monitoring of patient during ventilation and everyday checklist.								
CO5	Apply knowledge on various weaning criteria and management of complications during ventilation.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	Basic concept: <ul style="list-style-type: none"> • Mechanics of ventilation • Work of breathing • Pressure – Peak, Plateau 	7	Explain the basic concepts of mechanical ventilation and physiology of breathing.				1,2		
II	Initiation of ventilation: <ul style="list-style-type: none"> • Clinical conditions leading to mechanical ventilation • Ventilatory failure, • oxygenation failure • Strategies to improve ventilation and oxygenation 	8	Discuss the condition where ventilator support is needed and check all essential criteria's of mechanical ventilation.				1,2		
III	Operating modes of ventilation: <ul style="list-style-type: none"> • Modes of ventilation • Invasive modes- controlled, assisted, SIMV, APRV, Pressure support • Non invasive modes- CPAP & BiPAP Ventilator settings • Timings: inspiratory, expiratory, inspiratory hold PEEP, FiO2 • Alarm settings 	15	Illustrate different modes of ventilation including invasive and non-invasive modes.				1,2		
IV	Monitoring during ventilation: <ul style="list-style-type: none"> • Vital signs, chest inspection • & auscultation • Arterial blood gases (ABG), Oxygen and end tidal • carbon dioxide monitoring 	8	Explain factors that are needed to be monitored during mechanical ventilation and also checking acid-base balance.				1,2		

	<ul style="list-style-type: none"> • Fluid electrolyte balance • Acid base balance 			
V	Weaning: <ul style="list-style-type: none"> • Modes, weaning criteria's • Care of ventilator • Tubing and sterility complications during mechanical ventilation. 	7	Discuss about the weaning criteria's, maintaining sterility and care of ventilator.	1,2

TEXT BOOKS:

T1: Nancy Caroline's Emergency Care in the Streets, Andrew N. Pollak, MD, FAAOS, 7th Edition (1970)

T2: Essential of Mechanical Ventilation, DEAN R.HESS ROBERT M.KACMAREK 3rd Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate knowledge on basic concept of ventilation.	1,8
2	Apply Knowledge to initiate mechanical ventilation and assess for any respiratory failure.	1,2,3,4
3	Apply skills on using various modes of ventilation and the timings to be initiated with.	3,4
4	Demonstrate skills on monitoring of patient during ventilation and everyday checklist.	2,3
5	Apply knowledge on various weaning criteria and management of complications during ventilation.	1,2,3

SEMESTER – IV									
Course Title	Medical Equipment and Terminologies								
Course code	24BEDM2203R	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 Trauma Emergency and Disaster Management								
Semester	Fall / IV semester of second year of the programme								
Course Objectives	1. Understand the working principles of medical equipment's, their usage and management. 2. Knowledge related to medical terminologies and understands the, prefixes, and suffixes and applies them to the body systems. 3. Develop skills in selecting appropriate medical equipment based on clinical needs, budgetary constraints, regulatory requirements, and technological advancements.								
CO1	Identify and understand medical terminologies and equipment.								
CO2	Comprehend various diseases and illnesses caused by bacteria and viruses.								
CO3	Understand vital signs and the techniques of measurement including basic examination position.								
CO4	Recognize the significance of PPE as well as the essential equipment and adjuncts for airways.								
CO5	Classify the different equipment used in cardiac and trauma life support.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Introduction <ul style="list-style-type: none"> Introduction to Medical equipment and Terminology Types of medical equipment 	6	Discuss the terminologies of medical equipments, terms and also different types of equipment.	1,2					
II	Health and disease <ul style="list-style-type: none"> Diseases caused by virus Non-communicable diseases Diseases caused by bacteria 	8	Explain about different types of diseases caused by virus, bacteria and non-communicable diseases.	1,2					
III	Diagnostic procedures <ul style="list-style-type: none"> Describe the four vital signs recorded for most patients Identify and describe the basic examination positions Differentiate between projection and position 	8	Illustrate about types of diagnostic procedures including assessing vital signs, and documentation process.	1,2					
IV	Personal protective and airway management equipments <ul style="list-style-type: none"> Gloves, Mask, Goggle, Apron, etc OPA,NPA, Suction machine ET Tube 	6	Explain about personal protective equipments uses, and identification of airway management equipments.	1,2					
V	Cardiac life support and trauma life support equipments ECG Machine, Cardiac Monitor, Pulse-Oximeter, Sphygmomanometer, Stethoscope Defibrillator- AED, Splint Bandage-Cervical Collar, Spine Board, Scoop Stretcher, KED etc	8	Discuss about the equipments used in cardiac life support and also trauma life support for a patient.	1,2					

TEXT BOOKS:

T1: Nancy Caroline’s Emergency Care in the Streets, Andrew N. Pollak, MD, FAAOS, 7th Edition (1970)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify and understand medical terminologies and equipment.	1,4
2	Comprehend various diseases and illnesses caused by bacteria and viruses.	1,8
3	Understand vital signs and the techniques of measurement including basic examination position.	1,2,3,4
4	Recognize the significance of PPE as well as the essential equipment and adjuncts for airways.	2,3,4
5	Classify the different equipment used in cardiac and trauma life support.	2,3,4

SEMESTER – IV									
Course Title	Pharmacology II								
Course code	24BEDM2204R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / IV semester of second year of the programme								
Course Objectives	1. To understand the basic concepts of Pharmacology including Emergency Medicines and their Properties. 2. To identify a range of drugs used in medicine and discuss their mechanisms of action 3. The student will be able to report the clinical applications, side effects and toxicities of drugs used in medicine. The student will be able to translate pharmacological principles into clinical decision-making.								
CO1	Comprehend the fundamentals of how medications impact the nervous system and alter behaviour.								
CO2	Understand the basic principles of anxiety disorders and their treatment with anxiolytics								
CO3	Develop comprehensive knowledge on the classification of cardiovascular drugs along with their mechanism of action.								
CO4	Classify antihypertensive drugs as well as with their mechanism of action.								
CO5	Identify classes of drugs used to treat vascular disease and tissue ischemia.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Neuro pharmacology: • Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines • Anti-anxiety Drugs: Benzodiazepines		5	Discuss about mechanism of action of neuro-pharmacologic drugs like sedative- hypnotic drugs and anti-anxiety drugs.				1,2	
II	Other Anxiolytics • Antiepileptic drugs, Narcotic analgesics		5	Discuss about anxiolytic drugs its function and mechanism of action.				1,2	
III	Cardiovascular pharmacology: • Drugs used in the treatment of Heart Failure (Digitalis, Diuretics, Vasodilators) • ACE inhibitors		5	Explain about the drugs used for cardiovascular treatment or immediate management.				1,2	
IV	Antihypertensive drugs • Calcium channel Blockers • Central acting Alpha agonists • Peripheral Alpha Antagonists • Direct acting vasodilators		6	Describe about antihypertensive drugs its types and mechanism of action.				1,2	
V	Drugs used in the treatment of vascular disease and tissue Ischemia • Vascular Disease • Lipid lowering agents • Antithrombotic • Anticoagulants and Thrombolytics • Ischemic Heart Disease • Nitrates, Beta Blockers, Calcium channel Blockers		9	Explain different drugs used in treatment of vascular disease and tissue ischemia.				1,2	

TEXT BOOKS:

T1: Dr. KD Tripathi “Essentials of Medical Pharmacology”

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Comprehend the fundamentals of how medications impact the nervous system and alter behaviour.	1
2	Understand the basic principles of anxiety disorders and their treatment with anxiolytics	1,2
3	Develop comprehensive knowledge on the classification of cardiovascular drugs along with their mechanism of action.	1,2
4	Classify antihypertensive drugs as well as with their mechanism of action.	1,2
5	Identify classes of drugs used to treat vascular disease and tissue ischemia.	1,2

SEMESTER – IV									
Course Title	Introduction To Ambulance Operation System								
Course code	24BEDM2205R	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 Trauma Emergency and Disaster Management								
Semester	Fall / IV semester of second year of the programme								
Course Objectives	1.To identify and properly use the equipment and supplies found in an ambulance. 2.To understand the maintenance and restocking procedures for ambulance equipment and supplies. 3.To implement protocols for patient care during transport, including monitoring vital signs and providing necessary medical interventions.								
CO1	Develop fundamental knowledge on the ambulance and its development.								
CO2	Understand the principles and guidelines of ground ambulance management of the different barriers.								
CO3	Describe the evaluation and management of pain in patients and get acquainted with the different drug interventions.								
CO4	Classify the different types of air ambulance and its operation.								
CO5	Apply knowledge on triage for priorities of patient transportation with legal and ethical consideration.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to ambulance Operation		10	Explain the history and development of ambulance operation, roles and responsibilities, use of different equipments, and reducing hazards through the operation.				1,2	
II	Ground Ambulance		5	Defines about ground ambulance system its advantages, disadvantage and maintenance.				1,2	
III	Air Medical Ambulance		10	Describes the system of air ambulance its advantages and disadvantages, maintaining safety landing zones, etc.				1,2	
IV	Defensive Driving Principles		15	Illustrates all the driving tips for safety driving protocols.				1,2	
V	Transport Decision		5	Explains the emergency				1,2	

<ul style="list-style-type: none"> • Assessment and Triage • Determining transport destination • Transport mode and timing • Legal and Ethical consideration in transport 	transport decisions, maintaining time and considering legal and ethical values.
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TEXT BOOKS:

T1: Nancy Caroline’s Emergency Care in the Streets, Andrew N. Pollak, MD, FAAOS, 7th Edition (1970).

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge on the ambulance and its development.	1,2,4
2	Understand the principles and guidelines of ground ambulance management of the different barriers.	1,2,8
3	Describe the evaluation and management of pain in patients and get acquainted with the different drug interventions.	1,2
4	Classify the different types of air ambulance and its operation.	2,4
5	Apply knowledge on triage for priorities of patient transportation with legal and ethical consideration.	1,2,3,4

SEMESTER – IV									
Course Title	Introduction to Research Methodology								
Course code	24BEDM2206R	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 Trauma Emergency and Disaster Management								
Semester	Fall / IV semester of second year of the programme								
Course Objectives	1.To gain a basic understanding of key concepts and principles in research, including the scientific method, hypothesis testing, and variables, sampling, and data analysis. 2.Familiarize with ethical principles and guidelines governing research involving human subjects, animals, and sensitive data. 3.Acquire knowledge of various research designs, methodologies, and data collection techniques.								
CO1	Develop fundamental knowledge on the principles and types of research.								
CO2	Develop comprehensive understanding on research design.								
CO3	Acquire basic knowledge on the significance and conduction of literature review.								
CO4	Classify various types of data collection methods and techniques.								
CO5	Understand the different types of research ethics along with plagiarism.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to research <ul style="list-style-type: none"> • Definition of research • Importance and purpose of research • Types of research (basic, applied, quantitative, qualitative, etc.) • Research process 		5	Describes the knowledge of research, its importance and types.				1,2	
II	Research design <ul style="list-style-type: none"> • Formulating research questions and hypotheses • Variables and operationalization Experimental, correlation, and descriptive research designs • Choosing an appropriate research design 		10	Explains about research design, way of getting creative design, writing a proper research.				1,2	
III	Literature review <ul style="list-style-type: none"> • Conducting a literature search • Evaluating and synthesizing research literature • Identifying research gaps • Importance of literature review in research 		5	Describe the technique of reviewing literature and writing, identifying the gaps in research.				1,2	
IV	Data collection methods <ul style="list-style-type: none"> • Surveys/questionnaires • Interviews • Observations • Experiments • Case studies • Secondary data analysis • Sampling techniques 		10	Illustrate the methods of data collection and use it efficiently.				1,2	
V	Research ethics <ul style="list-style-type: none"> • Ethical considerations in research 		15	Describes the ethics related to research and keeping in mind				1,2	

	<ul style="list-style-type: none"> • Informed consent • Confidentiality and anonymity • Institutional review boards (IRBs) • Avoiding plagiarism and other forms of academic misconduct 		about the plagiarism.	
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TEXT BOOKS:

T1: Vivek Singh “Research methodology”

T2: Kitab Mahal “Fundamental of research methodology”

REFERENCE BOOKS:

R1: Nichols Walliman “Research methods the basic”

R2: C.R. Kothari “Research methodology methods and techniques”

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge on the principles and types of research.	6
2	Develop comprehensive understanding on research design.	6
3	Acquire basic knowledge on the significance and conduction of literature review.	6
4	Classify various types of data collection methods and techniques.	6
5	Understand the different types of research ethics along with plagiarism.	6

SEMESTER – IV									
Course Title	Basic Life Saving Skills								
Course code	24UULS2201R	Total credits: 1 Total hours: 30P	L 0	T 0	P 2	S 0	R 0	O/F 0	C 1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
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) <ul style="list-style-type: none"> • Introduction of BLS • Chain of survival • ABCs Assessment • CPR and Ventilation Technique • AED - Choking for adult and children 	5	Introduction about basic life support, about the chain of survival, different assessment techniques.				1,2		
II	Soft skills <ul style="list-style-type: none"> • Introduction • Communications Skills • Situational Skills • Team Work - Other Soft Skills 	4	Illustrates different communication skills, situational awareness including teamwork.				1,2		
III	Trauma emergencies <ul style="list-style-type: none"> • 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 	10	Explains about different trauma emergencies and methods of managing trauma emergencies.				1,2		

IV	Triage system <ul style="list-style-type: none"> • Introduction • Flow chart approach of Triage • Triage of Multiple Casualties in Pre-Hospital setting - Triage of Single casualty 	5	Illustrates the triage system and explains about multiple causality operations.	1,2
V	Medical emergencies Introduction <ul style="list-style-type: none"> • Victim centred approach in medical emergency • Management of:- <ul style="list-style-type: none"> a) seizures b) heart attack c) asthma d) diabetic emergencies e) emergency childbirth f) stroke recovery position 	6	Describes different types of medical emergencies and its management.	1,2

TEXT BOOKS:

T1: Nancy Caroline’s Emergency Care in the streets Seventh edition by Jones and Bartlett

T2: First Aid book by LC Gupta

T3: Advance Cardiovascular life support and Basic life support provider manual @ American Heart Association (AHA).

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate knowledge and skill to perform CPR use an AED, and respond to choking in adults and children.	2,3,4
2	Understand the significance of communication and teamwork in various situations.	2,5,7
3	Apply knowledge and skill about pre-hospital care and management of trauma emergencies.	2
4	Understand the principles and purpose of the Triage system in healthcare settings.	2,3,4,7
5	Identify and manage common medical emergency conditions.	2

SEMESTER – IV									
Course Title	Enhanced Professional Skills								
Course code	24UBPD2201R	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 Trauma Emergency and Disaster Management								
Semester	Fall / IV semester of second year of the programme								
Course Objectives	1.To teach students the essential elements of public speaking and techniques to overcome the fear of speaking in public. 2.To enhance students' ability to effectively use non-verbal cues when delivering a public speech. 3.To guide students through the process of creating, finalizing, and screening a professional resume.								
CO1	Identify and effectively utilize key elements of public speaking while overcoming associated fears.								
CO2	Demonstrate the ability to use non-verbal cues to enhance their public speeches.								
CO3	Produce and submit a polished, professional resume suitable for job applications.								
CO4	Understand different interview types, including telephonic, virtual, and face-to-face.								
CO5	Learn to answer common interview questions and adhere to appropriate dress code ethics.								
Unit- No.	Content			Contact Hour	Learning Outcome				KL
I	Presentation Skills <ul style="list-style-type: none"> • Introduction • Essential characteristics of a good presentation • Preparation of a good presentation 			3	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	Public Skills <ul style="list-style-type: none"> • Fear of Public Speaking • Understanding and Overcoming Fear of Public Speaking • Confidence and Control • Physiology and Stress-Control/Process • Tips for Presentations and Public Speaking, • Tips for Using Visual Aids in Presentations, Process for Preparing and Creating Presentations • Delivering Presentations Successfully, • Doubt Clearing and Summary of Main Points 			3	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
III	Practical session on Resume, Curriculum Vitae, Writing cover letter & LinkedIn Profile Preparation, submission & screening of Resume <ul style="list-style-type: none"> • Practical session on cover letter screening session • Creating profile in LinkedIn • How to utilize it 			3	Explain various strategies for developing vocabulary, including contextual learning and the use of phrasal verbs and idioms in conversation.				1,2
IV	Leadership & Management Skills <ul style="list-style-type: none"> • Concepts of Leadership 			3	Explain common interview questions and				1,2

	<ul style="list-style-type: none"> • Leadership Styles • Manager VS Leader • How to be an Effective Leader • Mock/Practice Session 		effective answering strategies, as well as the importance of dress code ethics during interviews.	
V	Interview Skills & Dress code Ethics <ul style="list-style-type: none"> • Types of interview-telephonic, virtual & face to face • Online interview, personal interview • Panel interview, • Group interview, • JAM session, • Types of interview questions traditional/ common 	3	Identify common grammar errors related to word stress and syllable division.	1,2

TEXT BOOKS:

T1: Barrett, Grant “Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speak” 2016

T2: McDowell, Gayle Laakmann “Cracking the Coding Interview” Indian Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify and effectively utilize key elements of public speaking while overcoming associated fears.	6
2	Demonstrate the ability to use non-verbal cues to enhance their public speeches.	6
3	Produce and submit a polished, professional resume suitable for job applications.	6
4	Understand different interview types, including telephonic, virtual, and face-to-face.	6
5	Learn to answer common interview questions and adhere to appropriate dress code ethics.	6

SEMESTER – IV									
Course Title	Personal Financial Planning								
Course code	24UUFL2201R	Total credits: 1 Total hours: 30P	L 0	T 0	P 2	S 0	R 0	O/F 0	C 1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / 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.								
CO5	The students would be able to manage the money flow of digital market.								
Unit- No.	Content			Contact Hour	Learning Outcome			KL	
I	Presentation Skills <ul style="list-style-type: none"> • Introduction • Essential characteristics of a good presentation • Preparation of a good presentation 			6	Illustrates the techniques to improve presentation skills.			1,2	
II	Public Skills <ul style="list-style-type: none"> • Fear of Public Speaking • Understanding and Overcoming Fear of Public Speaking • Confidence and Control • Physiology and Stress-Control/Process • Tips for Presentations and Public Speaking, • Tips for Using Visual Aids in Presentations, Process for Preparing and Creating Presentations • Delivering Presentations Successfully, • Doubt Clearing and Summary of Main Points 			6	Explains the techniques of improving self confidence and overcoming the fear of public speaking through visual aids, practicing.			1,2	
III	Practical session on Resume, Curriculum Vitae, Writing cover letter & LinkedIn Profile Preparation, submission & screening of Resume <ul style="list-style-type: none"> • Practical session on cover letter screening session • Creating profile in LinkedIn • How to utilize it 			6	Illustrates the methods of writing resume, CV, presentation by several practice sessions.			1,2	

IV	Leadership & Management Skills <ul style="list-style-type: none"> • Concepts of Leadership • Leadership Styles • Manager VS Leader • How to be an Effective Leader • Mock/Practice Session 	6	Explains the concept of leadership and self development to become an effective leader.	1,2
V	Interview Skills & Dress code Ethics <ul style="list-style-type: none"> • Types of interview-telephonic, virtual & face to face • Online interview, personal interview • Panel interview, • Group interview, • JAM session, • Types of interview questions traditional/ common 	6	Illustrates different types of interview and performing them.	1,2

TEXT BOOKS:

T1: George S.” The Richest Man in Babylon”

T2: Dr. Purvi Kothari and, Mr. Keyur “Financial literacy to financial planning”

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	The students would be able to understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.	7
2	The students would be able to understand the need and various kind of banking institutions’ instrument and their utilities	7
3	The student would be able to describe the importance of insurance services as social security measures.	7
4	The student would be able to manage the money and debt more effectively.	7
5	The students would be able to manage the money flow of digital market.	7

SEMESTER – V									
Course Title	Clinical Observation I (Emergency Patient Care)								
Course code	24BEDM3101R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 120P	0	0	8	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / V semester of third year of the Programme								
Course Objectives	1. To develop keen observation skills in clinical settings. 2. To understand patient care practices and decision-making. 3. To develop skills to assess patient conditions and emergency responses.								
CO1	Understand the role, workflow and essential equipment of emergency room for patient care.								
CO2	Learn a comprehensive assessment for priority and treating patient effectively in emergencies.								
CO3	Learn essential emergency procedures for immediate life-saving interventions.								
CO4	Apply knowledge to assess pain levels and skills to manage pain as well as monitor the side effects.								
CO5	Learn infection control and safety protocols, ensuring safe environment.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to Emergency Patient Care <ul style="list-style-type: none"> • Overview of emergency care settings and roles • Essential equipments present in emergency room and protocols of their usage • Emergency Codes • Fire Safety 		12	Describes about emergency patient care, explains different protocols in emergency situations and identify different equipments.				1,2	
II	Medical And Trauma Assessment And Management <ul style="list-style-type: none"> • Emergency triage • Initial assessment and management in ER • On-going assessment and management 		12	Explains about assessment of trauma, emergency triage system, initial and on-going assessment and management.				1,2	
III	Emergency Procedures And Techniques <ul style="list-style-type: none"> • Airway management • Haemorrhage control • Fracture stabilization • Guidelines and practices of CPR • Guidelines and practices of BLS • Guidelines and practices of ACLS • Guidelines and practices of using defibrillator Minor invasive procedures 		12	Describes the emergency medical procedures and maintaining guidelines.				1,2	
IV	Critical Care In Emergency Settings <ul style="list-style-type: none"> • Initial treatment of patients with heart attack • Recognition, initial care and management protocols of ischemic and haemorrhagic stroke • Recognition and initial assessment of cardiac arrest • Recognition, initial care of shock 		12	Explains critical care in emergency settings initial recognition of any emergency situations and immediate management with sustaining crucial times.				1,2	

	<ul style="list-style-type: none"> • Recognition, initial care of asthma, COPD, respiratory failure • Recognition, initial care of diabetic emergencies 			
V	Infection Control And Safety <ul style="list-style-type: none"> • Hand hygiene-moments and techniques • PPE- types ,usage, donning and doffing • Aseptic techniques • Infection control precautions-airborne, droplets and contact infection; isolation protocols • Environmental hygiene • Spillage management • Needle prick injury • Waste management 	12	Illustrates the infection control protocols and maintaining safety environment.	1,2

TEXT BOOKS:

T1: Nancy Caroline’s Emergency Care in the streets Seventh edition by Jones and Bartlett

T2: First Aid book by LC Gupta

T3: Advance Cardiovascular life support and Basic life support provider manual @ American Heart Association (AHA)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the role, workflow and essential equipments of emergency room for patient care.	1,4
2	Learn a comprehensive assessment for priority and treating patient effectively in emergencies.	1,3
3	Learn essential emergency procedures for immediate life-saving interventions.	1,3
4	Apply knowledge to assess pain levels and skills to manage pain as well as monitor the side effects.	2,3
5	Learn infection control and safety protocols, ensuring safe environment.	1,2

SEMESTER – V									
Course Title	Clinical Observation II (Advanced Concepts and Specialized Care)								
Course code	24BEDM3102R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 120P	0	0	8	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / V semester of third year of the programme								
Course Objectives	1. Implement advanced procedures and medications to enhance patient care outcomes 2. Evaluate and apply specialized interventions in patient care settings, utilizing advanced procedures and medications to optimize treatment efficacy and patient comfort. 3. Demonstrate proficiency in administering and monitoring advanced medications and procedures, ensuring patient safety and well-being throughout the care process.								
CO1	Understand pressure injury stages and management strategies.								
CO2	Analyze advanced patient monitoring techniques for early detection and invention.								
CO3	Demonstrate proficiency in blood sample collection techniques.								
CO4	Develop knowledge and skills on how to perform any advance procedures.								
CO5	Develop a skill on how to administer medication safely and accurately following established protocols.								
Unit-No.	Content			Contact Hour	Learning Outcome			KL	
I	Pressure Injury <ul style="list-style-type: none"> • Definition, causes, classification • Assessment and prevention • Management and treatment • Complication and long term-care 			12	Describes the types of pressure injury and management.			1,2	
II	Advanced Patient Monitoring <ul style="list-style-type: none"> • Continuous monitoring of vital signs • Advance cardiac monitoring • Fluid and electrolytes monitoring • Neurological Monitoring 			12	Illustrates techniques of advanced patient monitoring techniques including cardiac, neurologic monitoring.			1,2	
III	Sample Collection <ul style="list-style-type: none"> • Indications and techniques for specialized blood sampling procedures • Selection and used o specialized blood collection tubes • Blood sample handling, storage and transportation protocols • ABG-Indications, Techniques, interpretation 			12	Explains the sample collection techniques and avoiding hazards.			1,2	
IV	Advanced Procedures <ul style="list-style-type: none"> • Central line • Arterial line • Chest tube • Advance airway management procedures Thoracentesis • Advance wound care technique 			12	Illustrates some advanced procedure like central line, arterial line, chest tubes including advanced wound care and airway management techniques.			1,2	
V	Medications: <ul style="list-style-type: none"> • Emergency Drugs- Usage and Preparation Sound-alike-look-alike(LASA) 			12	Describe the usage of different types of medications in			1,2	

	<ul style="list-style-type: none"> • High Risk ,high Alert • Narcotic Drugs • Drug Selection and Stocking • Dispensing and Administration • Storage and Handling • Documentation • Techniques of administration through • different routes 		emergency situations.	
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TEXT BOOKS:

T1: Nancy Caroline’s Emergency Care in the streets Seventh edition by Jones and Bartlett

T2: First Aid book by LC Gupta

T3: Advance Cardiovascular life support and Basic life support provider manual @ American Heart Association (AHA)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand pressure injury stages and management strategies.	1,2
2	Analyze advanced patient monitoring techniques for early detection and invention.	2,3
3	Demonstrate proficiency in blood sample collection techniques.	2,3,4
4	Develop knowledge and skills on how to perform any advance procedures.	1,2,3
5	Develop a skill on how to administer medication safely and accurately following established protocols.	1,3

SEMESTER – V									
Course Title	Clinical Observation III (Communication And Documentation Skills)								
Course code	24BEDM3103R	Total credits: 4 Total hours: 120P	L	T	P	S	R	O/F	C
			0	0	8	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / V semester of third year of the programme								
Course Objectives	1. Enhance abilities in documenting patient information comprehensively and precisely. 2. Improve verbal and non-verbal communication skills for effective patient interaction and teamwork. 3. Apply ethical and legal standards in clinical observation, documentation, and communication.								
CO1	Demonstrate proficiency in utilizing various communication techniques.								
CO2	Demonstrate proficiency in asking clear and specific questions to elicit relevant medical information from patients.								
CO3	Apply empathetic language and communication techniques to document sensitive conversations with patients.								
CO4	Analyze and accurately document procedures, including indications, techniques used, and patient responses.								
CO5	Apply legal and ethical standards in documentation, including confidentiality, privacy, and HIPAA compliance.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Communication <ul style="list-style-type: none"> Types of communication Techniques Importance of communication History taking techniques Special considerations during communication 		12	Describe the types of communication techniques, importance of good communication for proper history taking.				1,2	
II	Patient Interview Skills: <ul style="list-style-type: none"> Effective Questioning Active Listening Note-taking Methods Empathy and Rapport- building 		12	Illustrate effective questioning, active listening techniques for proper patient interview.				1,2	
III	Sensitive Discussions Documentation: <ul style="list-style-type: none"> Empathetic Language: End-of-Life Care Professional Tone Informed Consent 		12	Explains usage of empathetic language for critical taking decision in emergency situations.				1,2	
IV	Documentation of Procedures and Treatments: <ul style="list-style-type: none"> Procedure Documentation: Treatment Plans Response to Interventions Patient Education 		12	Illustrates proper documentation methods and critical thinking to bring a better treatment plan.				1,2	

TEXT BOOKS:

T1: Nancy Caroline's Emergency Care in the streets Seventh edition by Jones and Bartlett

T2: First Aid book by LC Gupta

T3: Advance Cardiovascular life support and Basic life support provider manual @ American Heart Association (AHA)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate proficiency in utilizing various communication techniques.	7
2	Demonstrate proficiency in asking clear and specific questions to elicit relevant medical information from patients.	2,7
3	Apply empathetic language and communication techniques to document sensitive conversations with patients.	7
4	Analyze and accurately document procedures, including indications, techniques used, and patient responses.	2,7
5	Apply legal and ethical standards in documentation, including confidentiality, privacy, and HIPAA compliance.	6,7

SEMESTER – V									
Course Title	Summer Internship								
Course code	24BEDM3104R	Total credits: 4	L	T	P	S	R	O/F	C
			0	0	0	0	0	24	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester	Fall / V semester of third year of the Programme								
Course Objectives	1. To develop and enhance specific professional skills relevant to the intern's career path. 2. To gain a comprehensive understanding of the industry and build a professional network. 3. To identify and pursue personal and career goals through guided reflection and mentorship.								
CO1	Understand and become familiar with the work environment.								
CO2	Understanding and practicing workplace professionalism.								
CO3	Develop specific skills like communication, teamwork, or technical abilities.								
CO4	Develop a clear scope of career aspect.								
CO5	Develop practical knowledge and skills for application in real time.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand and become familiar with the work environment.	3,5,6,7,8
2	Understanding and practicing workplace professionalism.	3,4,5,6,7,8
3	Develop specific skills like communication, teamwork, or technical abilities.	5,6,7,8
4	Develop a clear scope of career aspect.	3,5,6,7,8
5	Develop practical knowledge and skills for application in real time.	1,3,4,5,6,7,8

SEMESTER – VI									
Course Title	Trauma Care								
Course Code	24BEDM3201R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 45T+60P		0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Science in Trauma Emergency and Disaster Management								
Semester									
Course Objectives	<ol style="list-style-type: none"> 1. This course is about managing trauma, from minor injury to humanitarian emergencies, including injuries in women, children, and the elderly, and with the principal goal of improving quality of care and patient safety. 2. Learn basic techniques of triage and emergency care within the first, most critical hour, of a patient's arrival at the hospital 3. Understand the psychosocial impact of trauma on patients, families, and caregivers, including psychological trauma, grief, coping mechanisms, and post-traumatic stress. 								
CO1	Comprehend knowledge and skills in determining the mechanism of injury and identify different trauma centres.								
CO2	Understand diverse facets of soft tissue, and capable of utilizing this understanding to assess and effectively manage shock incidents.								
CO3	Proficiency in evaluating and addressing injuries associated with the abdominal and thoracic cavities, including the effective management of 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	Trauma systems and mechanism of injury -Energy <ul style="list-style-type: none"> • Biomechanics and Kinematics • Trauma centres • Types of traumas 	6	Introduction of trauma system explaining biomechanics of trauma, different trauma centres and types of trauma.				1,2		
II	Soft tissue injury and Bleeding and Shock <ul style="list-style-type: none"> • Review of Cardiovascular system • Anatomy and physiology of skin • Pathophysiology of Haemorrhage Assessment and management of bleeding patient <ul style="list-style-type: none"> • 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 	8	Describes the mechanism of soft tissue injury, bleeding from different sites its management and illustrate the treatment of shock.				1,2		
III	Burns, Abdominal Injuries & Thoracic Injuries <ul style="list-style-type: none"> • Pathophysiology of Burns • Assessment & Management of Burns • Review of anatomy and physiology of 	8	Illustration about the types of burn techniques of its assessment and management.				1,2		

	<ul style="list-style-type: none"> abdomen • Pathophysiology, assessment and management of abdominal injuries • Pathophysiology Assessment & Management of Thoracic Injuries 			
IV	Musculoskeletal injuries, Head and face an Spinal Injuries <ul style="list-style-type: none"> • Review of anatomy Assessment and management of head and facial injuries • Assessment and management of spinal injuries • Spinal immobilization 	10	Explains about musculoskeletal injuries of different parts of the body including its assessment and management.	1,2
V	Environmental Emergencies <ul style="list-style-type: none"> • Heat Illness • Cold Injuries • Drowning • Diving Injuries • Attitude Illness • Lightning Strike • Bites and Stings 	8	Illustrates different types of injuries associated with environment such as heat, cold, lightning, etc.	1,2

TEXT BOOK:

T1: Nancy Caroline's Emergency care in the streets, Seventh Edition, Series Editor: Andrew N.Pollak, MD, FAAOS: Lead Editors: Bob Elling, MPA, EMT-P Mike Smith, BS, MICP: JONES AND BARTLETT LEARNING :(2012)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Comprehend knowledge and skills in determining the mechanism of injury and identify different trauma centres.	1,3
2	Understand diverse facets of soft tissue, and capable of utilizing this understanding to assess and effectively manage shock incidents.	1,2,3
3	Proficiency in evaluating and addressing injuries associated with the abdominal and thoracic cavities, including the effective management of burns.	2,3
4	Develop knowledge and skills to assess and manage injuries related to musculoskeletal system.	1,2,3
5	Apply skills to assess and manage different types of injuries such as lightning strike, heat injury, etc.	2,3

SEMESTER – VI									
Course Title	Disaster Management in Health Care								
Course code	24BEDM3202R	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 Trauma Emergency and Disaster Management								
Semester									
Course Objectives	<ol style="list-style-type: none"> 1. Demonstrate knowledge of driver’s responsibilities, vehicle laws, and defensive driving techniques and understanding the practical knowledge of techniques on basic inspections and maintenance of ambulances. 2. Demonstrate knowledge of techniques for operating an ambulance vehicle prior to the run, during the run, while at the emergency scene, to the hospital, and when returning to quarters. 3. Implementing the disaster management cycle (mitigation, preparedness, response, and recovery) in the aspects of disaster management. 								
CO1	Develop an understanding on the basic operation of an ambulance and different types of patient transportation.								
CO2	Demonstrate competency in the knowledge and skills for providing comprehensive care in mass casualty incidents.								
CO3	Implement fundamental knowledge on hazardous materials and the process of decontamination and treatment in case of contact.								
CO4	Apprehend knowledge on preservation on crime scene and how to work with interdisciplinary departments in special cases such as hostage situations.								
CO5	Differentiate between man-made and natural disasters including the effects, management and treatment of injuries caused by such disasters.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Ambulance operations, medical incident command <ul style="list-style-type: none"> • Understanding your ambulance • Ambulance staffing and development • Emergency vehicle operation • Air medical transport • The incident commands • Standard operating procedures • Medical incident command • Triage 	8	Demonstrate the ability to implement medical incident command protocols during simulated scenarios, including triage management and resource allocation.					1,2	
II	Terrorism and weapons of mass destruction, Rescue awareness and operations <ul style="list-style-type: none"> • Terrorism • Weapons of mass destruction • Paramedic Response to terrorism • Chemical agents • Biological agents • Radiological/nuclear devices • Guidelines for operations • Steps of special rescue General rescue scene procedure • Assisting rescue crews • Patient Care 	10	Analyze response guidelines and protocols for handling chemical, biological, radiological, and nuclear incidents, identifying key steps for special rescue operations.					1,2	

III	Hazardous material incidents <ul style="list-style-type: none"> • Identification of hazardous materials • Hazardous scene management • Contamination and toxicology • Decontamination and treatment 	8	Identify various types of hazardous materials commonly encountered in emergency situations, explaining their potential risks and appropriate handling procedures.	1,2
IV	Crime scene awareness <ul style="list-style-type: none"> • Highway incidents • Residential incidents • Violence on the streets • Hostage situations • Contact and cover • Self-defines • Preserving crime scene evidence 	8	Assess the techniques such as contact and cover procedures, self-defence strategies, and evidence preservation methods to maintain crime scene integrity and ensure responder safety.	1,2
V	Disaster management <ul style="list-style-type: none"> • Understanding natural and manmade disasters • Understanding effects of disasters • Prevention, preparation, response • Medical response to disasters • Mock drill 	8	Evaluate response effectiveness, and refine strategies for preventing, preparing for, and responding to disasters.	1,2

Textbook:

T1: Nancy Caroline's Emergency care in the streets, Seventh Edition, Series Editor: Andrew N.Pollak, MD, FAAOS: Lead Editors: Bob Elling, MPA, EMT-P Mike Smith, BS, MICP: JONES AND BARTLETT LEARNING :(2012)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop an understanding on the basic operation of an ambulance and different types of patient transportation.	1,8
2	Demonstrate competency in the knowledge and skills for providing comprehensive care in mass casualty incidents.	1,2,3
3	Implement fundamental knowledge on hazardous materials and the process of decontamination and treatment in case of contact.	2,6
4	Apprehend knowledge on preservation on crime scene and how to work with interdisciplinary departments in special cases such as hostage situations.	1,7
5	Differentiate between man-made and natural disasters including the effects, management and treatment of injuries caused by such disasters.	1

SEMESTER – VI									
Course Title	Introduction To Emergency Medical Services								
Course code	24BEDM3201R	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 Trauma Emergency and Disaster Management								
Semester	Fall / VI semester of third year of the Programme								
Course Objectives	1. Understanding of the working principles of medical equipments, their usage and management. 2. Explain the history of EMS dispatch, describe basic configuration of EMS communication systems, 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. 3. Understand the legal and ethical responsibilities of EMS providers, including patient confidentiality, informed consent, documentation, and adherence to professional standards of conduct.								
CO1	Comprehend knowledge of the different level of EMT education, medical laws and ethics that contribute to professionalism in the healthcare system.								
CO2	Demonstrate knowledge on the components of well-being and how to handle stress.								
CO3	Understand the law and role of Public Health along with the importance of injury and illness prevention.								
CO4	Illustrate different types of EMS Communications and inter-professional communication.								
CO5	Implement fundamental knowledge on the purpose, importance and types of documentation along with legal issues with patient care report.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	EMS systems <ul style="list-style-type: none"> • EMS system development • Licensure, certification and registration • Level of education • Paramedic education • Additional type of transports • Working with other profession • Professionalism • Roles and responsibilities • Medical direction • EMS research 	9	Describe the development and evolution of EMS systems, including their organizational structure and integration with healthcare systems.	1,2					
II	Work safety and wellness: <ul style="list-style-type: none"> • Components of well-being • Stress • Coping with death and dying • Disease transmission • Protecting Yourself 	9	Identify stress management techniques and coping strategies for paramedics dealing with high-stress environments and situations.	1,2					
III	Public health: <ul style="list-style-type: none"> • Role of Public Health • Public health laws, regulation, and guidelines 	9	Explain principles of injury prevention and design prevention programs	1,2					

	<ul style="list-style-type: none"> • EMS interface with public health • Injury and illness prevention and EMS • Principles of injury and prevention 		tailored to community needs and healthcare settings.	
IV	EMS communication <ul style="list-style-type: none"> • EMS communication system • Communication by radio • Communication with healthcare professionals, dispatching, therapeutic communication 	9	Explain the unique considerations in air ambulance operations, including air physics, patient care during transport, and critical care capabilities.	1,2
V	Documentation <ul style="list-style-type: none"> • Introduction • Legal issues of patient care report • Purposes of documentation • Types of patient care report Documentation for every EMS call 	9	Discuss the legal framework governing paramedic practice, emphasizing scope of practice, documentation standards, and ethical considerations.	1,2

TEXT BOOKS:

T1: Nancy Caroline's Emergency care in the streets, Seventh Edition, Series Editor: Andrew N. Pollak, MD, FAAOS: Lead Editors: Bob Elling, MPA, EMT-P Mike Smith, BS, MICP: JONES AND BARTLETT LEARNING (2012)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand and become familiar with the work environment.	1,3,6,7,8
2	Understanding and practicing workplace professionalism.	1
3	Develop specific skills like communication, teamwork, or technical abilities.	1,2,3
4	Develop a clear scope of career aspect.	6
5	Develop practical knowledge and skills for application in real time.	6,8



Assam down town University

Curriculum and Syllabus

Bachelor of Medical Laboratory Technology

**OUTCOME BASED EDUCATION FRAMEWORK
CHOICE BASED CREDIT SYSTEM**

Version: 2.2

FACULTY OF PARAMEDICAL SCIENCES

July, 2024

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 Board of Studies (BOS) meeting of the Faculty of Paramedical Sciences held on dated 20/06/2024 and approved by the 51st Academic Council (AC) meeting held on dated 26/07/2024.



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

Bachelor of Medical Laboratory Technology program offers to candidate's 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 Bachelor of Medical Laboratory Technology program is 3 (three) years 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 formulate, 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: Apply 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.

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: Total credit need to sore for the successful completion of BSc Medical Laboratory Technology degree program is **133**.

VII. Career Prospects: Medical Laboratory Technicians can earn employment in pathology labs, hematology, Biochemistry, microbiology, cytotechnology, research labs, immunology, pharmaceuticals, and Clinics or hospitals. They can also ensue a career in the education line as a lecturer or clinical instructor.

Some of the job roles offered to Bachelor of Medical Laboratory Technology graduates includes:

Laboratory Technician

Blood Bank Technician

Medical Record Technician

Laboratory Manager

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.

S.N.	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.

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 follows a unique pattern and the total marks is 60

Table 1: Question paper pattern for End semester examination

S.N.	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-Voice 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^{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.

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

The CGPA shall be convertible into equivalent percentage of marks using Equation Conversion of CGPA to percentage marks: = CGPA*10

c. 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 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 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.

Breakdown of Credits

Sl. No	Category	Title of the Course	Total number of Credits
1	University Core (UC)	Skill Enhancement Course (SEC)	
		Ability Enhancement Course (AEC)	08
		Field Training (FT)	
		Discipline Specific Elective (DSE)	
		Value Added Course (VAC)	08
2	University Elective (UE)	Multidisciplinary Course (MDC)	09
		Value Added Course (VAC)	
3	Program Core (PC)	Discipline Specific Core (DSC)	88
		Field Training	01
		Research /Industry Internship	06
		Summer Internship	04
4	Program Elective (PE)	Discipline Specific Elective (DSE)	
		Value Added Course (VAC)	
5	Faculty Core (FC)	Skill Enhancement Course (SEC)	09
		Ability Enhancement Course (AEC)	
Total			133

Breakdown by categories of courses

Sl. No.	Category	Credits	%
1	Paramedical Sciences	124	93.23%
2	FOCT	02	1.50%
3	Commerce and Management	01	0.75%
4	CLPDP	06	4.51%
Total		133	100%

SEMESTER WISE COURSE DISTRIBUTION

	S.N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
Semester I	1.	24BMLT1101R	Human Anatomy and Physiology I	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200	
	2	24BMLT1102R	General Biochemistry	DSC (Major)	3	0	2	0	0	0	4	40	60	100	200	
	3	24BMLT1103R	Basic Principle of Hospital Practice and Patient Care	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100	
	4	24BMLT1104R	Techno Professional Skills I	SEC	0	0	2	0	0	0	1	0	0	100	100	
	5	24UBPD1101R	Basic Communicative English (PDP)	AEC	0	0	2	0	0	0	1	0	0	100	100	
	6	24BMLT1101M	MOOCs (CBCS)	VAC	2	0	0	0	0	0	2	100	0	0	100	
	7	24BMLT1105R	Medical Psychology	MDC	3	0	0	0	0	0	3	40	60	0	100	
	8	24UBEC1101	Extra-Curricular/ Co- Curricular	Extra - Curricular	0	0	0	4	0	0	1	0	0	100	100	
	Total					14	0	10	4	0	0	20	260	240	500	1000
Semester II	1.	24BMLT1201R	Human Anatomy and Physiology II	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200	
	2	24BMLT1202R	Biochemistry: Biomolecules and their Metabolism	DSC (Major)	3	0	2	0	0	0	4	40	60	100	200	
	3	24BMLT1203R	Fundamental of Patient Care and Safety	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100	
	4	24BMLT1204R	Self-Study (Seminar/ Presentation)	AEC	0	0	2	0	0	0	1	0	0	100	100	
	5	24UBPD1201R	Functional English	AEC	0	0	2	0	0	0	1	0	0	100	100	
	6	24URSH1201M	Radiation Source and Hazards	MDC	3	0	0	0	0	0	3	40	60	0	100	
	7	24UBES1201R	Environmental Studies	VAC	2	0	0	0	0	0	2	40	60	0	100	
	8	24UBCC1201	Co- Curricular	Co- Curricular	0	0	0	4	0	0	1	0	0	100	100	
	Total					14	0	10	4	0	0	20	200	300	500	1000

	S.N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
Semester III	1	24BMLT2101R	Bacteriology	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200	
	2	24BMLT2102R	Pathology	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200	
	3	24BMLT2103R	Metabolic Biochemistry	DSC (Minor)	2	0	4	0	0	0	4	40	60	100	200	
	4	24BMLT2104R	Biomedical waste Management	DSC (Minor)	4	0	0	0	0	0	4	40	60	0	100	
	5	24BMLT2105R	Techno Professional Skill II	SEC	0	0	2	0	0	0	1	0	0	100	100	
	6	24URSP2101R	Radiation Safety and Protection	MDC	1	0	0	0	0	0	1	40	60	0	100	
	7		Design Thinking and Entrepreneurship	SEC	1	0	0	0	0	0	1	40	60	0	100	
	8	24UBPD2101R	Executive English	AEC	0	0	2	0	0	0	1	0	0	100	100	
	9	24UDLS2101R	Digital Literacy	VAC	0	0	2	0	0	0	1	0	0	100	100	
	10	24UULS2101R	Basic Acclimatizing Skills	MDC	0	0	2	0	0	0	1	0	0	100	100	
	11	24BMLT2106R	Field Training	FT	0	0	0	0	0	8	1	0	0	100	100	
Total					12	0	20	0	0	8	23	240	360	800	1400	
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.	24BMLT2201R	Parasitology	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200	
	2	24BMLT2202R	Clinical Pathology	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200	
	3	24BMLT2203R	Analytical and Nutritional Biochemistry	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200	
	4	24BMLT2204R	Laboratory Instrumentation	DSC (Major)	1	0	0	0	0	0	1	40	60	0	100	
	5	24BMLT2205R	Medical Record Keeping and Roles of MLT Professionals	DSC (Major)	3	0	0	0	0	0	3	40	60	0	100	
	6	24BMLT2206R	Techno Professional Skills III	SEC	0	0	4	0	0	0	2	0	0	100	100	
	7	24UBPD2201R	Enhance Professional Skills	AEC	0	0	2	0	0	0	1	0	0	100	100	
	8	24BMLT2207R	Self- Study (Seminar/ Project)	AEC	0	0	2	0	0	0	1	0	0	100	100	
	9	24UUF2201R	Financial Literacy	MDC	0	0	2	0	0	0	1	0	0	100	100	
10	24UULS2201R	Basic Life Saving Skills	VAC	0	0	2	0	0	0	1	0	0	100	100		
Total					10	0	24	0	0	0	22	200	300	800	1300	

	S.N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for				
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
Semester V	1.	24BMLT3101R	Virology and Immunology	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200	
	2	24BMLT3102R	Histopathology	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200	
	3	24BMLT3103R	Clinical Biochemistry	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200	
	4	24BMLT3104R	Laboratory Infrastructure and Design	DSC (Major)	4	0	0	0	0	0	4	40	60	0	100	
	5	24BMLT3105R	Techno Professional Skills IV	SEC	0	0	4	0	0	0	2	0	0	100	100	
	6	24BMLT3106R	Bio-Hazard	SEC	0	0	4	0	0	0	2	0	0	100	100	
	7	24BMLT3107R	Internship (Summer Training)	Internship	0	0	0	16	0	0	4	0	0	100	100	
	8	24BMLT3108R	Research/ Industry Internship	Research/ Industry Internship	0	0	0	0	12	0	2	0	0	100	100	
	Total					10	0	20	16	12	0	26	160	240	700	1100

	S.N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
Semester VI	1	24BMLT3201R	Cytopathology	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200
	2	24BMLT3202R	Metabolic Errors and Quality Control in Clinical Biochemistry	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200
	3	24BMLT3203R	Medical Mycology	DSC (Major)	2	0	4	0	0	0	4	40	60	100	200
	4	24BMLT3204R	Principle of Laboratory Management	DSC (Major)	4	0	0	0	0	0	4	40	60	0	100
	5	24BMLT3205R	Research/ Industry Internship	Research/ Industry Internship	0	0	0	0	24	0	4	0	0	100	100
	6		Finishing School	AEC	0	0	4	0	0	0	2	0	0	100	100
	Total					10	0	16	0	24	0	22	160	240	500

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

SEMESTER – I									
Course Title	Human Anatomy and Physiology I								
Course code	24BMLT1101R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 60T+30P	4	0	4	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	1. To learn about the anatomical positions, gross and microscopic structure of the organs and skeleton in the human body. 2. To assist students in developing a better grasp of the anatomical structure and basic physiological functions of various body regions. 3. To recognize and differentiate between different types of tissues under a microscope.								
CO1	Discuss the anatomical terms and basic structure and function of cells								
CO2	Explore knowledge of Musculoskeletal system and bones along with their special features and functions.								
CO3	Describe the composition of the human digestive system and their specific functions.								
CO4	Explain respiratory system and classify various respiratory disorders.								
CO5	Describe the anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	Introduction To Anatomical Terms, Basic Structure and Function of Cell Level of Organization – Body Parts and Areas, Planes and Sections. Common anatomical terminology Structure and Function of Cell Membrane, Cellular Transport	10	Explain the significance of the anatomical position and use directional terms to describe the location of various body structures.				1,2,3		
II	Musculoskeletal-System and Bones Bones: Classification & types according to morphology. Tissue and its types Cartilage Joints: definition, classification, and movements of joints. Muscle and its types For Specific programs- Radiology: Importance of different bones of human body.	14	Describe the types of bones, tissue, muscles and their functions.				1,2,3,4		
III	Digestive System- Anatomy of gastrointestinal tract and accessory organs of digestive system. Composition and functions of gastric, pancreatic, intestinal, and biliary secretion.	10	Analyze the anatomy of the gastrointestinal tract and the accessory organs of the digestive system.				2,3		

IV	Respiratory System- Anatomy of the respiratory tract Mechanisms and Regulation of respiration. Gaseous exchange in lung and tissues. Lung volumes and capacities. Respiratory abnormalities: Hypoxia, cyanosis, dyspnea, Asphyxia, hyperventilation, hypoventilation, tachypnoea and bradypnea Specific Program ECC: Intrapleural and intrapulmonary pressures and their changes with respiration, Hypoxia. For Specific programs- ECC: Description of larynx, trachea, and respiratory centers	10	Identify and describe the major anatomical structures of the respiratory tract and understand respiratory abnormalities.	1,2,3
V	Cardio-vascular System and Blood: Mediastinum–division Structure of heart and blood vessels. Systemic circulation, pulmonary circulation, and coronary circulation Cardiac output, cardiac cycle, conducting system of heart. Heart sounds, pulse, blood pressure and their regulation. Composition and functions of blood, Plasma, and body fluids. Functions of RBC, WBC, and platelets. Hemoglobin. Blood hemostasis Blood groups	16	Integrate knowledge of the cardiovascular system and blood components to develop a comprehensive presentation on how these systems work together to maintain homeostasis and respond to physiological challenges.	2,4,5
Practical	1. Study of Skull, Vertebrae, Ribs and bones of upper limb 2. Study of compound Microscope 3. Measurement of blood pressure, Arterial pulse 4. Bleeding time (BT), Clotting time(CT)	30	Discuss a comprehensive understanding of anatomical structures and physiological measurements.	1, 2, 3, 4, 5

TEXT BOOKS:

T1: Fundamentals of Anatomy: Pamela K Levangie, Cynthia C Norkin

T2: Fundamentals of Medical Anatomy: Duane Nudson

T3: Ross and Wilson Anatomy and Physiology

REFERENCE BOOKS:

R1: JP Bros Medical Publishers, Bangalore, 1st Indian Ed 1997: Medical Anatomy

R2: Agarwal/ Arya: Anatomy & Physiology

R3: Robert K. Clark: Anatomy and Physiology

OTHER LEARNING RESOURCES:

[https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy- and physiology](https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy-and-physiology)

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Discuss the anatomical terms and basic structure and function of cells	1,2,4
2	Explore knowledge of Musculoskeletal system and bones along with their special features and functions.	1,2,4
3	Describe the composition of the human digestive system and their specific functions.	1,2,4
4	Explain respiratory system and classify various respiratory disorders.	1,2,4
5	Describe the anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body.	1,2,4

SEMESTER – I									
Course Title	General Biochemistry								
Course code	24BMLT1102R	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 Medical Laboratory 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	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: Definition and classification of carbohydrates Example of some common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch), their sources and structures. Biological significance of Carbohydrate	10	Develop a comprehensive understanding of carbohydrates, encompassing their definitions, classifications.				1,2		
II	PROTEINS: Definition of Proteins along with the biological significance, Amino acids and its, classification: Essential and Non-essential amino acids	10	Define proteins and explain their biological significance in various cellular functions.				1,2		
III	LIPIDS: Definition and classification of lipids Classification of Fatty Acids Examples and functions of some common lipids (Phospholipids, Glycolipids, Steroids)	10	Classify fatty acids based on their saturation and explain how these classifications influence lipid function and physiological impact.				1,3		
IV	NUCLEIC ACIDS: Basics on the structure of DNA and RNA Function of DNA and RNA	8	Explain the respective functions of DNA (storage and transmission of genetic information) and RNA.				1,4		

V	ACID-BASE BUFFERS: Basics about acids, bases, pH, pOH, pKa and Buffer Acid base balance	7	Explain the concepts of acids, bases, pH, pOH, pKa, and buffers.	3,4,5
Practical	1. Identification and Demonstration of Biochemistry Laboratory Glassware's and Apparatus. 2. Identification and Demonstration of Biochemistry Laboratory Instruments (Principle and its applications). 3. To perform Fehling's test for determination of reducing and non-reducing sugar in an unknown sample 4. To perform Benedict's test for determination of reducing and non-reducing sugar in an unknown sample. 5. To perform Molisch's test for Determination of sugar in an unknown sample.	30	Explain the principles behind the operation of biochemistry laboratory instruments and describe the chemical basis of the test.	1,2,3,4,5

TEXT BOOKS:

T1: Textbook of Biochemistry: U Satyanarayana and U Chakrapani

T2: Text book of Biochemistry for medical students: DM Vasudevan, Sreekumari S, Kannan Vaidyanathan

REFERENCE BOOKS:

R1: Dr. J.L Jain, Dr. Sunjay Jain, Nitin Jain: Fundamentals of Biochemistry

R2: David L Nelson, Michael M. Cox: Lehninger Principles of Biochemistry

OTHER LEARNING RESOURCES:

<https://www.khanacademy.org/science/biology/human-biology><https://open.oregonstate.edu>

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Explain the sources, functions and metabolism process of Carbohydrates	1,3,4
2	Identify various classification of amino-acids and recognize the significance of Protein.	1,3,4
3	Describe the significance, classification and functions of lipids.	1,3,4
4	Comprehend the structure and functions of Nucleic Acids.	1,3,4
5	Explain the fundamentals and importance of acid, base and buffers	1,3,4

SEMESTER – I									
Course Title	Basic Principle of Hospital Practice and Patient Care								
Course Code	24BMLT1103R	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 Medical Laboratory Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	<ol style="list-style-type: none"> To impart the knowledge in patient in a holistic approach for the overall wellbeing of the patient. To impart a comprehensive knowledge on medical ethics and the quality and functions of medical professionals. 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	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	Describe vital signs and effectively manage the abnormalities.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	Hospital and records & reports 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	5	Discuss different functions, process of record keeping, reporting and essential components of hospital management.					1,2	
II	Medical Profession AI and Legal Hazards of Medical Profession First aid 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 Scorpion bite Dog bite Ch. 7/t1 &/r1 White Board, ppt Analyzing evaluating foreign bodies in various organs Burns & Hemorrhage	5	Illustrate the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.					2, 3	

III	<p>HYGIENE AND BASIC CARE NEEDS 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</p>	6	Execute the knowledge on personal hygiene and basic care needs of patients.	1, 2
IV	<p>SAFETY IN THE LABORATORY Common laboratory accidents from Physical injuries Electrical shock Chemical injury Bleeding, Burn, Eye accidents biological hazards.</p>	4	Illustrate the basic principles, Golden rules of First Aid and Effectively implement the skills in certain medical emergencies.	1, 2
V	<p>VITAL SIGNS OF PATIENTS: 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</p>	10	Examine the importance of vital signs of patients- Body temperature, Pulse, Blood pressure and Respiration.	3, 4

TEXT BOOKS:

T1: Principles of Hospital Practice and Patient Care: Srinivasulu Reddy

T2: Hospital and Patient Care Management: Dr. Vidhya Srinivasan, Dr. Akshay Ch. Deka

REFERENCE BOOKS:

R1: Sylvia McKean: Principles and Practice of Hospital Medicine

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Discuss different functions, process of record keeping, reporting and essential components of hospital management.	1,2,5,8
2	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	1,2,5,8
3	Apply fundamental knowledge of patient safety and care to ensure basic care needs of patients.	1,2,5,8
4	Assessment of common laboratory accidents and its effective management.	1,2,5,8
5	Describe vital signs and effectively manage the abnormalities.	1,2,5,8

SEMESTER – I									
Course Title	Phlebotomy (Techno Professional Skills – I)								
Course code	24BMLT1104R	Total Credits: 1	L	T	P	S	R	O/F	C
		Total Hours : 30	0	0	2	0	0	0	1
Pre-requisite		Co-requisite	Nil						
Programme	Bachelor of Medical laboratory Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	<ol style="list-style-type: none"> Students will be taught the technique of collecting different types of specimens for diagnostic purpose. 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. Safety and infection control procedures which are important for routine lab practices will also be taught. 								
CO1	Understanding Phlebotomy and underlining the roles and responsibilities of a phlebotomist and Patient Care.								
CO2	Identifying different samples for collection, example: blood, urine, Body fluid, Semen, Pus, scrapping.								
CO3	Demonstrate the sequence of collection and importance of labelling of samples								
CO4	Recognize the common errors and significance of specimen rejection.								
CO5	Categorize the types of infections, its causative agents and steps for management.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Phlebotomist, Role and Responsibilities <ul style="list-style-type: none"> Patient Care 	5	Ability to assess situations, identify challenges and devise solutions on the spot.	1, 2,3					
II	Type of Samples and site of collection: <ul style="list-style-type: none"> Blood Urine Body fluid, Semen, Pus, Scrapping 	5	Improved ability to communicate effectively	2,3					
III	Specimen Collection: <ul style="list-style-type: none"> Order Of Draw Labeling Of Samples 	5	Ability to organize, prioritize, and complete tasks.	1,3					
IV	Common errors and Specimen Rejections: <ul style="list-style-type: none"> Hemolysis Hematomas Specimen Rejections 	5	Demonstration of a professional attitude and respect for workplace	2, 4					
V	Safety And Infection Controls: <ul style="list-style-type: none"> Osha (Occupational Safety and Health Act) Types of Infections: Blood Borne Pathogens, Airborne Pathogens PPE (Personal Protective Equipment) Finger stick Injury Biomedical Waste Management 	5	Ability to reflect on experiences to identify personal strengths	1, 3, 4					

TEXT BOOKS:

1. Textbook of Medical Lab Technology– PrafulB.Godkar, DarshanP.Godkar.
2. Textbook of Medical LabTechnology–RamnikSood.
3. Clinical chemistry-Michael.L.Bishop
4. Essentials in Haematology and Clinical pathology-Ramdas Nayak
5. Textbook of Microbiology–Ananthanarayan & Paniker

REFERENCE BOOKS:

1. Textbook of Medical Lab Technology– PrafulB.Godkar, DarshanP.Godkar.
2. Textbook of Medical Lab Technology– Ramnik Sood.
3. Clinical chemistry-Michael.L.Bishop
4. Essentialsin Haematology and Clinical pathology- Ramdas Nayak
5. Textbook of Microbiology–Ananthanarayan & Paniker

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understanding Phlebotomy and underlining the roles and responsibilities of a Phlebotomist and Patient Care.	1, 4, 6
2	Identifying different samples for collection, example: blood, urine, Body fluid, Semen, Pus, scrapping.	4, 5
3	Demonstratethesequenceofcollectionandimportancesoflabellingofsamples	4
4	Recognize the common errors and significance of specimen rejection.	2, 4
5	Categorize the types of infections, its causative agents and steps for management.	2

SEMESTER – I											
Course Title	Basic Communicative English										
Course Code	24UBPD1101R	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 Medical Laboratory Technology										
Semester	Fall/ I Semester of First Year of the Programme										
Course Objectives	<ol style="list-style-type: none"> To introduce the students to the basics of English grammar and their application. To enhance communication skills through listening and speaking exercises. To learn and understand the importance of pronunciation of words. 										
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	Module 1- Grammar <ul style="list-style-type: none"> Parts of Speech Articles Affirmative and Negative Sentences 				6	Learn about how to write speech, articles etc.				1,2,3,4,5	
II	Module 2- Grammar <ul style="list-style-type: none"> Determiners Sentence Construction from jumbled words Types of Sentences (Assertive, Imperative etc.) 				6	Learn about how to write the sentence.				1,2,3,4,5	
III	Module 3- Building Vocabulary <ul style="list-style-type: none"> Synonyms Antonyms 				6	Learn about how to change the word.				1,2,3,4,5	
IV	Module 4- Speaking Skills <ul style="list-style-type: none"> Introduction and greetings Pronunciation Asking and offering information Video Recording for self-analyze 				6	Learn about how to speak.				1,2,3,4,5	
V	Module 5- Communication Skills <ul style="list-style-type: none"> Introduction to Communication, Importance of Communications kills, Purpose of Communication, Types of Communication, Barriers to Communication, 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. Sultan Chand 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
3. <https://youtu.be/xQfYiHbAjJo>

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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	The application of grammatical rules will enable the students to improve the speaking and writing skills.	1,6,8
2	It enables the learners to use the language effectively.	1,6,8
3	It will strength both listening and speaking skills.	1,6,8
4	It will strengthen their vocabulary and use of words.	1,6,8
5	It will give an introduction on the concept of communication, its importance and barriers.	1,6,8

SEMESTER – I									
Course Title	Medical Psychology								
Course Code	24BMLT1104R	Total Credits: 3 Total Hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	1. Aims to provide students with a comprehensive understanding of human behavior and mental processes. 2. Explore various psychological domains such as cognitive, developmental, social, and abnormal psychology, gaining insights into how individuals think, feel, and act. 3. To be equipped with critical thinking skills and an appreciation for the complexities of human behaviour, enabling them to apply psychological concepts to real-world situations.								
CO1	Understand the significance, history, scope and branches of psychology.								
CO2	Discuss the biology of human behaviour and sensation.								
CO3	Identify the different stages of human growth and development and the factors influencing it.								
CO4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.								
CO5	Apply skills to assess mental health and identify the warning signs of poor mental health.								
Unit- No.	Content		Contact Hour	Learning Outcome					
I	Introduction to Psychology Definition of psychology Evolution of modern psychology Branch of psychology		7	Introduces the knowledge of psychology its evolution in modern world and different branches of it.					
II	Biology of Behavior Body mind relationship modulation process in health and illness Brain and behavior: nervous system, neurons and synapse, Association cortex, Right and Left hemispheres.		10	Explains the biology of behaviour the mindset and all the complex function.					
III	Growth and Development Life span : different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age) Heredity and environment: role of heredity and environment in physical and psychological development.		10	Describes the growth and development of a person.					
IV	Motivation and Emotional Processes Motivation: meaning, concepts, types, theories, motives and behavior. Emotion: definition, components, changes in emotions, theories, emotional adjustments, emotions in health and illness. Stress: stressors, cycle, effects, adaptation & coping and management. Conflicts and frustration, conflict		8	Explains the techniques of keeping one motivated and maintaining emotional processes.					

	resolution.		
V	Mental Hygiene and Mental Health Concepts of mental hygiene and mental health. Characteristics of mentally healthy person Warning signs of poor mental health, Promotive and preventive mental health – strategies and services. Guidance counselling and Rehabilitation.	10	Explain the warning sign of poor mental health ways of preventing it and characteristics of a healthy person.

TEXT BOOKS:

T1: Medical Psychology, Robert Dunn, (2023), Legare Street Press,

T2: Psychology for Medicine and Healthcare, Ayers Susan, Sage Publications Ltd.

REFERENCE BOOKS:

R1: Psychology - by Baron/Misra (2016). Pearson Education India.

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understand the significance, history, scope and branches of psychology.	1,2
2	Discuss the biology of human behaviour and sensation.	1,3
3	Identify the different stages of human growth and development and the factors influencing it.	1,4,7
4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.	3,5
5	Apply skills to assess mental health and identify the warning signs of poor mental health.	3,5

SEMESTER I									
Course Title	Extra-Curricular								
Course Code	24UBC1101	Total Credits: 1 Total Hours: 60	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Anti-requisite	Nil								
Programmes	Bachelor of Medical Laboratory Technology								
Semester	Fall/ I semester of first year of the Programme								
Course Objectives :	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. 3. It is to develop the social and soft skills and to promote a holistic development of the learners.								
CO1	Students will develop effective leadership qualities through practical activities and projects, fostering teamwork and decision-making abilities.								
CO2	Students will develop critical thinking skills by analyzing complex issues, evaluating evidence, and proposing innovative solutions.								
CO3	Students will engage in community service projects or advocacy efforts, promoting social justice, environmental sustainability, and ethical leadership.								
CO4	Students will unleash their creative potential by exploring new ideas, experimenting with different mediums								
CO5	Through mock interviews and resume workshops, students will enhance their employability and prepare for future career opportunities								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	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	60	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	

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Students will develop effective leadership qualities through practical activities and projects, fostering teamwork and decision-making abilities.	5,7,9
2	Students will develop critical thinking skills by analyzing complex issues, evaluating evidence, and proposing innovative solutions.	5,7,9
3	Students will engage in community service projects or advocacy efforts, promoting social justice, environmental sustainability and ethical leadership.	5,7,9
4	Students will unleash their creative potential by exploring new ideas, experimenting with different mediums	5,7,9
5	Through mock interviews and resume workshops, students will enhance their employability and prepare for future career opportunities.	5,7,9

SEMESTER – II									
Course Title	Anatomy and Physiology II								
Course Code	23BMLT121R	Total Credits: 6 Total Hours: 60T+30P	L	T	P	S	R	O/F	C
			4	0	4	0	0	0	6
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring/ II Semester of First Year of the Programme								
Course Objectives	1. To provide a comprehensive concept of all the anatomical position and physiological function of the human body. 2. To provide a comprehensive concept of physiological function of the human body 3. To understand the underlined mechanism and regulation of the human body.								
CO1	Explain the structure and function of excretory system.								
CO2	Describe the sensory organs and nervous system along with their functions								
CO3	Identify different types of immune cells and lymphatic system in the body.								
CO4	Explain the structure and functions of male and female reproductive system.								
CO5	Describe the endocrine system and their regulation								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	Urinary System Structure of kidney, ureter, Urinary bladder, male and female urethra. Functions of kidneys, nephron. Urine formation.	10	Explain the process of urine formation, including the role of nephrons in filtering blood.				1,2,3		
II	Nervous System Classification of Nervous system. Central Nervous system– Brain and Spinal cord, blood supply of brain. Cranial nerves and spinal nerves Introduction of motor system, sensory system and Autonomic Nervous System. Functions of brain, and spinal cord Synapse, reflex arc Cerebrospinal fluid Sensory Organs: Skin, Ear, Nose, Tongue Eye	15	Describe the organization and function of the central and peripheral nervous systems, including the roles of sensory and motor pathways.				1,2		
III	Lymphatic and Immunological System Structure of lymphatic system and functions. Immunity– Antigen, Antibody, and Immune response. Acquired immunity	15	Describe the structure and functions of the lymphatic system in supporting immune function.				1,2		
IV	Reproductive System Structure of male and female reproductive organs. Structure of breast Changes during puberty Ovulation, Menstrual cycle Pelvic cavity with its boundaries and contents	10	Identify and explain the structures of male and female reproductive organs and their functions.				1,2		

V	Endocrine System Different endocrine glands Hormones and functions of endocrine glands Regulation of secretion hormones.	10	Explain the structure and function of various endocrine glands and identify the hormones they secrete.	3,4
Practical	1. Study of pelvic bones and bones of lower limbs of human body. 2. Study of organs: Brain, heart, lung, liver, kidney 3. Blood group 4. DLC 5. Total count of RBC and WBC	60	Demonstrate a thorough understanding of the structure and function of pelvic bones, major organs, and blood groups.	1,2,3,4

TEXT BOOKS:

T1: Anatomy & Physiology- Ross and Wilson.

T2: Anatomy and Physiology: Understanding the Human Body by Clark. T3: Anatomy and Physiology for nurses by Evelyn Pearce.

REFERENCE BOOKS:

R1: Anatomy and Physiology for nurses by Pearson. R2: Anatomy and Physiology by N Murgesh.

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 (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Explain the structure and function of excretory system.	1,2,4
2	Describe the sensory organs and nervous system along with their functions	1,2,4
3	Identify different types of immune cells and lymphatic system in the body.	1,2,4
4	Explain the structure and functions of male and female reproductive system.	1,2,4
5	Describe the endocrine system and their regulation	1,2,4

SEMESTER – II									
Course Title	Biochemistry: Biomolecules and their Metabolism								
Course Code	24BMLT1202R	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	Bachelor of Medical Laboratory Technology								
Semester	Spring/ 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 explain about the energy flow in the form on ATP in the human body and cells. 3. To provide information and understanding on the basic idea about the enzymes, nomenclature functions, regulations and their significance in biological processes.								
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: Definition and classification of enzyme. Basics of co-enzyme, iso-enzyme. Mechanism of enzyme Action. Factors affecting enzyme action	7	Describe the mechanism of enzyme action, and analyze the factors that affect enzyme activity in biological systems.					1,2	
II	CARBOHYDRATES METABOLISM: Glycolysis Kreb's Cycle Gluconeogenesis Glycogenesis Glycogenolysis	10	Analyze the processes involved carbohydrate metabolism and explain their significance in energy production and regulation of blood glucose levels. in					1,2,3	
III	PROTEIN METABOLISM: Transamination Deamination Urea Cycle and its Significance RFT (Renal Function Tests)	10	Explain the processes of protein synthesis, degradation, and amino acid metabolism					1,2,5	
IV	LIPID METABOLISM: β-oxidation of Fatty Acids. Ketone bodies Ketosis and ketoacidosis LFT (Liver Function Tests)	8	Demonstrate proficiency in understanding lipid metabolism, including the processes of lipid digestion.					2, 5	
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 fluoride, copper, selenium, molybdenum etc.) – their sources, function and properties.	10	Understand the differences between the water soluble and fat-soluble vitamins and their key role in the metabolism as coenzymes					2,3,4	

Practical	<ol style="list-style-type: none"> 1. To perform precipitation test to determine the presence of proteins in an unknown urine sample. 2. To perform heat and acetic acid test to determine the presence of proteins in an unknown urine sample 3. To perform Heller's test to determine the presence of proteins in an unknown urine sample 4. To perform lipid solubility test 	30	Determine the presence of proteins and lipids in urine samples, enhancing their diagnostic skills in clinical laboratory practice.	1,2,3,4, 5
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TEXT BOOKS:

T1: Textbook of Biochemistry for Paramedical Students: P Ramamoorthy

T2: Fundamentals of Biochemistry: U. Satyanarayana, U. Chakrapani

REFERENCE BOOKS:

R1: Text book of Biochemistry for medical students: DM Vasudevan, Sreekumari S, Kannan Vaidyanathan

R2: Lehninger Principles of Biochemistry: David L Nelson and Michael M Cox

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Describe classification, mechanism of enzymes, and factors affecting enzyme actions.	1, 3,4
2	Define the mechanism of carbohydrate metabolism in the body.	1, 3,4
3	Explain the metabolism of protein and its significant effects on different organs of body.	1, 3,4
4	Describe the process of Lipids metabolism and associated clinical conditions.	1, 3,4
5	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body	1, 3,4

SEMESTER – II									
Course Title	Fundamental of Patient Care and Safety								
Course Code	24BMLT1203R	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 Medical Laboratory Technology								
Semester	Spring/ II 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	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	Determine the signs and symptoms of hyperglycemia and hypoglycemia and its immediate management								
CO5	Proficient in performing quality laboratory investigation process and laboratory management								
Unit-No	Content	Contact Hour	Learning Outcome					KL	
I	POISONING Definition Causes of poisoning Sources of Poisoning Symptoms of poisoning First aid & Management Antidotes Common drugs poisoning Carbon monoxide poisoning	5	Describe the basic introduction of poisoning and learn about the Symptoms of poisoning, First aid & Management, Antidotes.					1,2	
II	MEDICAL PROFESSIONAL AND LEGAL HAZARDS OF MEDICAL PROFESSION 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	8	Illustrate the knowledge on the Medical Professional and Legal Hazard.					2,3	
III	SHOCK Definition Types of shock General Features of shock Investigations of shock Initial Management & first aid of shock	5	Understanding about the SHOCK. Types of shock, General Features of shock, Investigations of shock Initial management & first aid of shock.					1,2,4	

IV	<p>HYPERGLYCEMIA AND HYPOGLYCEMIA 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 Hypoglycemia</p>	6	Explain about Hyperglycemia and Hypoglycemia and their investigations.	2,4
V	<p>LABORATORY INVESTIGATION AND LABORATORY SETUP 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 Characteristics of Pulse</p>	6	Describe, illustrate and explain medical ethics along with the guidelines and management of different laboratories in the hospital	1,2,3

TEXT BOOKS:

- T1: Textbook of Biochemistry by Dr D. M Vasudevan, Sreekumari S, Jaypee Publishers, New Delhi.
 T2: Biochemistry by V. Satyanarayan, Books and Allied Pvt. Ltd. Calcutta
 T3: Textbook of Medical Biochemistry by Chatterjee and Shinde
 T4: Text of Medical Laboratory Technology by Prafula Godkar

REFERENCE BOOKS:

- R1: Satyanarayana, U. Biochemistry. Elsevier Health Sciences, 2013.
 R2: Kumar, Vijay, and Kiran Dip Gill. Basic concepts in clinical biochemistry: a practical guide. Springer Singapore, 2018.
 R3: Bender, David A. Nutritional biochemistry of the vitamins. Cambridge university press, 2003.
 R4: Masoro, E. J. "Lipids and lipid metabolism." Annual Review of Physiology 39, no. 1 (1977): 301-321.

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Describe signs and symptoms of common poisonings and its immediate management	1,2,5,8
2	Explain the medical ethics and its importance on the healthcare system	1,2,5,8
3	Identify the different types of shock along with the management.	1,2,5,8
4	Determine the signs and symptoms of hyperglycaemia and hyperglycaemia and its immediate management	1,2,5,8
5	Proficient in performing quality laboratory investigation process and laboratory management	1,2,5,8

SEMESTER – II									
Course Title	Functional English								
Course Code	24UBPD1201R	Total Credits: 1	L	T	P	S	R	O/F	C
		Total Hours: 30P	0	0	2	0	0	0	1
Prerequisite	Basic English	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring/ 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	Module 1- 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	Module 2 - Vocabulary Homonyms Homophones	6	Learn about vocabulary	1,2,3,4 ,5					
III	Reading Skills Techniques of Effective Reading Gathering ideas and information from a text	6	Learn about the reading skills	1,2,3,4 ,5					
IV	Module 4 - Conflict Management Definition Type of Conflict Management Effects of Conflict Management	6	Learn about conflict management	1,2,3,4 ,5					
V	Module 5 - Time-Management Skills Introduction To Time Management, Importance of Time Management, Basic Tips to Maintain Time.	6	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 (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	The application of grammatical rules will enable the students to improve the speaking and writing skills.	1,6,8
2	It enables the learners to use the language effectively.	1,6,8
3	It will strength both listening and speaking skills.	1,6,8
4	It will strengthen their vocabulary and use of words.	1,6,8
5	It will give an introduction on the concept of communication, its importance and barriers.	1,6,8

SEMESTER–II									
Course Title	Radiation Sources & Hazards								
Course Code	24URSH1201R	Total Credits: 3	L	T	P	S	R	O/F	C
		Total Hours: 45T	3	0	0	0	0	0	3
Pre-requisite		Co-requisite							
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring/II Semester of First Year of the Programme								
Course Objectives	1. To provide knowledge of various sources of radiation and types of ionizing radiation. 2. To identify and understand the biological, environmental, and occupational hazards posed by radiation exposure. 3. To familiarize students with international radiation safety symbols and signage for hazard identification and compliance.								
CO1	Explain the concept of radiation and differentiate the various types of radiation.								
CO2	Describe the discovery, production and properties of X-rays.								
CO3	Explain the principles of interaction of x-rays with matter.								
CO4	Classify the different types of radiation hazards and interpret standard radiation symbols and signage used in facilities, equipment, and environments where radiation is present.								
CO5	Understanding the biological effects of ionizing radiation.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction: <ul style="list-style-type: none"> Radiation Types of Radiation Sources of Radiation 	9	The students will learn the concepts of Radiation and differentiate the types of radiation.					1,2	
II	Introduction to X-rays: <ul style="list-style-type: none"> History Production of x-rays Properties 	9	The students will learn about the discovery and production of X-rays.					1,2	
III	Interaction of X-rays with matter: <ul style="list-style-type: none"> Coherent scattering Compton effect Photoelectric effect Pair-production Photodisintegration 	9	The students will be able to recognize the significance of understanding X-ray interactions for minimizing potential hazards and optimizing their safe use in professional settings.					3,4	
IV	Radiation Hazards: <ul style="list-style-type: none"> Types of hazards Radiation symbols /signage 	9	The students will be able to learn about radiation hazards and interpret radiation warning symbols and signages.					3,4,5	
V	Biological effects of ionizing radiation: <ul style="list-style-type: none"> Deterministic effect Stochastic effect 	9	The students will be able to gain the knowledge on effects of radiation.					3,4,5	

TEXT BOOKS:

- T1: Radiological Science for Technologist: Physics, Biology and Protection, 8th Edition, 2004, Bushong, Stewart C.
- T2: Safety code for medical diagnostic X-ray equipment and installations, 1986, Radiological Safety Division, AERB.
- T3: Radiological safety in Enclosed Radiography 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 (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Explain the concept of radiation and differentiate the various types of radiation.	1,5
2	Describe the discovery, production and properties of X-rays.	1,3
3	Explain the principles of interaction of x-rays with matter.	1,3
4	Classify the different types of radiation hazards and interpret standard radiation symbols and signage used in facilities, equipment, and environments where radiation is present.	1,3,5
5	Understanding the biological effects of ionizing radiation.	1,5

SEMESTER-II									
Course Title	Environmental Studies								
Course Code	24UBES1201R	Total Credits: 2	L	T	P	S	R	O/F	C
		Total Hours: 30T	2	0	0	0	0	0	2
Pre-requisite		Co-requisite							
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring/II Semester of First Year of the Programme								
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. 3. To prepare students collectively towards solutions of current problems and prevention of new ones.								
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								

Course Contents:

Unit 1- Multidisciplinary nature of environmental studies: Definition, scope and importance (2 lectures) need for public awareness.

Unit 2- 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.

Unit 3- 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) (6 lectures)

Unit 4- 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 (8 lectures).

Unit 5: 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. (8 lectures)

Unit 6: 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.(7 lectures)

Unit 7: 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. (6 lectures)

Unit 8: 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. (Field work Equal to 5lecture hours)

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, Vol I and 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 – 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p Clark R.S., 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. Course Contents: Unit 1- Multidisciplinary nature of environmental studies: Definition, scope and importance (2 lectures) need for public awareness.

SEMESTER II									
Course Title	Co-Curricular								
Course Code	24UBEC1201	Total Credits:1 Total Hours: 60	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-Requisite	Nil						
Anti-requisite	Nil								
Programmes	Bachelor of Medical Laboratory Technology								
Semester	Spring/ II Semester of First Year of the Programme								
Course Objectives:	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. 3. 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 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					KL	
I	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	60	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	

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

CO PO Mapping		
S.N.	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 – III									
Course Title	Bacteriology								
Course Code	24BMLT2101R	Total Credits: 4 Total Hours: 30T+60P	L	T	P	S	R	O/F	C
			2	0	4	0	0	0	4
Pre-requisite	Nil		Co-requisite			Nil			
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	1. The candidates who are pursuing medical laboratory technology will learn about the sample processing and identification of various bacteria using different techniques. 2. The basic knowledge of different diseases caused by bacteria are also imparted. 3. The training is aimed at making the students competent to isolate and identify the causative micro-organisms.								
CO1	Understand the microbial growth and their nutritional requirements.								
CO2	Differentiate between gram positive and gram-negative bacteria's and their pathogenesis								
CO3	Demonstrate the morphological characteristics, pathogenesis and lab diagnosis of medically important bacteria.								
CO4	Examine the importance of the Antibiotics susceptibility testing in bacteriology.								
CO5	Recognize the causative agents of HAIs.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Microbial growth and nutrition Nutritional requirement Nutritional types of microorganisms, growth factors Bacterial growth curve Culture Media- Types and their applications.	5	Explain the essential principles of microbial nutrition and growth, facilitating further study and application in microbiology.					2,3	
II	Gram Positive and Gram-Negative bacteria Classifications, Morphology, Cultural characteristics, Pathogenesis and Laboratory diagnosis of: Staphylococcus spp. Streptococcus spp. Pneumococcus spp. Escherichia coli, Klebsiella spp. Shigella spp. Salmonella spp. Vibrio cholera -	10	Understand and differentiate between the Gram positive and Gram-negative bacterial Characteristics, pathogenesis, and diagnostic methods for each species.					1,2, 3	
III	Miscellaneous bacteria Classifications, Morphology, cultural characteristics, Pathogenesis and Laboratory diagnosis of: Pseudomonas aeruginosa Corynebacterium diphtheriae Rickettsia Spirochetes Mycobacterium spp. Clostridium spp.	7	Describe the unique morphological features and differentiate the cultural characteristics of each bacterium when grown on appropriate media.					1,2,4	
IV	Antibiotic susceptibility testing in bacteriology: Definition of antibiotics and Culture medium used Preparation of inoculums Choice of antibiotics MIC and MBC: Concepts and methods for determination	4	Define antibiotics and understand their modes of action and understand their Significance.					2,3	

	Various methods of Antibiotic susceptibility testing.			
V	Nosocomial infections Causative agents, transmission methods, prevention and control Hospital borne infections.	4	Understand the complexities of nosocomial infections, their Causative agents, transmission methods, and strategies for prevention and control within Hospital settings.	1,2, 3
Practical	Preparation of culture media Staining: Preparation of smears, Gram's stain, AFB stain, Negative stain Hanging drop preparation Biochemical tests: Catalase test, Coagulase test, Oxidase test, IMViC test, TSI test, Sugar fermentation test Antibiotic Susceptibility Testing	60	Demonstrate and interpret essential microbiological techniques, aiding in the identification and characterization of microorganisms and their susceptibility to antibiotics.	1,2,3,4, 5

TEXT BOOKS:

T1: Textbook of Microbiology by CP Baveja, 7th edition. T2: Microbiology-An introduction, Tortora, Funke, Case.

T3: Textbook of Microbiology by Ananthanarayan and Paniker

REFERENCE BOOKS:

R1: Textbook of microbiology and immunology by S.C. Parija

R2: Microbiology by Prescott, Harley, Kleis

R3: Textbook of Microbiology by Ananthanarayan and Paniker.

OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

<https://www.ncbi.nlm.nih.gov/books/NBK546149/>

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understand the microbial growth and their nutritional requirements.	1,2,4
2	Differentiate between gram positive and gram-negative bacteria's and their pathogenesis	1,2,4
3	Demonstrate the morphological characteristics, pathogenesis and lab diagnosis of medically important bacteria.	1,2,4
4	Examine the importance of the Antibiotics susceptibility testing in bacteriology.	1,2,4
5	Recognize the causative agents of HAIs.	1,2,4

SEMESTER – III									
Course Title	Pathology								
Course Code	24BMLT2102R	Total Credits: 4 Total Hours: 30T+60P	L	T	P	S	R	O/F	C
			2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical laboratory technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	1. The training in this subject is imparted to enable the students to carry out routine clinical laboratory investigation (blood, urine etc.). 2. They should be able to provide technical help for selected sophisticated hematological techniques with adequate knowledge of various principles. 3. They should be able to compare and contrast, the morphology and cytological content of neutrophils, eosinophils, monocytes and basophils.								
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	Introduction to Hematology 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, Romanowsky 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	Red Blood Cells/ Erythrocytes Formation, Morphology, Functions Count methods and its clinical importance Hemoglobin- structure, function and types, Reticulocyte, PCV, ESR, Red cell indices Anemia –definition, Morphology & Etiology classification, Microcytic Hypochromic Anaemia Causes Types Lab investigation. Laboratory pictures Clinical importance Sickle cell Anaemia Thalassemia	8	Describe, illustrate and explain Normal blood cells and various red cells disorders related with RBC.				1,2,3		
III	White Blood Cells (WBC) Formations Types Functions, life morphology Methods of counting, WBC and differential co (preparation of smears) Leukemia and its classification	6	Describe, illustrate and explain the morphology and functions of WBC and techniques to count the WBC.				1,2,4		

IV	Platelets Formation, morphology, Function Method of counting, normal abnormal counts with clinical importance Hemostasis and coagulation Normal hemostasis mechanism of blood coagulation and nor fibrinolytic system Investigation of hemostasis mechanism - BT, CT, white blood coagulation time test, PT, PTT Hemophilia –Definition	6	Describe, illustrate and explain the morphology and functions of platelets and techniques to count the morphology and functions of platelets	1,2,3
V	Bone marrow Method of preparation of bone marrow smears. Different types of staining of bone marrow smear	4	Describe, illustrate and explain different techniques of staining bone marrow.	1,2
Practical	HAEMATOLOGY 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. Hemoglobin estimation by various methods. 12. ESR estimation 13. PCV estimation 14. Reticulocyte count 15. Sickle cell preparation 16. BT, CT, PT, PTT and APTT	60	Describe, illustrate and explain various hematological techniques and carry out microscopic examination.	1,2,3,4

TEXT BOOKS:

T1: Clinical Haematology Principles, procedure, correlations by E. Anne Stiene Martin, Cheryl A. Lotspiech – steininger, John A. Koepke.

REFERENCE BOOKS:

R1: Textbook of Medical Lab Technology – Praful B. Godkar, Darshan P. Godkar R2: Clinical Haematology in Medical Practice – de Gruchy

R3: Medical Laboratory Technology Methods & interpretation – Ramnik Sood

OTHER LEARNING RESOURCES:

<https://vdoc.pub/documents/dacie-and-lewis-practical-haematology-44o9vf6jei70>

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Describe the basics on haematology and understanding the formation, collection and preservation of blood samples.	1,2,3,4
2	Describe about RBC and the relation between haemoglobin and Anaemia.	1,2,3,4
3	Execute the knowledge on WBCs, its morphological understanding on leukaemia	1,2,3,4
4	Understand the haemostasis in details	1,2,3,4
5	Examine on Bone marrow smear and staining techniques.	1,2,3,4

SEMESTER – III											
Course Title	Metabolic Biochemistry										
Course Code	24BMLT2103R	Total Credits: 4			L	T	P	S	R	O/F	C
		Total Hours: 30T+60P			2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite			Nil						
Programme	Bachelor of Medical Laboratory Technology										
Semester	Fall/ III Semester of Second Year of the Programme										
Course Objectives	1. The candidates are imparted basic training of theoretical and practical in the field of Clinical biochemistry. 2. They are taught the technique of collection of clinical samples and their processing. 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										
CO1	Define carbohydrate and describe its metabolism.										
CO2	Explain the general and integrated pathways of protein.										
CO3	Describe the metabolism of lipids.										
CO4	Explain the process of DNA replication and Protein synthesis										
CO5	Discuss the formation of bile pigment, metabolism of bilirubin.										
Unit- No.	Content			Contact Hour	Learning Outcome				KL		
I	Metabolism of carbohydrates: 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.			8	Explain the comprehensive processes involved in the metabolism of carbohydrates, including digestion, absorption and various metabolic pathways.				1,2		
II	Metabolism of Proteins: 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.			8	Understand the overall pathway of protein metabolism and its significance in maintaining metabolic balance and health.				2,3,5		
III	Metabolism of Lipids: 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.			8	Understand and explain the processes involved in the metabolism of lipids and the integration of metabolic pathways of fats.				1,4,5		
IV	DNA Replication and Protein synthesis: Translation and Transcription			3	Understand the fundamental processes of DNA replication and protein synthesis and their regulation.				1,3		

V	Catabolism of heme: Formation of bile pigments, metabolism of bilirubin, catabolism of heme.	3	Describe the enzymatic processes involved in the breakdown of heme and explain their metabolism.	2,4
Practical	<ol style="list-style-type: none"> 1. 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. 	60	Describe and explain the preparation of percentage and Normality solution also demonstrate the routine examination of urine sample for determination of presence of protein, ketone bodies, urobilinogen and blood.	1,2,3,4

TEXT BOOKS:

T1: Biochemistry–U. Satyanarayana, U. Chakrapani.

T2: Textbook of Medical Biochemistry– MN Chatterjee, Kano Shinde.

T3: Principle & Technique of Biochemistry–S Ramakrishnan, K.G. Prasanna, R. Rajan. T4: Principle & Techniques of Biochemistry& Molecular Biology–Keith Coilson

T5: Textbook of Medical Lab Technology– Praful B. Godkar, Darshan P. Godkar

REFERENCE BOOKS:

R1: Cummings, J. H. "Carbohydrate terminology and classification." *European Journal of Clinical Nutrition* 55, no. Suppl 3 (2001): S5-S12.

R2: 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.

R3: Gefter, Malcolm L. "DNA replication." *Annual review of biochemistry* 44, no. 1 (1975): 45-78.

R4: 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:

<https://www.ncbi.nlm.nih.gov/books/NBK21054/?term=Biochemistry>

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Define carbohydrate and describe its metabolism.	1,2,3,4
2	Explain the general and integrated pathways of protein.	1,2,3,4
3	Describe the metabolism of lipids.	1,2,3,4
4	Explain the process of DNA replication and Protein synthesis	1,2,3,4
5	Discuss the formation of bile pigment, metabolism of bilirubin.	1,2,3,4

SEMESTER – III									
Course Title	Biomedical Waste Management								
Course Code	24BMLT2104R	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 Medical Laboratory Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	1. To acquaint the students with basics of biomedical waste and the severity of lives in jeopardy. 2. To acquire the knowledge on various types of waste generated and their treatment methods. 3. To ensure safe economical disposal of infectious wastes in appropriate medium.								
CO1	Describe adequate knowledge on biomedical waste management.								
CO2	Understand the sources, types of biomedical waste and a requirement for an integrated solution.								
CO3	Explain the processes of segregation of waste and its significance.								
CO4	Identify and analyze different methods of treatment of solid waste.								
CO5	Assess recent practices and handling of waste management.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction Definition of Biomedical Waste, General and Hazardous health care waste.	8	Define biomedical waste, distinguish between general and hazardous healthcare waste.					1,2	
II	Types of Biomedical Waste Infectious waste, Genotoxic waste, Waste Sharps Categories, Categorization, and composition of Biomedical waste. Liquid Biomedical Waste - Radioactive wastes, Metals, Chemicals & drugs Hospital Generated Waste Human Blood and Blood Products, pathological wastes, Contaminated sharps.	15	Categorize and describe different types of biomedical waste, including infectious, genotoxic, waste sharps, liquid biomedical waste, and radioactive wastes.					1,2	
III	Segregation of Biomedical waste Color Coding and types of containers for disposal of medical waste, Segregation, collection & disposal.	12	Identify and apply the correct color coding and types of containers for the segregation.					1,2,3	
IV	Types of Waste Disposal Disinfections unit container for autoclaving, Sharp waste containers for storage & transportation, Autoclaving, Incineration, Plasma Pyrolysis/ Gasification systems, Composting.	15	Describe and evaluate various waste disposal methods, including the use of disinfection units for autoclaving, sharp waste containers for storage and transportation.					2,3	

V	Recent Trends and Bioethics Protective Devices, Bioethics and Handling of Waste Management	10	Identify recent trends in biomedical waste management, understand the ethical considerations and principles of bioethics in waste handling.	1,2,4
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TEXT BOOKS:

T1: Sumit Enterprises Biomedical Waste Management by Radhakrishan R.

T2. Abhijeet Publications Medical Waste Management by Dr. P. N. Harikumar, Dr. Ann Naisy Jacob.

T3. Jaypee Brothers Medical Publishers Biomedical Waste Disposal by Anantpreet Singh and Sukhjit Kaur.

REFERENCE BOOKS:

R1: V. J. Landrum, Medical Waste Management and disposal, Elsevier, 1991, ISBN: 978-0-8155-12646

R2: 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 Health Care, I S B N (Hardbound): 8184502273, 9788184502275. 2010.

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Describe adequate knowledge on biomedical waste management.	1,5,8
2	Understand the sources, types of biomedical waste and a requirement for an integrated solution.	1,5,8
3	Explain the processes of segregation of waste and its significance.	1,5,8
4	Identify and analyze different methods of treatment of solid waste.	1,5,8
5	Assess recent practices and handling of waste management.	1,5,8

SEMESTER – III									
Course Title	Laboratory Accidents and Management (TPS-II)								
Course Code	24BMLT2105R	Total Credits: 2	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 Medical Laboratory Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	<ol style="list-style-type: none"> Students are taught about the various biomedical wastes, types, and its management. The students will also learn about safety measures in the lab and documentation accidental records and information in the laboratory. Students will learn about the hazards related to handling chemicals, biologic specimens. 								
CO1	Understanding the importance of safety awareness for clinical laboratory personnel and listing the responsibilities of employer.								
CO2	Appraise the hazards related to handling chemicals, biologic specimens, and radiologic materials.								
CO3	Organize the precautionary measures when working with electrical equipment, cryogenic materials, and compressed gases.								
CO4	Demonstrate the correct means of waste disposal generated in the clinical laboratory.								
CO5	Implement the steps required in documentation of an accident in the workplace.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	LABORATORY SAFETY AND REGULATIONS Occupational safety and health Safety awareness for clinical laboratory personnel, Signage and labeling	6	Implement best practices to prevent accidents and exposures, and comply with regulatory standards.					1, 2,3	
I	SAFETY EQUIPMENT Chemical fume hoods and bio safety cabinet Chemical storage PPE and hygiene	6	Understand and effectively utilize safety equipment such as chemical fume hoods and biosafety cabinets					2,3	
III	SAFETY Biological safety Chemical safety Radiation safety Fire safety	6	Demonstrate comprehensive knowledge and practices chemical safety, radiation safety, and fire safety protocols within laboratory environments.					1,3	
IV	DISPOSAL OF HAZARDOUS MATERIALS Biomedical waste Management, classification, types Chemical Waste Radioactive waste Bio hazardous waste	6	Understand and effectively manage the disposal of hazardous materials, including biomedical waste and biohazardous waste.					2, 4	
V	ACCIDENT DOCUMENTATION AND INVESTIGATION	6	Develop and revise safety protocols, procedures, and training programs to address identified deficiencies.					1, 3, 4	

TEXT BOOKS:

T1: Text book on biohazard By Jesse Caignou.

REFERENCEBOOKS:

R1: Text book of Microbiology by Ananthanarayan and Paniker.

R2. Text book on Biohazard–ByKen Alibek with Stephen Handelman.

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understanding the importance of safety awareness for clinical laboratory personnel and listing the responsibilities of employer.	5,6,7,8
2	Appraise the hazards related to handling chemicals, biologic specimens, and radiologic materials.	4,5,8
3	Organize the precautionary measures when working with electrical equipment, cryogenic materials, and compressed gases.	3,5,8
4	Demonstrate the correct means of waste disposal generated in the clinical laboratory.	4,5,8
5	Implement the steps required in documentation of an accident in the workplace.	5,7,8

SEMESTER – III									
Course Title	Executive English								
Course Code	24UBPD2101R	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	Fall/ III Semester of Second Year of the Programme								
Course Objectives	<ol style="list-style-type: none"> To enable students to learn and comprehend about the proficiency of the English language. To improve the writing skill of the learners and enable them to prepare CV and cover letter for professional development. To evaluate certain attributes in a candidate that can be otherwise difficult for time consuming to a certain 								
CO1	It will develop their writing skills through various techniques of language use.								
CO2	It will enable the learners to manage behaviours, thoughts, and emotions in a conscious and productive way.								
CO3	It will develop their critical thinking ability and develop an independency in their professional career.								
CO4	Accurately to convey ideas and information with clarity and precision.								
CO5	Utilizing appropriate language, tone, and style for diverse audiences and contexts.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	Grammar <ul style="list-style-type: none"> Use of Prepositions ii. Tag Questions. 	2	Basics of grammar					1,2	
II	Grammar <ul style="list-style-type: none"> Active and Passive Voice Direct and Indirect Speech. 	3	Introduction of grammar					2,3	
III	Writing Skills <ul style="list-style-type: none"> The Basics of Writing; avoid ambiguity and vagueness Paragraph Writing Resume, CV and Cover Letter 	8	Learn about writing skills					1,2,3,4	
IV	Self-Management Skills <ul style="list-style-type: none"> SWOT Analysis Goal Setting Personal Hygiene 	5	Introduction of self-Management skill					3,4,5	
V	Non-Verbal Communication- Sciences of Body Language <ul style="list-style-type: none"> What is Non-Verbal Communication & Body Language Types of Body Language Importance and Impact 	7	Learn about Body languages					3,4,5	

VI	Group Discussion (Theory) <ul style="list-style-type: none"> • Importance, • Planning, Elements, and Skills assessed; Effectively on skills disagreeing, iv. Summarizing and • Attaining the • Objective 	5	Learn about effective communication skill	2,3,4,5
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TEXT BOOKS:

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

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

T3. Mc Dowell, Gayle Laakmann. 2008. Cracking the Coding Interview (IndianEdition)

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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	It will develop their writing skills through various techniques of language use.	6,7,8
2	It will enable the learners to manage behaviours, thoughts, and emotions in a conscious and productive way.	6,7,8
3	It will develop their critical thinking ability and develop an independency in their professional career	6,7,8
4	Accurately to convey ideas and information with clarity and precision.	6,7,8
5	Utilizing appropriate language, tone, and style for diverse audiences and contexts.	6,7,8

SEMESTER III											
Course Title	Digital Literacy										
Course Code	24UDLS2101R	Total Credits: 2			L	T	P	S	R	O/F	C
		Total Hours: 30P			0	0	2	0	0	0	1
Pre-requisite	Nil	Co-requisite			Nil						
Anti-requisite	Nil										
Programmes	Bachelor of Medical Laboratory Technology										
Semester	Fall/ III Semester of Second Year of the Programme										
Course Objectives:	<ol style="list-style-type: none"> Students will be able to identify and analyze computer hardware, software and their uses. Students will be able to use MS-Office suite for various purposes. Students will be able to use the Internet efficiently for required information as well as for digital financial transactions. 										
CO1	Students will have basic understanding of Computer Hardware, Software and Computer handling.										
CO2	Student will be able to create, send, and manage emails, attachments, and folders										
CO3	Students will be able to solve basic information management issues using MS-Office Products.										
CO4	Students will be able to efficiently search the Internet for required information										
CO5	Students will be able to use computing technically ethically, safely, Securely and legally for day-to-day use										
Unit No	Contents			Contact Hours	Learning outcome				KL		
I	Fundamentals of Computer Systems <ul style="list-style-type: none"> Components of a Computer and their functions. Different Types of Computers and their applications. 			5	To identify reliable sources, detect misinformation, and ensure data accuracy and integrity.				1,2,3,4		
II	Introduction to MS-Office <ul style="list-style-type: none"> Components of the MS-Office suite. Creating documents with MS- Word. Creating Presentations with MS-PowerPoint. Creating Spreadsheets with MS-Excel. 			6	To identify reliable sources, detect misinformation, and ensure data accuracy and integrity.				1,2,3,4, 5		
III	Introduction to Internet & Cyber World <ul style="list-style-type: none"> 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. 			7	To identify reliable sources, detect misinformation, and ensure data accuracy and integrity.				1,2,3,4, 5		

IV	Introduction to Social Media <ul style="list-style-type: none"> The Power of Social Media, Relevance of Social Media in presents scenario. Creating accounts and using some popular Social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, LinkedIn. Social Media Etiquettes 	6	To identify reliable sources, detect misinformation, and ensure data accuracy and integrity.	1,2,3, 4,5
V	Digital Payments <ul style="list-style-type: none"> Introduction to Digital Payment Systems. Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, UPI. 	6	Demonstrate knowledge of digital payment systems, including account creation and usage of credit cards, debit cards, net banking, and UPI."	1,2,3, 4,5

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. Balaguru swamy, E. 2009 Fundamentals of Computers, Tata McGraw-Hill Education.
2. Balaguru swamy, 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/>
5. Latest updates available in WWW.

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

CO PO Mapping		
S.N.	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 III									
Course title	Basic Acclimatizing Skills (BAS)								
Course Code	24UULS2101R	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						
Anti-requisite	Nil								
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ III Semester of second year of the Programme								
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'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.								
Unit No	Contents		Contact hours	Learning outcome				KL	
I	Introduction to Accommodation Management Telephone handling technique Organizing of Rooms. Cleaning agents. Cleaning equipment and uses. Bed making Process.		8	To acquire knowledge on accommodation Management.				1, 2	
II	Fundamentals of Cooking Definition of cookery – Aim & Objectives of cooking. Use of basic Cooking equipment		8	To acquire knowledge on cooking and personal hygiene and its safety.				1, 2	
III	Methods of Cooking Different Cuts. Use of Herbs and Spices. Basic Food and Beverage Preparation. Regional food Habits.		8	To acquire knowledge the knowledge of different types of herbs and spices in cooking.				1, 2	
IV	Forms & Format's C - form Reservation form Registration form Passport Application form Legal Rent Agreement		6	To gain knowledge about forms and formats.				1, 2	

TEXT BOOKS:

1. Arora K (2011). Theory of cookery, Frank brothers & company (pub) pvt ltd-New Delhi.
2. Bruce H. Axler, Carol A. Litrides (2010) Food and Beverage Service Volume 1ofWiley Professional Restaurateur, Guides.
3. Mohammed Zulfikar (2010) - Introductions to Tourism and Hotel Industry Introduction to Tourism and Hotel Industry. Vikas Publishing.
4. Sudhir Andrews (2013) Food and Beverage Service: A Training Manual, Tata McGraw Hill.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Students will have basic knowledge of cooking methods.	1,7,8
2	Students will gain the knowledge of organizing & Cleaning of Rooms.	1,7,8
3	Students will be able to gain the travel management concept.	1,7,8
4	Students will be able to acquire the knowledge of basic households	1,7,8
5	Students will be able to the physiological and psychological processes involved in acclimatization.	1,7,8

SEMESTER – III									
Course Title	Field Training								
Course Code	24BMLT2106R	Total Credits: 1	L	T	P	S	R	O/F	C
		Total Hours : 15	0	0	0	0	0	8	1
Pre-requisite		Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	1. Understanding Healthcare Systems and Hospital Operations. 2. Exploring Patient Care and Clinical Procedures. 3. Exposure to Medical Equipment and Technology.								
CO1	Students will be able to describe the structure and functioning of a hospital, including the roles of various departments and the workflows within the healthcare system.								
CO2	Students will be able to explain the basics of patient care and clinical procedures, observing how protocols are followed to ensure safe and effective treatment.								
CO3	Students will identify and understand the purpose of key medical equipment and technologies, recognizing their role in diagnostics, treatment, and patient monitoring.								
CO4	Students will be able to identify the roles of various healthcare professionals and explain how interdisciplinary teams work together to deliver patient care.								
CO5	Students will reflect on professional behaviors and effective communication observed during the visit, highlighting the importance of empathy, teamwork, and patient-centered communication.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<ul style="list-style-type: none"> Overview of healthcare systems Introduction to the field environment and work culture Safety protocols and emergency procedure Code of conduct, ethics, and professionalism in the workplace 		15	Ability to assess situations, identify challenges, and devise solutions on the spot.				1,2,3,4,5	
II	<ul style="list-style-type: none"> Overview of key tasks specific to the field Training on specific tools, equipment, or technology relevant to fieldwork Hands-on practice with supervision, 			Improved ability to communicate effectively				1,2,3,4,5	
III	<ul style="list-style-type: none"> Practical exercises to develop job-specific technical skills Emphasis on accuracy, efficiency, and best practices 			Ability to organize, prioritize, and complete tasks.				1,2,3,4,5	
IV	<ul style="list-style-type: none"> Development of interpersonal skills for interacting with colleagues, supervisors, and clients Training in professional communication, both verbal and written 			Demonstration of a professional attitude and respect for workplace				1,2,3,4,5	
V	<ul style="list-style-type: none"> Self-assessment exercises to reflect on learning and improvement areas Reflection on field experiences, lessons learned, and personal growth 			Ability to reflect on experiences to identify personal strengths				1,2,3,4,5	

TEXT BOOKS:

1. Arora K (2011). Theory of cookery, Frank brothers & company (pub) pvt ltd-New Delhi.
2. Bruce H. Axler, Carol A. Litrides (2010) Food and Beverage Service Volume 1 of Wiley Professional Restauranteur, Guides.
3. Mohammed Zulfikar (2010) - Introductions to Tourism and Hotel Industry Introduction to Tourism and Hotel Industry. Vikas Publishing.
4. Sudhir Andrews (2013) Food and Beverage Service: A Training Manual, Tata McGraw Hill.

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Students will be able to describe the structure and functioning of a hospital, including the roles of various departments and the workflows within the healthcare system.	5,6,7
2	Students will be able to explain the basics of patient care and clinical procedures, observing how protocols are followed to ensure safe and effective treatment.	5,6,7
3	Students will identify and understand the purpose of key medical equipment and technologies, recognizing their role in diagnostics, treatment, and patient monitoring.	5,6,7
4	Students will be able to identify the roles of various healthcare professionals and explain how interdisciplinary teams work together to deliver patient care.	5,6,7
5	Students will reflect on professional behaviors and effective communication observed during the visit, highlighting the importance of empathy, teamwork, and patient-centered communication.	5,6,7

SEMESTER – IV											
Course Title		Parasitology									
Course Code	23BMLT221R	Total Credits: 4			L	T	P	S	R	O/F	C
		Total Hours: 30T+30P			2	0	4	0	0	0	4
Pre-requisite		Nil		Co-requisite			Nil				
Programme		Bachelor of Medical Laboratory Technology									
Semester		Spring / IV Semester of Second Year of the Programme									
Course Objectives		1 Students will acquire the knowledge of sufficient information about parasite and their classification. 2 The student will be taught about introduction, general characteristics, life cycle and laboratory diagnosis of parasites. 3 The students will be able to analyze the test for determining the infective parasite.									
CO1		Discuss about parasites and its classification.									
CO2		Describe the morphology, lifecycle, pathogenesis and laboratory diagnosis of Protozoa and flagellates.									
CO3		Discuss the morphology, lifecycle, pathogenesis and laboratory diagnosis and prophylaxis of Sporozoa and ciliates.									
CO4		Complete knowledge on the morphology, pathogenesis and laboratory diagnosis and prophylaxis of Cestodes and Trematodes.									
CO5		Describe the morphology, lifecycle, pathogenesis and laboratory diagnosis of nematode parasite.									
Unit No.	Content			Contact Hour	Learning Outcome				KL		
I	Introduction to Medical Parasitology: Introduction and Classification of parasites.			2	Understand the basic principles and importance of parasitology.				1,2		
II	Protozoology: Introduction to protozoa. Protozoa: Morphology, life cycle, pathogenesis, laboratory diagnosis and prophylaxis Entamoeba histolytica Flagellates: Morphology, life cycle, pathogenesis, laboratory diagnosis and prophylaxis Giardia lamblia and Leishmania donovani			10	Describe the morphology, life cycle, pathogenesis, laboratory diagnosis, and prophylaxis of protozoan parasites				2,3		
III	Sporozoa: Morphology, life cycle, pathogenesis, laboratory diagnosis and prophylaxis Plasmodium vivax, Plasmodium falciparum and Toxoplasma gondii Ciliates: Morphology, life cycle, pathogenesis, laboratory diagnosis and prophylaxis Balantidium coli			8	Describe the morphology, life cycles, pathogenesis, laboratory diagnosis and understand the clinical manifestation of infections caused by Sporozoa and ciliates.				1,2,3		
IV	Helminthology: Introduction to helminths Cestodes: Tapeworms Morphology, life cycle, pathogenesis, laboratory diagnosis and prophylaxis Taenia solium, Taenia saginata and			6	Develop the ability to identify and understand the clinical implications of helminth infections				2,3,4		

	Echinococcus granulosus Trematodes: Morphology, life cycle, pathogenesis, laboratory diagnosis and prophylaxis Fasciola hepatica Schistosoma haematobium			
V	Nematodes: Morphology, life cycle, pathogenesis, laboratory diagnosis, prophylaxis. Ascaris lumbricoides Hookworms Trichuris trichiura Wuchereria bancrofti	4	Acquire knowledge of the characteristics and clinical Management of nematode infections.	1,2
Practical	Sample collection and processing. Examination of faeces: Macroscopic examination: Consistency, color, odor and presence of blood. Microscopic examination: Normal saline preparation Iodine preparation. Concentration method: Flootation technique. Sedimentation techniques Examination of blood and urine: Wet mount preparation and stained blood smear.	30	Interpret macroscopic and microscopic examinations of feces, and examining wet mounts and stained blood smears for the detection of parasites in blood and urine samples.	1,2,3,4

TEXT BOOKS:

T1: Textbook of Microbiology by CP Baveja, 7th edition. T2: Textbook of Parasitology by Dr C P Baveja

REFERENCE BOOKS:

R1: Textbook of Microbiology and Immunology by S.C. Parija
R2: Microbiology by Prescott, Harley, Kleis
R3: Textbook of Microbiology by Ananthanarayan and Paniker.

OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>
<https://www.ncbi.nlm.nih.gov/books/NBK546149/>

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Discuss about parasites and its classification.	1,2,4
2	Describe the morphology, lifecycle, pathogenesis and laboratory diagnosis of Protozoa and flagellates.	1,2,4
3	Discuss the morphology, lifecycle, pathogenesis and laboratory diagnosis and prophylaxis of Sporozoa and ciliates.	1,2,4
4	Complete knowledge on the morphology, pathogenesis and laboratory diagnosis and prophylaxis of Cestodes and Trematodes.	1,2,4
5	Describe the morphology, lifecycle, pathogenesis and laboratory diagnosis of nematode parasite.	1,2,4

SEMESTER – IV									
Course Title	Clinical Pathology								
Course Code	24BMLT2202R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 30T+30P	2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring / IV Semester of Second Year of the Programme								
Course Objectives	<ol style="list-style-type: none"> Students will be made aware of the composition and methods of estimating different components of urine, body fluids etc. Physical, chemical and microscopic examination of body fluid. Understand the clinical significance and diagnosis of various body fluids. 								
CO1	Discuss on the clinical significance of urine analysis								
CO2	Assessing certain diagnostic methods of stool								
CO3	Explain comprehensive understanding on sputum analysis								
CO4	Analyze various body fluids, formation with different analyzing methods								
CO5	Evaluation on importance of blood banking, donor screening and blood components.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Urine Examinations: 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.Urine examination for proteins. Occult blood test, Pregnancy test, Bence Jones Proteins Urobilinogen etc.	8	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.					1,2,3	
II	Stool analysis: 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, Concentration method of stool examination and Clinical importance.	5	Describe, illustrate and explain normal Physiology of GIT and their physiological significance and proper techniques for collecting samples. Perform and interpret various stool examination for diagnosis.					1,2,4	
III	Sputum examination– Collection of specimens i. Physical examination ii. Microscopic-Gram's stain, Ziehl Neelsen stain for AFB iii. Chemical examination	3	Describe, illustrate and explain the collection and various test for sputum examination for diagnosis.					2,3	

IV	<p>Body fluids:</p> <p>a. 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</p> <p>b. Pleural fluid, ascetic fluid, pericardial fluid, synovial fluid and cerebrospinal fluid - Collection, sample preparation and processing - Physical examination - Chemical examination - Microscopic examination.</p> <p>c. Other Body fluids–Amniotic fluid, sweat, saliva etc.</p>	6	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.	2,3,4
V	<p>Blood banking and Immune-Haematology</p> <ul style="list-style-type: none"> • History of blood group • Importance types and • Principle of blood grouping • Blood banking; Requirements • Blood components: – separation etc. Clinical importance of all relevant blood banking. • Blood components Introduction to Apheresis. • Methods of ABO blood grouping and Rh Type • Other Blood grouping system • ABO antibody Titration • Donor’s screening • Cross matching, definition, types, methods. • Coomb’s test • Transfusion reaction/complication. 	8	Describe, illustrate and explain different techniques of staining bone marrow.	1,2
Practical	<p>Urine collection for Routine examination Midstream Urine Collection, 24 hrs. Urine examination for proteins. Urine R/E-</p> <p>Physical Examination- Color, pH, Specific Gravity.</p> <p>Biochemical Examination-</p> <p>1. Urine Sugar, Urine Protein, Bile salt, bile pigment Urobilinogen, Occult Blood, Ketone bodies Pregnancy test Bence Jones Proteins.</p> <p>Microscopic Examination.</p> <p>2. Fluid–Pleural Fluid examination - Physical, Chemical, Cell count–DLC/TLC, Bacteriological</p>	30	Describe, illustrate and explain various techniques to collect the samples and carry out routine, chemical, microscopic examination for diagnosis.	1,2,3,4

3. Cerebrospinal Fluid (CSF)examination Physical, Chemical, Cell count–DLC/TLC, - Bacteriological 4. Synovial fluid examination Physical, Chemical, Cell count–DLC/TLC, - Bacteriological 5. Peritoneal/Pericardial Fluid examination Physical, Chemical, Cell count–DLC/TLC, - Bacteriological 6. Semen analysis Physical Examination, Chemical examination, Sperm count, Motility, Morphology study etc. 7. Stool analysis. 8. Sputum analysis. 9. Preparation of Blood cells for ABO grouping Preparation of Serum &Cells for reverse grouping. 10. Blood grouping Forward grouping - Moist Chamber Slide method and tube method Reverse Grouping– Moist Chamber Slide method and tube method 11. Cross matching Donor Screening			
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TEXT BOOKS:

T1: Clinical Haematology Principles, procedure, correlations by E. Anne Stiene Martin, Cheryl A. Lotspiech – steininger, John A. Koepke.

REFERENCE BOOKS:

R1: Textbook of Medical Lab Technology – Praful B. Godkar, Darshan P. Godkar R2: Clinical Haematology in Medical Practice – de Gruchy
R3: Medical Laboratory Technology Methods & interpretation – Ramnik Sood

OTHER LEARNING RESOURCES:

<https://vdoc.pub/documents/dacie-and-lewis-practical-haematology-44o9vf6jei70>

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Discuss on the clinical significance of urine analysis	1,2,3,4
2	Assessing certain diagnostic methods of stool	1,2,3,4
3	Explain comprehensive understanding on sputum analysis	1,2,3,4
4	Analyze various body fluids, formation with different analyzing methods	1,2,3,4
5	Evaluation on importance of blood banking, donor screening and blood components.	1,2,3,4

SEMESTER – IV									
Course Title	Analytical and Nutritional Biochemistry								
Course Code	24BMLT2203R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 30T+30P	2	0	4	0	0	0	4
Pre- requisite	Nil	Co-Requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring / IV Semester of Second Year of the Programme								
Course Objectives	1. The students will acquire a knowledge about metabolism of minerals and hormones. 2. The students will learn about fluid distribution and its balance in the body. 3. The students will learn basic principles/mechanism, procedures and various types of techniques commonly performed in analytical Biochemistry.								
CO1	Correlating fluid distribution in body with its influencing factors.								
CO2	Explain metabolism of important minerals.								
CO3	Evaluate the mechanism action of hormones.								
CO4	Classify vitamins and their disorders.								
CO5	Analyze the working principle of modern laboratory technique.								
Unit No.	Content	Contact Hour	Learning Outcome				KL		
I	WATER AND ELECTROLYTE BALANCE: Distribution of fluids in body, Water metabolism, Factor influencing the distribution of body water, Intake and loss of body water, Dehydration. Sodium, potassium, chloride.	5	Explain the distribution of fluids in the body and identify factors influencing body water distribution.				1,2,3		
II	MINERAL METABOLISM: Principal mineral elements, essential trace elements, Calcium and phosphorus metabolism, Magnesium metabolism, Iron, zinc, copper metabolism	5	Identify and describe the principal mineral elements and essential trace elements in the body and their physiological roles.				2,3,4		
III	HORMONES: General characteristics of hormone, Mechanism of action of hormone, Hypothalamic and pituitary hormones, Steroid hormones, Thyroid hormones, Pancreatic hormones	6	Describe the general characteristics and mechanisms of action of hormones.				1,2,4		
IV	VITAMINS Definition, Classification – water soluble and fat soluble, Fat soluble – A, D, E, K vitamins, Water soluble – C, B, Pectin, lipoic acid, inositol etc. RDA, Rickets, osteomalacia, scurvy, beriberi, pellagra, pernicious anaemia.	7	Understanding on classification of vitamins, functions and disorders.				1,2,3		
V	MODERN TECHNIQUES IN BIOCHEMISTRY Chromatography Ion exchange chromatography, Partition chromatography, thin layer chromatography Electrophoresis Paper electrophoresis, Gel electrophoresis, pH meter Photometry-Colorimeter, Spectrophotometer	7	Describe and apply various modern biochemical techniques and understand their principles, methodologies, and applications in biochemical research and analysis.				2,4,5		

Practical	<ol style="list-style-type: none"> 1. Identification of special instruments 2. Blood sugar and protein estimation 3. Estimation of Albumin 4. Estimation of cholesterol 5. Estimation of HDL cholesterol 6. Estimation of Triglycerides 7. Serum electrolytes Bicarbonate Sodium Potassium Calcium Chlorine Electrophoresis demonstration Paper chromatography demonstration	30	Conduct, evaluate, and estimate the results of the blood test for biochemical analysis of specified analytes, while also understanding laboratory instruments, electrophoresis, and paper chromatography techniques	1,2,3,4,5
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TEXT BOOKS:

- T1: Biochemistry–U. Satyanarayana, U. Chakrapani Text book Of Medical Biochemistry–MN Chatterjee, Kano Shinde.
 T2: Principle & Technique of Biochemistry–S Ramakrishnan, K.G. Prasanna, R. Rajan.
 T3: Principle & Techniques of Biochemistry & Molecular Biology–Keith Coilson.
 T4: Textbook of Medical Lab Technology– Praful B. Godkar, Darshan P. Godkar. T5: Practical Clinical Biochemistry–Harold Varley, 4th edition.

REFERENCE BOOKS:

- R1: Nutritional Biochemistry, Sharma D. C. (2017). CBS Publishers & Distributors Pvt. Ltd.
 R2: Textbook of Nutritional Biochemistry Hardcover, Malik, D., Narayanasamy, N., Pratyusha, V.A. (2023). Springer Verlag, Singapore;

OTHER LEARNING RESOURCES:

file:///C:/Users/DELL/OneDrive/Desktop/biochemistry/Textbook%20of%20Medical%20Biochemistry%2

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Correlating fluid distribution in body with its influencing factors.	1,2,4
2	Explain metabolism of important minerals.	1,2,4
3	Evaluate the mechanism action of hormones.	1,2,4
4	Classify vitamins and their disorders.	1,2,4
5	Analyze the working principle of modern laboratory technique.	1,2,3,4

SEMESTER – IV									
Course Title	Laboratory Instrumentation								
Course Code	24BMLT2204R	Total Credits: 1	L	T	P	S	R	O/F	C
		Total Hours: 15T	1	0	0	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring / IV Semester of Second Year of the Programme								
Course Objectives	1 To understand basic instruments used in Laboratory. 2 To know the handling and understanding the working principle behind laboratory instruments. 3 To understand the importance of calibration of laboratory instruments.								
CO1	To have basic concept on the general instruments used in the laboratory								
CO2	Students will get the idea on different type of sterilization methods.								
CO3	The students will learn the significance of quality control								
CO4	Students will be able to analyze the working principle behind all the laboratory instruments.								
CO5	Summarized on automation and importance on its approach.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction of basic Instruments in laboratory	2	Students can learn the basics like name and use if instruments.					1,2	
II	Working principle of the Instruments	3	Students can learn how the instruments functions.					2,3	
III	Maintenance of the Instruments	3	Students can learn how to maintain the instruments					1,2,3	
IV	Quality control of the instruments	4	Students can learn how to run the QC.					1,2,3	
V	Automation of the instruments.	3	Students can learn about the recent automation					1,3,4	

TEXT BOOKS:

T1: MLT methods and Technology by Ramnik Sood.

T2: Textbook of MLT by Praful B. Godkar and Darshan P. Godkar.

REFERENCE BOOKS:

R1: MLT methods and Technology by Ramnik Sood.

R2: Textbook of MLT by Praful B. Godkar and Darshan P. Godkar

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	To have basic concept on the general instruments used in the laboratory	1,2,3
2	Students will get the idea on different type of sterilization methods.	1,2,3
3	The students will learn the significance of quality control	1,2,3
4	Students will be able to analyze the working principle behind all the laboratory instruments.	1,2,3
5	Summarized on automation and importance on its approach.	1,2,3,4

SEMESTER – IV									
Course Title	Medical Record Keeping and Roles of MLT Professionals								
Course Code	24BMLT2205R	Total Credits: 3 Total Hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring / IV Semester of Second Year of the Programme								
Course Objectives	1. Explore the origins and formation of medical terms to build a strong foundation for understanding medical language. 2. Identify and interpret word roots, prefixes, and suffixes to construct and decipher medical terminology effectively. 3. Learn the principles of maintaining logs, reports, and records for accurate and traceable laboratory operations.								
CO1	Demonstrate the ability to construct and interpret medical terms using roots, prefixes, and suffixes, ensuring accurate spelling and usage.								
CO2	Accurately interpret medical abbreviations, symbols, and reports, enhancing understanding of clinical documentation.								
CO3	Maintain accurate records and utilize electronic health record systems, adhering to legal and ethical guidelines.								
CO4	Students will be able to accurately interpret laboratory test results using normal reference ranges for effective patient care.								
CO5	Understand and articulate the critical role of Medical Laboratory Technologists in healthcare, including diagnostic testing, quality assurance, and collaboration with healthcare teams.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Fundamentals of Medical Terminology <ul style="list-style-type: none"> Derivation of medical terms. Define word roots, prefixes, and suffixes. Basic medical terms and their meanings. Spelling and pronunciation of medical terms. 	10	Identify and construct medical terms using roots, prefixes, and suffixes, ensuring accurate spelling and pronunciation.					1,2,4	
II	Abbreviations and Symbols in Medical Laboratory Technology (MLT) <ul style="list-style-type: none"> General Abbreviations in Medical Laboratory Technology Common Abbreviations for Laboratory Tests and Procedures Abbreviations for Microbiology Tests Abbreviations for Hematology Tests Abbreviations for Biochemistry Tests Abbreviations for Blood Banking and Transfusion Common Laboratory Symbols	15	Identify and accurately interpret the common abbreviations and symbols used in Medical Laboratory Technology (MLT) for tests, procedures, and equipment to ensure effective communication and accurate documentation of laboratory results.					1,2,3	
III	Record Keeping in Medical Laboratories <ul style="list-style-type: none"> Data entry and management in electronic health record (EHR) systems. Basics of laboratory documentation: logs, reports, and records. Legal and ethical aspects of record- 	10	Demonstrate accurate record-keeping practices, including data entry and management in electronic health record systems, while adhering to ethical and legal guidelines.					1,2,3,6	

	keeping, including confidentiality. <ul style="list-style-type: none"> Error management and traceability in records. 			
IV	Introduction to Normal Values <ul style="list-style-type: none"> Normal Values for Hematological tests Normal Values for Biochemical tests Normal Values for Microbiological tests 	5	Students will learn to identify and understand the normal reference ranges for common laboratory tests, enabling them to accurately interpret clinical results and contribute to effective patient care.	1,2,3
V	Role of Medical Laboratory Professionals	5	Understand the key roles of Medical Laboratory Professionals in various fields like microbiology, pathology and their contribution to accurate diagnosis and patient care.	1,2,4

TEXT BOOKS:

T1: An Introduction to Medical Lab Technology by FJ Baker and Silverton

T2: Medical Laboratories Management- Cost effective methods by Sangeeta Sharma, Rachna Agarwal, Sujata Chaturvedi and Rajiv Thakur.

REFERENCE BOOKS:

R1: An Introduction to Medical Lab Technology by FJ Baker and Silverton

R2: Medical Laboratories Management- Cost effective methods by Sangeeta Sharma, Rachna Agarwal, Sujata Chaturvedi and Rajiv Thakur.

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate the ability to construct and interpret medical terms using roots, prefixes, and suffixes, ensuring accurate spelling and usage.	1,2,3
2	Accurately interpret medical abbreviations, symbols, and reports, enhancing understanding of clinical documentation.	1,4,6
3	Maintain accurate records and utilize electronic health record systems, adhering to legal and ethical guidelines.	1,5,6
4	Students will be able to accurately interpret laboratory test results using normal reference ranges for effective patient care.	1,2,4
5	Understand and articulate the critical role of Medical Laboratory Technologists in healthcare, including diagnostic testing, quality assurance, and collaboration with healthcare teams.	1,6,7

SEMESTER – IV										
Course Title	Techno Professional Skills - III									
Course Code	24BMLT2206R	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 Medical Laboratory Technology									
Semester	Spring / IV Semester of Second Year of the Programme									
Course Objectives	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.									
CO1	Acquire knowledge on healthcare quality improvement and patient safety principles, concepts, and methods at the micro-, meso and macro-system levels.									
CO2	Understanding the concept of infection control.									
CO3	Understanding the concept of control and prevention of bio medical waste.									
CO4	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.			10	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.			12	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)			13	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.	12	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, 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.	13	To acquire the knowledge about the history of antibiotics, types of resistance and bacteria control	1,2,3,4

TEXT BOOKS:

T1: Understanding Patient Safety, Second Edition by Robert Wachter.

T2: Handbook of Healthcare Quality & Patient Safety Author: Girdhar J Gyani, Alexander.

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 Schibevaag .

R3: Old Handbook of Healthcare Quality & Patient Safety by Gyani Girdhar J

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Acquire knowledge on healthcare quality improvement and patient safety principles, concepts, and methods at the micro-, meso, and macro-system levels.	1,2
2	Understanding the concept of infection control	1
3	Understanding the concept of control and prevention of bio medical waste	1,8
4	Understanding the knowledge of life saving drugs.	1,2
5	Understanding the concept of different norms and guidelines of patient safety.	2,5

SEMESTER- IV									
Course Title	Financial Literacy								
Course Code	24UUFL2201R	Total Credits: 1	L	T	P	S	R	O/F	C
		Total Hours: 30 P	0	0	2	0	0	0	1
Pre-Requisite	Nil	Co-requisite	Nil						
Anti-Requisite	Nil								
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring / 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.								
CO5	The Student will gain knowledge on Transformations in Digital Money market								
Unit No	Course Contents	Contact Hours	Learning Outcome					KL	
I	Introduction: 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	6	To learn about the financial literacy					1,2	
II	Financial Planning: Meaning, need and importance for financial planning, Economic needs, balancing between economic need and resources; Three pillars of investments-risk, return, liquidity; iv. 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 from surplus, sources for meeting deficit. Informal Society funds and crowd funding	8	To learn about the financial planning, economic needs and investments and budgeting.					1,2,3	

III	Banks & Post Office - As financial service provider: Meaning and evolution of money, Banks – meaning, types & functions; types of accounts; Formalities to open various accounts. Different types of Post Office saving schemes: Recurring deposit, savings, term deposit; NSC; Kisan Vikas Patra; Monthly Income scheme (MIS) Account, Public Provident Funds (PPF), Senior citizen savings scheme (SCSS), Sukanya Samriddhi Accounts, Indian Postal Order; International Money transfer service; Forex Services; Money remittance services; Jan Suraksha Scheme	6	To understand the knowledge about different types of banks.	1,2,3
IV	Insurance - As financial service provider: Different types of Risks and their Management, Diversification of risk; Meaning, need and importance of Insurance; Types of Insurance – Life Insurance, Health Insurance, General Insurance, Term Insurance, Pension and retirement policies; Post office life insurance schemes, Postal life insurance and rural postal life insurance	5	To acquire the knowledge about different types of insurance company.	1,2,3,4
V	Transformations in Digital Money market: Various functions & innovative services of Banks; Mobile Banking, NEFT, IMPS, RTGS, Money transfer, Different types of cards- Debit & Credit, E-Banking, Unified payment interface (UPI), Credit Scoring - CIBIL, Digital Banking, crypto currency and related transactions, Fintech, Block chain; Understanding Digital Payments.	4	To acquire the knowledge about the Various functions & innovative services of Banks.	1,2,3,4,5

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 Pen down 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.

OTHER LEARNING RESOURCES:

<https://in.search.yahoo.com/search?fr=mcafee&type=E210IN714G0&p=financial+literacy>

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAM OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	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
2	The students would be able to understand the need and various kind of banking institutions' instrument and their utilities	7
3	The student would be able to describe the importance of insurance services as social security measures.	5
4	The student would be able to manage the money and debt more effectively.	8
5	The Student will gain knowledge on Transformations in Digital Money market	7,8

SEMESTER IV									
Course Title	Basic Life Saving Skills (BLSS)								
Course Code	24UULS2201R	Total Credits: 2	L	T	P	S	R	O/F	C
		Total Hours: 30P	0	0	2	0	0	0	1
Pre-Requisite	Nil	Co-Requisite	Nil						
Anti-Requisite	Nil								
Programmes	Bachelor of Medical Laboratory Technology								
Semester	Spring / IV Semester of Second Year of the Programme								
Course Objectives:	1. To provide the learners with basic knowledge and practical skills needed in an emergency fire situation 2. To provide appropriate basic management and treatment for injuries 3. Develop the ability to assess and prioritize emergency situations								
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, aiding 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 Hours	Learning Outcome				KL		
I	Basic Life Support (BLS) <ul style="list-style-type: none"> Introduction of BLS Chain of survival ABCs Assessment CPR and Ventilation Technique AED Choking for adult and children 	5	To learn the knowledge about basic survival skills.				1,2		
II	Soft Skills <ul style="list-style-type: none"> Introduction Communication Skills Situational Skills Team work Other soft skills 	6	Illustrate different communication skills, situational awareness including teamwork				1,2,3		
III	Trauma emergencies <ul style="list-style-type: none"> Introduction Priorities of Initial approach in pre-hospital care Scene safety Primary assessment, Bleeding control Extrication of victims and safe transfer Cervical spine stabilization and C-collar application Splinting of broken Limbs 	8	To learn the knowledge about the handling of trauma patients and patient safety.				1,2,3		
IV	Triage system Introduction Flow chart approach of Triage of Single and Multiple Casualties In Pre-Hospital setting	5	To learn the knowledge about the Triage system				1,2,3,4		

V	Medical emergencies Introduction Victim centered approach and Management of: - Seizures Heart attack asthma diabetic emergencies emergency child birth Respiratory distress and failure	6	To acquire the knowledge on the approach to medical emergencies.	1,2,3,4,5
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TEXT BOOKS:

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

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate knowledge and skill to perform CPR use an AED, and respond to choking in adults and children.	2,3,4
2	Understand the significance of communication and teamwork in various situations.	2,5,7
3	Apply knowledge and skill about pre-hospital care and management of trauma emergencies.	2
4	Understand the principles and purpose of the Triage system in healthcare settings.	2,3,4,7
5	Identify and manage common medical emergency conditions.	2

SEMESTER – V											
Course Title	Virology and Immunology										
Course Code	24BMLT3101R	Total Credits: 4			L	T	P	S	R	O/F	C
		Total Hours: 30T+30P			2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite			Nil						
Programme	Bachelor of Medical Laboratory Technology										
Semester	Fall/ V Semester of Third Year of the Programme										
Course Objectives	1 The student will be taught about introduction, general characteristics, morphology, pathogenesis, and laboratory diagnosis of various medically important viruses. 2 Understanding the process of sample collection, transport and processing. 3 An outline approach towards the concept of immunology.										
CO1	Understand the basics of virology and its classification.										
CO2	Recognize some of the common viruses that caused various viral infection.										
CO3	Execute the knowledge of handling and processing of infected samples.										
CO4	Differentiate the types of immunity.										
CO5	Describe the antigen-antibody reactions and types of hypersensitivity.										
Unit No.	Content			Contact Hour	Learning Outcome				KL		
I	Introduction to general virology: Introduction HIV Hepatitis virus Rabies virus Dengue virus			6	Explain the basic principles of virology, including viral structure, replication cycles and classification.				1,2		
II	Viral diseases: Influenza virus Parainfluenza virus Chikungunya virus Poliovirus Toga/ Flavi viruses			6	Differentiate between various viral diseases caused by influenza virus, parainfluenza virus, chikungunya virus, and poliovirus and understand their impact on public health.				1,2,4		
III	Diagnostic Virology: Sample collection and transport and Processing Identification Vaccines			6	Demonstrate proficiency in the collection, transport, and processing of clinical samples for virological diagnosis.				2,3		
IV	Introduction to Immunology: Introduction to immunology Immunity and its types and classification. Structure and function of Immune system.			6	Describe the fundamental principles of immunology, differentiate between innate and adaptive immunity.				1,3,4		
V	Antigen-Antibody and Basics of autoimmunity Antigen and Antibodies Ag-Ab reactions. Hypersensitivity, Basic of Autoimmunity and Immunodeficiency.			6	Explain the concepts of antigens and antibodies, describe antigen-antibody reactions including their types and applications.				2,4		

Practical	i. Blood grouping Serological diagnostic tests - ELISA, WIDAL, VDRL, RPR, ASO, CRP, TPHA, HCG, HIV tridot, HbsAg. I. Bacteriological examination of water, air and milk. - Culture and Sensitivity Urine culture, Pus culture	30	Demonstrate proficiency in laboratory techniques and understand their clinical significance, interpret blood grouping tests and serological diagnostic tests.	1,2,3,4
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TEXT BOOKS:

T1: Textbook of Microbiology Immunology by Subash Chandra Parija 2nd edition.

REFERENCE BOOKS:

- R1: Textbook of Medical Lab Technology– Praful B. Godkar, Darshan P. Godkar 3rd edition
 R2: Ananthanarayan and Paniker, “Textbook of Microbiology 8th edition.
 R3: Textbook of Essentials Microbiology Apurba Sankar Sastry, Sandhya Bhat 4th edition.

OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understand the basics of virology and its classification.	1,2,4
2	Recognize some of the common viruses that caused various viral infection.	1,2,4
3	Execute the knowledge of handling and processing of infected samples.	1,2,4,5
4	Differentiate the types of immunity.	1,2,4
5	Describe the antigen-antibody reactions and types of hypersensitivity.	1,2,4

SEMESTER – V									
Course Title	Histopathology								
Course Code	24BMLT3102R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 30T+30P	2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ V Semester of Third Year of the Programme								
Course Objectives	1. To make the students learn and understand cytological techniques along with cancer biology. 2. Students learn about the stain, which is used in the histocytology. 3. To comprehend the general context of how histology aids in the diagnosis of disease.								
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	Histo-Cytology: Introduction to Cells, Tissues, Outline of methodology Fixation- Definition, Classification of fixatives, Details of each fixative Tissue Processing- Definition, Grossing, Dehydration, Clearing, Impregnation, Embedding. Paraffin waxes and its properties Frozen section studies of tissues – Description of instruments, Utility	8	Identify various tissue types and cells, understand the principles of tissue processing, and recognize the properties of paraffin waxes.					1,2,3	
II	Microtomy: Definition, Microtome knife, Microtome types and its functions, honing and stropping, Blocking, Section cutting, Mounting	5	Explain the principles, types, and functions of microtomes, as well as their role in preparing thin tissue sections for microscopic examination					1,2	
III	Staining: Basic structure of a dye, Production of colour, Mechanism of staining, Metachromasia, Progressive and regressive staining, Mordant, Accentuators, Classification of dyes, Preparation of Solvent, Routine staining Haematoxylin & Eosin stains Preparation & compositions, Technique Special stains a) Connective tissue stains- Van Gieson's stain, Masson's trichrome stains, Mallory trichrome stains, Gordon's and sweets methods, Orcein method for elastic fibres, PTAH b) Carbohydrates staining-PAS, Mucicarmine stain c) RNA stain- Fielgen stain, Unna	10	Describe 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	

	preparation,			
IV	Pigments and its stains: Endogenous pigments. e.g: Haem pigments, Perl's Prussian blue, Hemozoin pigments, Haematoidin pigments, Bile pigments, Tyrosine pigments, Lipid pigments	4	Explain different pigments and their origins, staining methods, and its clinical significance.	1,2,3
V	Immunohistochemistry (IHC) Cancer Biology	3	Describe the concept of cancer; learn Immunohistochemistry and its principles, clinical applications, and the significance of tumor markers.	2,4
Practical	<ol style="list-style-type: none"> 1. Labelling of specimen, Filling of forms 2. Receiving, entering and labelling and register 3. Slide demonstration of different types of cells 4. Common instruments for histopathology 5. Fixative preparation, Preparations of graded alcohols 6. Grossing, role of technicians 7. Tissue Processing, Decalcification 8. Preparation of blocking and section cutting, staining, mounting and labelling. 9. Staining- Hematoxylin & Eosin stain, PAS stain Oil Red O' Sudan Black stain Special stains – Van Gieson, Masson Fontana trichrome, Verhoeff's, Field's staining etc. 10. Preservation and museum technique. 	30	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

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 REFERENCES:

<https://doi.org/10.5539%2Fgjhs.v8n3p72>

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understanding basics on cells, tissues and a brief outline on tissue processing.	1,2,4
2	Describe the concept of Microtome knife, its types and functions.	1,2,4
3	Analyze the basic structure of a dye, and concept of special staining techniques.	1,2,4
4	Explain the concept of pigment staining.	1,2,4
5	Illustrate the Immunohistochemistry (IHC) and its relation with cancer biology.	1,2,4

SEMESTER – V									
Course Title	Clinical Biochemistry								
Course Code	24BMLT3103R	Total Credits: 4 Total Hours: 30T+30P	L	T	P	S	R	O/F	C
			2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ V Semester of Third Year of the Programme								
Course Objectives	1. This subject shall give information about all the major clinical enzymology and bio markers used for diagnosis. 2. The students will learn the details about radioactivity and various organ function test. 3. The students will also learn the methods/principles and procedures used to determine the various organ function tests.								
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	CLINICAL ENZYMOLOGY AND BIOMARKERS: Isoenzymes, 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.	8	Identify and explain the biochemical properties and clinical significance of various enzymes and biomarkers.					1,2	
II	RADIOACTIVITY: Introduction, properties of alpha, beta and gamma radiations, radioisotopes, measurement of radioactivity, Radioisotopes in medicine, radiation hazards, radiation safety and precaution, diagnostic, therapeutic uses of radioisotopes.	5	Describe the fundamental principles of radioactivity, differentiate between alpha, beta, and gamma radiations based on their properties and interactions with matter.					2,4	
III	ORGAN FUNCTION TEST: Liver function tests: 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	6	Explain the physiological functions of the liver, classify liver function tests (LFT) based on their diagnostic purposes.					2,4,5	
IV	ORGAN FUNCTION TEST Renal function tests: Functions of kidney, Urea clearance tests, Endogenous creatinine clearance tests, Tests For renal blood flow, Test based on tubular function.	5	Analyze the clinical significance of renal function test results in diagnosing renal disorders and monitoring renal health.					1, 4, 5	

V	ORGAN FUNCTION TEST Gastric function tests: Test for determining gastric function, Examination of resting contents, Fractional gastric analysis, Histamine stimulation tests. Thyroid function tests: Tests based on primary function –RIU, PBI ¹³¹ . Test based on blood levels of thyroid hormones–T3, T4, TSH. Test based on metabolic effects of thyroid hormone, Scanning of thyroid gland	6	Identify and perform gastric function tests and thyroid function tests.	1,3
Practical	1. Glucose tolerance test (GTT) 2. Liver function tests Bilirubin (total, direct, indirect)-SGOT, SGPT 3. Renal function tests-Urea, Creatinine, Uric acid 4. Thyroid function tests (Demonstration) TSH, T3, T4 5. Clinical enzymology-LDH, Serum amylase, ALP, ACP	30	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.	1,2,3,4,5

TEXT BOOKS:

T1: Biochemistry–U. Satyanarayana, U. Chakrapani.

T2: Textbook of Medical Biochemistry–MN Chatterjee, Kano Shinde.

T3: Principle and Technique of Biochemistry–S Ramakrishnan, K.G. Prasannan, R. Rajan.

T4: Principle & Techniques of Biochemistry & Molecular Biology – Keith Coilson.

T5: Textbook of Medical Lab Technology- Praful B. Godkar, Darshan P. Godkar

REFERENCE BOOKS:

R1: Clinical Biochemistry and Metabolic Medicine (2012) - by Martin Andrew Crook. CRC Press

R2: Clinical Chemistry: Principles, Techniques, and Correlations (2022). by Carleen Van Sicken, Edward P. Fody, James March Mistler, Jones and Bartlett Publishers

OTHER LEARNING RESOURCES:

Fundamentals Biochemistry 4th edition: Free Download, Borrow, and Streaming: Internet Archive

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Define the relationship of various clinical important enzyme and their role as biomarkers.	1,2, 4
2	Recognize the radioactivity and its diagnostic importance.	1,2, 4
3	Execute the comprehensive knowledge on liver functions.	1,2, 4
4	Evaluate the assessment method used to determine renal function.	1,2, 4
5	Appraise about the Gastric and Thyroid function tests.	1,2, 4

SEMESTER V									
Course Title	Laboratory Infrastructure and Design								
Course Code	24BMLT3104R	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						
Anti-requisite	Nil								
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall/ V Semester of Third Year of the Programme								
Course Objectives:	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. 3. Students will learn about the fundamental design, maintenance, and cleaning of a laboratory.								
CO1	Understanding the rationale behind laboratory architecture and infrastructure.								
CO2	Describe a comprehensive knowledge on how a laboratory operates, generalize to the entire laboratory								
CO3	Briefly outline on Laboratory's general management and public support								
CO4	Evaluate the sample floor plan for different clinical laboratory and primary service category.								
CO5	Demonstrate the fundamental design, maintenance, and cleaning of a laboratory.								
Unit No	Content	Contact Hours	Learning Outcome					KL	
1	Purpose of engineering controls: -to provide a safe, accessible environment for laboratory personal to conduct a work -patients/users, staff & environment safety	12	Understand the importance of engineering controls in ensuring a safe and accessible environment for laboratory personnel, patients, and staff.					2, 3	
2	Layout of Laboratory areas: -sample collection area -laboratory working area -General laboratory area	12	Demonstrate proficiency in organizing workspaces, handling equipment safely, and adhering to standard operating procedures.					1, 2	
3	Work flow: -Staff movement -Patient movement -Sample movement	12	Develop skills in facilitating smooth and comfortable patient and staff movement for feasible workflow.					1,3,4	
4	Infrastructure requirement for laboratory: -Reception -Blood sample collection Storage area	12	Identify and implement appropriate infrastructure for reception, sample collection and storage area.					2,3	
5	Laboratory renovation -Repairing, Cleaning	12	Demonstrate effective strategies for repairing and cleaning laboratory spaces.					2,3,4	

TEXT BOOKS:

T1: Laboratory Design guide by Brian Griffin

T2: Design and planning of research in clinical laboratory facilities by Leonard Mayer

REFERENCE BOOKS:

R1: Textbook of Medical Laboratory Technology by Praful B. Godkar, Darshan P. Godkar

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understanding the rationale behind laboratory architecture and infrastructure.	1,3,5
2	Describe a comprehensive knowledge on how a laboratory operates, generalize to the entire laboratory	1,3,5
3	Briefly outline on Laboratory's general management and public support	1,3,8
4	Evaluate the sample floor plan for different clinical laboratory and primary service category.	1,3,8
5	Demonstrate the fundamental design, maintenance, and cleaning of a laboratory	1,3,8

SEMESTER – V									
Course Title	Quality Control and Laboratory Management (TPS-IV)								
Course Code	24BMLT3105R	Total Credits: 2	L	T	P	S	R	O/F	C
		Total Hours: 30P	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Fall / V Semester of Third Year of the Programme								
Course Objectives	<ol style="list-style-type: none"> Understand the basic concepts of Quality Control (QC) and Quality Assurance (QA) in clinical laboratories. Learn how to manage laboratory resources such as staff, equipment, and supplies for maximum efficiency. Understand the principles of continuous improvement and how to apply them to laboratory operations to maintain high-quality standards. 								
CO1	Explain the importance of quality control and assurance in clinical laboratory settings.								
CO2	Demonstrate basic knowledge of laboratory management, including resource and personnel management.								
CO3	Identify and implement quality improvement strategies in laboratory operations.								
CO4	Apply regulatory standards and compliance requirements (e.g., ISO 15189, CLIA) in laboratory practices.								
CO5	Develop and maintain a Laboratory Quality Management System (LQMS) to ensure efficient and reliable test results.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to Quality Control and Laboratory Management <ul style="list-style-type: none"> Quality Control (QC) and Quality Assurance (QA) The difference between QA and QC in the lab setting. The role of QC and QA in ensuring accuracy and reliability of test results. 	5	Define QC and QA. Understand how QC and QA help in maintaining high standards of testing in the laboratory. Explain how quality standards ensure patient safety and diagnostic accuracy.					1,2	
II	Key Concepts in Quality Control Precision vs Accuracy: <ul style="list-style-type: none"> The difference and importance in laboratory tests. Sensitivity and Specificity: Understanding how these concepts apply to diagnostic tests. The role of internal controls and calibration in quality control. 	10	Understand the difference between precision and accuracy in laboratory results. Learn how sensitivity and specificity influence test outcomes. Identify key tools used in quality control, such as control samples and calibration standards.					1,2,3	
III	Managing Laboratory Resources <ul style="list-style-type: none"> Managing staff: Roles of laboratory personnel and the importance of training and communication. 	5	Understand how to manage laboratory staff effectively, including training and role assignment. Learn how to manage equipment and ensure it's well-maintained for accurate results. Understand the importance of					2,3	

	<ul style="list-style-type: none"> Equipment management: Calibration, maintenance, and troubleshooting. 		inventory control and managing laboratory supplies efficiently.	
IV	Regulatory Standards and Laboratory Accreditation <ul style="list-style-type: none"> ISO 15189: Requirements for laboratory quality and competence. CLIA (Clinical Laboratory Improvement Amendments): U.S. regulatory standards. 	5	Understand the importance of regulatory standards for laboratory operations and learn the requirements for ISO 15189 and CLIA certification.	1,2,3
V	Continuous Improvement and Laboratory Quality Management Systems (LQMS) <ul style="list-style-type: none"> Introduction to the Laboratory Quality Management System (LQMS) framework. Continuous quality improvement techniques (e.g., PDCA Cycle). 	5	Learn the key components of a Laboratory Quality Management System (LQMS), understand the concept of continuous improvement and how it applies to lab operations.	2,3,4

TEXT BOOKS:

T1: Practical Laboratory Management by Craig A. D. Johnson

T2: Introduction to Laboratory Quality Management by Traci L. L. Simpson

T3: ISO 15189: Medical Laboratories – Requirements for Quality and Competence

REFERENCE BOOKS:

R1: World Health Organization (WHO). Laboratory Quality Management System: Handbook. Link: WHO Laboratory Quality Management Handbook

R2: U.S. Centres for Medicare & Medicaid Services (CMS): Clinical Laboratory Improvement Amendments (CLIA).

R3: Westgard, S., & Westgard, J.O. (2018). "The Evolution of Quality Control in the Clinical Laboratory." American Journal of Clinical Pathology.

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Explain the importance of quality control and assurance in clinical laboratory settings.	1,2
2	Demonstrate basic knowledge of laboratory management, including resource and personnel management.	1,9
3	Identify and implement quality improvement strategies in laboratory operations.	1,3
4	Apply regulatory standards and compliance requirements (e.g., ISO 15189, CLIA) in laboratory practices.	1,3,9
5	Develop and maintain a Laboratory Quality Management System (LQMS) to ensure efficient and reliable test results.	1,3,9

SEMESTER - V									
Course Title	Bio-Hazard								
Course Code	24BMLT3106R	Total Credits:2 Total Hours: 30P	L	T	P	S	R	O/F	C
			0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Anti-requisite	Nil								
Programmes	Bachelor of Medical Laboratory Technology								
Semester	Fall/V Semester of Third Year of the Programme								
Course Objectives	1. Students are taught about the various biomedical wastes, types and its management. 2. The students will also learn about safety measures in the lab and documentation accidental records and information in the laboratory. 3. Students are taught about disposal of waste generated in the clinical laboratory.								
CO1	Understanding the importance of safety awareness for clinical laboratory personnel and listing the responsibilities of employer.								
CO2	To identify the hazards related to handling chemicals, biologic specimens, and radiologic materials and learn about PPE kits.								
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.								
CO4	Students will learn how to select the correct means for disposal of waste generated in the clinical laboratory.								
CO5	Students will be able to outline the steps required in documentation of an accident in the workplace.								
Unit-No	Content	Contact Hour	Learning Outcome					KL	
I	LABORATORY SAFETY AND REGULATIONS Occupational safety and health safety awareness for clinical laboratory personnel, Signage and labelling	6	Students can learn about the safety measures in laboratory.					1,2	
II	SAFETY EQUIPMENT Chemical fume hood and bio safety cabinets Chemical storage PPE and hygiene	6	Students can learn how to use safety equipment.					2,3	
III	SAFETY Biological safety <ul style="list-style-type: none"> • Chemical safety • Radiation safety Fire safety 	6	Students will learn about the different types of safety precaution.					2,3,4	
IV	DISPOSAL OF HAZARDOUS MATERIALS <ul style="list-style-type: none"> • Biomedical waste Management, classification, types • Chemical Waste • Radioactive waste Bio-hazardous waste 	6	Students can understand different waste generated and its treatment in Health Care Sector.					1,3	
V	ACCIDENT DOCUMENTATION AND INVESTIGATION	6	Student will learn how to maintain the records.					1,3, 4	

TEXT BOOKS:

1. Text book on biohazard By Jesse Cragno.
2. Text book of Microbiology by Ananthanarayan and Paniker.
3. Text book on Biohazard–By Ken Alibek with Stephen Handelman.

REFERENCE BOOKS:

1. Text book on biohazard By Jesse Cragno.
2. Text book of Microbiology by Ananthanarayan and Paniker.
3. Text book on Biohazard–By Ken Alibek with Stephen Handelman.

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understanding the importance of safety awareness for clinical laboratory personnel and listing the responsibilities of employer.	1,3,9
2	To identify the hazards related to handling chemicals, biologic specimens, and radiologic materials and learn about PPE kits.	1,3,4,9
3	Students will learn the precautionary measures when working with electrical equipment, cryogenic materials, and compressed gases and avoiding mechanical hazards associated with laboratory equipment.	1,2,3
4	Students will learn how to select the correct means for disposal of waste generated in the clinical laboratory.	1,8
5	Students will be able to outline the steps required in documentation of an accident in the workplace.	1,2

SEMESTER – VI									
Course Title	Cytopathology								
Course Code	24BMLT3201R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 30T+30P	2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring /VI Semester of Third Year of the Programme								
Course Objectives	1. Students can learn about cytology Exfoliative and interventional cytology and role of Cytology. 2. To make the students learn and understand different cytological techniques. 3. To understand the general background regarding how cytopathology aids in the diagnosis of cancer.								
CO1	Describe the basics of cytology and its classification with their role.								
CO2	Summarize the process of collection of specimens from different parts of the body.								
CO3	Execute the techniques of Fine Needle Aspiration Cytology								
CO4	Illustrate the collection and processing of body cavity fluid specimens.								
CO5	Analyze the significance of different staining pattern and develop a practical understanding of laboratory layout.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to cytology Definition of cytology, Cells & tissues, Normal tissues. Classification of cytology Exfoliative and interventional cytology, Role of Cytology, Nuclear criteria of inflammation & malignancy, Progressive changes of the cells Changes in inflammation Dyskeratotic Changes in malignancy.	6	Develop a foundational understanding of cytology, the structure and function of cells and tissues, and the characteristics of normal tissues and recognize progressive changes in cell morphology.					1,2,3	
II	Collection of specimens from female genital tract specimen for routine screening. Cervical smear Vaginal pool smear Lateral vaginal smear Combined (fast) smear Triple smear Endo cervical and endometrial smear.	5	Demonstrate proficiency in collecting various types of specimens from the female genital tract also understand the specific techniques required for each type of specimen collection.					2, 3	
III	Urinary cytology Collection of urinary tract specimens Diagnostic utility of urinary cytology Fine Needle Aspiration Cytology Application of FNAC Advantages of FNAC General procedure of FNAC Limitation of FNAC Wet and Dry fixed smear, its difference Imprint Cytology, Crush smear cytology, Biopsy sediment cytology	5	Understand the principles of urinary cytology and its role in diagnosing urinary system cancers. Describe the advantages and limitations of FNAC. Recognize the applications of imprint, crush smear, and biopsy sediment cytology.					1,2	

IV	Body cavity Fluids Effusions Collection and processing of body cavity fluid specimens, Cyto-preparation and staining Processing of clotted and Blood specimen. Cellular Components in effusions Principal Cellular Components Cellular components in benign Effusions Cellular components in malignant Effusions	6	Understand the importance of proper handling in effusion cytology. Describe different collection and processing techniques. Recognize cellular components in benign and malignant effusions.	3,4
V	STAINING: R/E stain types-Methods, Maintenance, Preparation of stain, Pap's stain Special stains- MGG, PAS, ZN, Mucicarmine etc. Mounting and Labelling Cell Block preparation Cytological fixative-Definition, types/classification Mailing of smears Establishments of lab- Manpower, Space, Ventilation, Light, Water, working benches, Room arrangements, Reception of specimens, Instruments required.	8	Explain staining principles and methods. Recognize the importance of special stains. Describe cell block preparation and cytological fixatives.	2,4
Practical	1. Sample receiving labelling and entering 2. Preparation of Exfoliative cytological smears 3. Fixation – types and methods 4. Preparation of different solution 5. Preparation of smears in interventional cytology, Fixation and stains 6. Staining R/E - Preparations of stains - Methods – MGG &PAPs - Mounting - Labelling 7. Special Stains - PAS - AFB - Mucicarmine etc 8. Record keeping of reports and blocks etc. 9. Lab safety 10. Quality controls	30	Understand and apply various fixation types and methods, ensuring optimal preservation of cellular morphology. Describe application of stains such as MGG and PAPs, mounting, labelling, and performing special stains like PAS, AFB, and Mucicarmine stains.	1,2,3

TEXT BOOKS:

T1: Bancroft's theory and practice of Histological techniques by S. Kim Suvarna, Christopher Layton, John D. Bancroft.

T2: Textbook of Medical Laboratory Technology–Praful B Godkar, Darshan P Godkar

T3: Manual of Medical Laboratory Techniques by S. Ramakrishna

REFERENCE BOOKS:

R1: Textbook of Histological Techniques for Medical Laboratory Technology by Sudha R.

R2: Histopathology, A self-instructional text by Freida L. Carson

R3: [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 (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Describe the basics of cytology and its classification with their role.	1,2,4
2	Summarize the process of collection of specimens from different parts of the body.	1,2,3,4
3	Execute the techniques of Fine Needle Aspiration Cytology	1,2,3,4
4	Illustrate the collection and processing of body cavity fluid specimens.	1,2,3,4
5	Analyze the significance of different staining pattern and develop a practical understanding of laboratory layout.	1,2,4

SEMESTER – VI											
Course Title	Metabolic Errors and Quality Control in Clinical Biochemistry										
Course Code	24BMLT3202R	Total Credits: 4 Total Hours: 30T+30P			L	T	P	S	R	O/F	C
				2	0	4	0	0	0	4	
Pre-requisite	Nil	Co-requisite			Nil						
Programme	Bachelor of Medical Laboratory Technology										
Semester	Spring /VI Semester of Third Year of the Programme										
Course Objectives	<ol style="list-style-type: none"> 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. 3. Students will learn about the properties of cancer cells and correlate the biochemical changes. 										
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	Specimen collection and analysis: Concept of accuracy, precision, reliability, reproducibility, reference ranges, Quality control, LJ graph, collection, distribution, preservation, storage of specimen for appropriate test, introduction to NABL, NABH and ISO guidelines	8	Demonstrate specimen collection and analysis, encompassing the concepts of accuracy, precision, reliability, and reproducibility in diagnostic testing. Analyze quality control measures.					1,2			
II	Inborn error of carbohydrate metabolism Disorders of carbohydrate metabolism, diabetes mellitus, glycosuria, glycogen storage diseases, galactosemia, pentosuria, fructosuria, G6PD deficiency and, acid mucopolysaccharidosis	6	Illustrate various disorders related to carbohydrate metabolism in biochemical basis.					1,2,3			
III	Inborn error of Protein metabolism 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, Fanconi syndrome, tyrosinemia, albinism	8	Develop a comprehensive understanding of disorders related to protein and amino acid metabolism, diagnostic criteria, and management strategies.					1,2,3,4			

IV	Inborn error of lipid metabolism Hyperlipidemia, Carnitine deficiency, hypolipoproteinemia, hyperpolipoproteinemia, atherosclerosis, fatty liver.	4	Analyze the disorders related to lipid metabolism, including hyperlipidemia, Carnitine deficiency, Hypolipoproteinemia.	2,3
V	Cancer biochemistry: Properties of cancer cells, morphological and biochemical changes in cancer cells, Carcinogenesis, carcinogens, diagnosis of cancer Oncogenic markers.	4	Develop a comprehensive Understanding of cancer Biochemistry, encompassing the properties of cancer cells, Including morphological and biochemical changes.	2,3,4
Practical	1. Laboratory test for In Born error of Carbohydrate metabolism 2. Laboratory test for In Born error of Protein metabolism 3. Laboratory test for In Born error of Lipid metabolism 4. Biochemical test for body fluids	30	Describe and interpret certain laboratory tests performed for assessing inborn errors of carbohydrate, protein and lipids.	1,2,3,4

TEXT BOOKS:

T1: Textbook of Medical Biochemistry– MN Chatterjee, Kano Shinde.

T3: Principle & Technique of Biochemistry–S Ramakrishnan, K.G. Prasanna, R. Rajan.

T4: Principle & Techniques of Biochemistry & Molecular Biology–Keith Coilson

T5: Textbook of Medical Lab Technology– Praful B. Godkar, Darshan P.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.

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Explain the fundamentals of standardization guidelines, focusing on their relevance to laboratory practices and specimen analysis.	1,2,3,4
2	Demonstrate the skills necessary to diagnose and manage inborn errors of carbohydrate metabolism.	1,2,4
3	Recognize and categorize various inborn errors of protein metabolism, including enzymatic deficiencies and metabolic pathway disruptions.	1,2,4
4	Describe the clinical significance of inborn errors of lipid metabolism	1,2,4
5	Illustrate the properties of cancer cells and correlate the biochemical changes	1,2,4

SEMESTER – VI											
Course Title		Medical Mycology									
Course Code	24BMLT3203	Total Credits: 4			L	T	P	S	R	O/F	C
		Total Hours: 30T+30P			2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite			Nil						
Programme	Bachelor of Medical Laboratory Technology										
Semester	Spring /VI Semester of Third Year of the Programme										
Course Objectives	1. To have broad knowledge of how to collect, transport and process various mycological clinical specimen. 2. Serological tests used in the isolation of fungal pathogens in clinical specimens. 3. Understand the clinical significance and diagnosis of various fungal infections.										
CO1	Determine the basics of Mycology and its classification.										
CO2	Summarize the mechanism of fungal disease, pre disposing factor and the fungal immunity.										
CO3	Execute the knowledge on superficial, subcutaneous, systemic and opportunistic mycoses.										
CO4	Demonstrate the sample collection, transportation and processing of different laboratory tests of fungus.										
CO5	Explain the importance of antifungal susceptibility test, antifungal agents and state their actions.										
Unit No.	Content			Contact Hour	Learning Outcome					KL	
I	Introduction to Medical Mycology - General characteristics - Morphology of fungi - Classification of fungi			6	Classify fungi and understand their general characteristics.					1,2	
II	Disease mechanism of fungi - Overview of fungal diseases - Predisposing factors - Fungal Immunity			6	Evaluate the common fungal infections, predisposing factors that contribute to fungal disease development and involved immune responses.					1,2,3	
III	- Superficial mycoses - Subcutaneous mycoses - Systemic mycoses - Opportunistic mycoses			8	Develop a comprehensive understanding of superficial, subcutaneous, systemic, and opportunistic mycoses.					1,4,5	
IV	Laboratory Diagnosis of fungal Infection. - Collection transportation and processing of mycological specimen - Examination methods			5	Interpret laboratory findings, and contribute effectively to the diagnosis and management of fungal infections in clinical practice.					1,3,4	
V	Antifungal Susceptibility testing - Antifungal agents			5	Explain antifungal susceptibility testing, the principles of susceptibility testing methods.					1, 3	
Practical	Mycology Sample collection and processing in mycology. Urine, blood, hair, nail, skin scraping and discharge or pus from lesion. Direct microscopy Gram, Giemsa, KOH and calcofluor stains) - LPCB - Germ Tube test 1. Slide culture technique			30	Demonstrate proficiency in the collection and processing of diverse mycological specimens, performing direct microscopy using stains in identifying fungal elements accurately.					1,2,3, 4,5	

TEXT BOOKS:

T1: Textbook of Microbiology by Dr. R C Dubey, Dr D K Maheshwari

T2: Essentials of Microbiology by S Rajan, R. Selvi Christy

T3: Essentials of Medical Microbiology by Apurba S Sastry, Sandhya Bhat

REFERENCE BOOKS:

R1: Review of Medical Microbiology and Immunology by Warren Levinson

R2: Textbook of Microbiology by Dr C P Baveja

OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK21054/?term=Biochemistry>

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

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Determine the basics of Mycology and its classification.	1,2,4
2	Summarize the mechanism of fungal disease, pre disposing factor and the fungal immunity.	1,2,4
3	Execute the knowledge on superficial, subcutaneous, systemic and opportunistic mycoses.	1,2,4
4	Demonstrate the sample collection, transportation and processing of different laboratory tests of fungus.	1,2,4
5	Explain the importance of antifungal susceptibility test, antifungal agents and state their actions.	1,2,4

SEMESTER – VI									
Course Title	Principle of Laboratory Management								
Course Code	24BMLT3204R	Total Credits: 4 Total Hours: 60T	L 4	T 0	P 0	S 0	R 0	O/F 0	C 4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Medical Laboratory Technology								
Semester	Spring /VI Semester of Third Year of the Programme								
Course Objectives	1. Understanding the responsibilities of managing a medical lab. 2. Ability to puts plans for the established laboratory. 3. Demonstrate the ability to apply these plans without losing any rights.								
CO1	Define the Code and conduct of laboratory.								
CO2	Identify the safety symbols of laboratory.								
CO3	Demonstrate the role of a lab personnel in management of the patients.								
CO4	Evaluate the significance of Biomedical waste management.								
CO5	Contrast the basic concepts of MS word, Excel sheets and Email.								
Unit No.	Content	Contact Hour	Learning Outcome					KL	
I	Code and conduct of Laboratory	12	Explain the Code and conduct of Laboratory efficiently including adherence to safety protocols, ethical guidelines, and regulatory standards.					1, 2,3	
II	Safety symbols of Laboratory	10	Identify safety symbols of Laboratory					2,3	
III	Role of Lab Personnel in patient Management, soft skill in patient handling. Vaccination of technician and post exposure prophylaxis.	14	Understand the critical role lab personnel play in patient management, focusing on effective patient handling also the importance of vaccination.					1,3	
IV	Biomedical waste management	12	Identify, segregate, and dispose of biomedical waste according to regulatory guidelines and safety protocols.					2, 4	
V	Computer basics, word processing, spreadsheets, Data-Base, Email, Lis (Laboratory information system)	12	Develop foundational computer skills, including proficiency in word processing, spread sheet management, and database handling.					1, 3, 4	

TEXT BOOKS:

1. Textbook of first aid by Dr A Helen Perdita
2. Textbook on first aid and emergency by Jaypee

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 (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Define the Code and conduct of laboratory.	1,3,5
2	Identify the safety symbols of laboratory.	1,3,5
3	Demonstrate the role of a lab personnel in management of the patients.	1,3,5,6
4	Evaluate the significance of Biomedical waste management.	1,5,8
5	Contrast the basic concepts of MS word, Excel sheets and Email.	1,6,9



Assam down town University

Curriculum and Syllabus

Bachelor of Optometry

**OUTCOME BASED EDUCATION FRAMEWORK
CHOICE BASED CREDIT SYSTEM**

Version: 2.2

**FACULTY OF PARAMEDICAL
SCIENCES**

July, 2024

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 Board of Studies (BOS) meeting of the Faculty of Paramedical Science held on dated 20/06/2024 and approved by the 51st Academic Council (AC) meeting held on dated 26/07/2024.



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 orthoptic 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 orthoptic 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. Total Credits to be Earned: 174

VII. 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

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-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^{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, Student present and deliver lectures in presence of teacher and supervised by teacher	60%
Student visit fields or perform experiments or teacher perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

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

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

Breakdown of Credits

Sl. No	Category		Total number of Credits
1	University Core (UC)	Skill Enhancement Course (SEC)	9
		Ability Enhancement Course (AEC)	6
		Field Training	
		Discipline Specific Elective (DSE)	
		Value Added Course (VAC)	2
2	University Elective (UE)	Multidisciplinary Course (MDC)	9
		Value Added Course (VAC)	8
3	Programme Core (PC)	Discipline Specific Core (DSC)	82
		Field Training	2
		Research /Industry Internship	24
		Summer Internship	4
4	Programme Elective (PE)	Discipline Specific Elective (DSE)	28
		Value Added Course (VAC)	
5	Faculty Core (FC)	Skill Enhancement Course (SEC)	
		Ability Enhancement Course (AEC)	
Total			174

Breakdown by categories of courses

Sl. No.	Category	Credits	%
1	Paramedical Science	150	86.2%
2	FOCT	7	4.0%
3	Commerce and Management	5	2.9%
4	PDP	12	6.9%
Total		174	100%

SEMESTER WISE COURSE DISTRIBUTION

	S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for				
					L	T	P	S	R	O	C	IA*	SEE*	PI*	PE*	Total
Semester I	1.	24BOPT1101R	Basics of Human Anatomy and Physiology	DSC (Minor)	4	0	0	0	0	0	4	40	60	0	0	100
	2	24BOPT1102R	Basics of Optics	DSC (Major)	3	0	2	0	0	0	4	40	60	0	100	200
	3	24BOPT1103R	General and Ocular Biochemistry	DSC (Minor)	4	0	0	0	0	0	4	40	60	0	0	100
	4	24BOPT1104R	Ocular Pharmacology	MDC	3	0	0	0	0	0	3	40	60	0	0	100
	5	24BOPT1105R	Vision Assessment (TPS)	SEC	0	0	2	0	0	0	1	0	0	0	100	100
	6	24UBPD1101R	Basic Communicative English (CLPDP)	AEC	0	0	2	0	0	0	1	0	100	0	0	100
	7	24BOPT1101M	Financial market (MOOCs)	VAC	2	0	0	0	0	0	2	0	100	0	0	100
	8	24UBEC1101	Extra-Curricular	Extra-Curricular	0	0	0	4	0	0	1	0	0	100	0	100
	Total					16	0	6	4	0	0	20	160	440	100	200
Semester II	1.	24BOPT1201R	Ocular Anatomy and Physiology	DSC (Major)	4	0	0	0	0	0	4	40	60	0	0	100
	2	24BOPT1202R	Ophthalmic Optics	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	0	100
	3	24BOPT1203R	Visual Optics	DSC (Minor)	3	0	0	0	0	0	3	40	60	0	0	100
	4	24BOPT1204R	Instrumentation And investigation I	DSC (Minor)	2	0	2	0	0	0	3	40	60	0	100	200
	5	24UICT1202R	Infection control and sterile Technique Procedure	MDC	1	0	0	0	0	0	1	40	60	0	0	100
	6	24UBES1201R	Environmental Science	VAC	2	0	0	0	0	0	2	0	100	0	0	100
	7	24BOPT1206R	Field Visit	Field Training	0	0	0	0	0	8	1	0	0	0	100	100
	8	24UBPD1201R	Functional English	AEC	0	0	2	0	0	0	1	0	0	100	0	100
	9	24UBCC1201	Co- Curricular	Co-Curricular	0	0	0	4	0	0	1	0	0	100	0	100
Total					14	0	4	4	0	8	18	200	400	200	200	1000

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for					
				L	T	P	S	R	O	C	IA*	SEE*	PI*	PE*	Total		
Semester III	1	24BOPT2101R	Dispensing Optics I	DSC (Minor)	3	0	0	0	0	0	3	40	60	0	0	100	
	2	24BOPT2102R	Ocular Disease I	DSC (Minor)	3	0	0	0	0	0	3	40	60	0	0	100	
	3	24BOPT2103R	Pathology and Microbiology	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	0	100	
	4	24BOPT2104R	Clinical Optics and Refraction I	DSC (Major)	3	0	2	0	0	0	4	40	60	0	100	200	
	5	24BOPT2105R	Instrumentation and Investigation II	DSC (Major)	3	0	2	0	0	0	4	40	60	0	100	200	
	6	Yet to receive	DISA	SEC	0	0	2	0	0	0	1	0	0	0	100	100	
	7	24UDLS2101R	Digital Literacy	VAC	1	0	0	0	0	0	1	0	100	0	0	100	
	8	24BOPT2107R	Medical Psychology	MDC	3	0	0	0	0	0	3	40	60	0	0	100	
	9	24UBPD2101R	Executive English (CLPDP)	AEC	0	0	2	0	0	0	1	0	0	0	100	100	
	10	24BOPT2108R	Field Visit	Field Training	0	0	0	0	0	8	1	0	0	0	100	100	
Total				18	0	8	0	0	8	23	240	460	0	500	1200		
Semester IV	SN.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for				
	L	T	P	S	R	O	C	IA*	SEE*	PI*	PE*	Total					
	1	24BOPT2201R	Contact Lens I	DSC (Major)	3	0	2	0	0	0	4	40	60	0	100	200	
	2	24BOPT2202R	Ocular Disease II	DSC (Major)	4	0	0	0	0	0	4	40	60	0	0	100	
	3	24BOPT2203R	Dispensing Optics II	DSC (Major)	3	0	2	0	0	0	4	40	60	0	100	200	
	4	24BOPT2204R	Clinical Optics and Refraction II	DSC (Major)	3	0	2	0	0	0	4	40	60	0	100	200	
	5	24BOPT2205R	Biostatistics	DSC (Minor)	4	0	0	0	0	0	4	40	60	0	0	100	
	6	24BOPT2206R	Identification of Ocular Disease (TPS)	SEC	0	0	4	0	0	0	2	0	0	0	100	100	
	7	Code Yet to received	Enhanced Professional Skills (CLPDP)	AEC	0	0	2	0	0	0	1	0	0	0	100	100	
	8	24UUFL2201R	Introduction To Financial Budgeting and Planning (FL)	MDC	0	0	2	0	0	0	1	0	0	0	100	100	
	9	Code yet to receive	Self-Study Seminar/ presentation	AEC	1	0	0	0	0	0	1	0	0	0	100	100	
10	24BCIC2209R	Fundamentals of Patient Care and Safety	MDC	1	1	0	0	0	0	0	40	60	0	0	100		
11	24UULS2202R	Basic life Saving Skills	VAC	0	0	2	0	0	0	1	0	0	0	100	100		
Total				19	1	16	0	0	0	26	240	360	0	800	1400		

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SEE*	PI*	PE*	Total	
Semester V	1.	24BOPT3101R	Binocular Vision and Ocular Motility	DSC (Major)	4	0	2	0	0	0	5	40	60	0	100	200
	2	24BOPT3102R	Low Vision Aid and Visual Rehabilitation	DSC (Major)	4	0	2	0	0	0	5	40	60	0	100	200
	3	24BOPT3103R	Clinical Examination of Eye I	DSC (Major)	4	0	2	0	0	0	5	40	60	0	100	200
	4	24BOPT3104R	Contact Lens II	DSC (Major)	4	0	2	0	0	0	5	40	60	0	100	200
	5		Advanced Employability (CLPDP)	AEC	0	0	2	0	0	0	1	0	0	0	100	100
	6	24BOPT3101M	Understanding Indian Knowledge and Heritage	VAC	2	0	0	0	0	0	2	0	0	0	100	100
	7	24BOPT3105R	Summer Internship	Summer Internship	0	0	0	0	0	24	4	0	0	100	0	100
	8	24BOPT3105R	Ocular Diagnostics (TPS)	SEC	0	0	6	0	0	0	3	0	0	0	100	100
Total				18	0	16	0	0	24	30	160	240	100	700	1200	
SN.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SEE*	PI*	PE*	Total	
Semester VI	1.	24BOPT3201R	Applied Optometry and Orthoptics	DSC (Major)	3	0	4	0	0	0	5	40	60	0	100	200
	2	24BOPT3202R	Systemic Conditions and The Eye	DSC (Major)	4	0	0	0	0	0	4	40	60	0	0	100
	3	24BOPT3203R	Clinical Examination of Eye II	DSC (Major)	3	0	4	0	0	0	5	40	60	0	100	200
	4	24BOPT3204R	Public Health and Community Optometry	DSC (Major)	3	0	0	0	0	0	3	40	60	0	0	100
	5	24BOPT3205R	Professional Practice Management	DSC (Major)	3	0	0	0	0	0	3	40	60	0	0	100
	6		Finishing School	AEC	0	0	4	0	0	0	2	0	0	0	100	100
Total				16	0	12	0	0	0	22	200	300	0	300	800	

	S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for				
					L	T	P	S	R	O	C	IA*	SEE*	PI*	PE*	Total
Semester VII	1	24BOPT4101R	Clinical Observation-I (Hospital Posting)	Industry Internship	0	0	0	12	0	0	12	0	0	0	100	100
	2	24BOPT4102R	Case Report – I	DSC (Major)	0	0	8	0	0	0	4	0	0	0	100	100
	3	24BOPT4103R	Optometry Ethics	DSE (Minor)	0	0	4	0	0	0	2	0	0	0	100	100
	Total					0	0	12	12	0	0	18	0	0	0	300
Semester VIII	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	24BOPT4201R	Clinical Observation II (Hospital Posting)	Industry Internship	0	0	0	12	0	0	12	0	0	0	100	100
	2	24BOPT4202R	Case Report - II	DSC (Major)	0	0	8	0	0	0	4	0	0	0	100	100
3	24BOPT4203R	Occupational Behaviour of Optometry	DSE (Minor)	0	0	4	0	0	0	2	0	0	0	100	100	
Total					0	0	12	12	0	0	18	0	0	0	300	300

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

SEMESTER – I									
Course Title	BASIC OF HUMAN ANATOMY AND PHYSIOLOGY								
Course code	24BOPT1101R	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 Optometry								
Semester	I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> To provide a comprehensive concept of all the anatomical position, gross and microscopic structure and physiological function of the human To assist students in developing a better grasp of the anatomical structure and basic Physiological function of various body regions To understand the underlined mechanism and regulation of the human body. 								
CO1	Understand anatomical terminology, basic structure and function of cells and various organs of the human body.								
CO2	Comprehend anatomy and physiology of tissue, skeletal system, and the complexities of the nervous system.								
CO3	Discuss the knowledge and skills necessary to analyze and interpret the intricacies of blood composition, heart structure and function, blood vessels, pulmonary and systemic circulation, respiratory mechanisms, and associated physiological parameters.								
CO4	Discuss knowledge and skills necessary to analyze and interpret the processes of digestion, absorption, and urine formation.								
CO5	Analyze and interpret the complexities of glandular development, hormone actions, and the physiological processes related to reproduction.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction To Anatomical Terms, Basic Structure and Function of Cell Level of Organization – Body Parts and Areas, Planes and Sections. Structure of Cell – Structure and Function of Cell Membrane and Sub organelles. Cellular Transport Mechanism		10	Describe, illustrate and explain anatomical terms & basic structure of animal cell				1,2	
II	Tissues, Skeletal System and Nervous Tissue, Bone and its classification - Functions of the Skeleton system – Skull, Vertebral Column. Joint and its types – Articulation. Types and Structure of Neuron – Mechanism of Nerve Impulse - Structure and Parts of Brain and spinal cord. Special sense: Eye, Skin, nose and Ear, tongue		10	Describe, illustrate and explain the classification and functions of bones and tissues				1,2	
III	Respiratory and Cardiovascular Systems Cardiovascular: Composition of Blood and functions – Structure of Heart – Conduction system of Heart – Types of Blood vessel – Blood Pressure, pulse rate. Systemic and pulmonary circulation, Cardiac cycle, cardiac output. Lungs, Mechanism and regulation of respiration, lung volume and capacity, Hypoxia, cyanosis, dyspnoea, Asphyxia		10	Describe, illustrate and explain the conduction system of heart and mechanism and regulation of respiration				1,2	

IV	Digestive and Urinary Systems Digestive: Organs of Digestive system – Digestion and Absorption. Structure of Kidney and Nephron – Mechanisms of Urine formation – Regulation of Blood pressure	15	Describe, illustrate and explain the organs present in digestive system and procedure of urine formation	1,2
V	Reproductive and Endocrine System Glands- Embryology, different types of glands, Hormone mechanisms- actions, regulations Male and female reproductive organs and changes during puberty. Menstrual cycle, ovulation. Physiological changes during pregnancy.	15	Describe, illustrate and explain glands, hormones and reproductive organs	1,2

TEXT BOOKS:

- T1. Fundamentals of Anatomy by Pamela K Levangie, Cynthia C Norkin, JP Bros Medical Publishers, New Delhi.
T2. A book of Physiology, Dr Khurana
T3. Ross and Wilson Anatomy and Physiology

REFERENCE BOOKS:

- R1: Clinical Anatomy, JP Bros Medical Publishers, Bangalore, 5th Ed 1996, 1st Indian Ed1998
R2. Review of Medical Physiology- Ganong William F.
R3: Physiological basis of Medical practice – Best & Taylor

OTHER LEARNING RESOURCES:

<https://oli.cmu.edu/courses/anatomy-physiology-i-ii-v2-academic/>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand anatomical terminology, basic structure and function of cells and various organs of the human body.	1,6,8
2	Comprehend anatomy and physiology of tissue, skeletal system, and the complexities of the nervous system.	1,8
3	Discuss the knowledge and skills necessary to analyze and interpret the intricacies of blood composition, heart structure and function, blood vessels, pulmonary and systemic circulation, respiratory mechanisms, and associated physiological parameters.	6,8
4	Discuss knowledge and skills necessary to analyze and interpret the processes of digestion, absorption, and urine formation.	6,8
5	Analyze and interpret the complexities of glandular development, hormone actions, and the physiological processes related to reproduction.	1,6,8

SEMESTER – I									
Course Title	BASICS OF OPTICS								
Course code	24BOPT1102R	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	Bachelor of Optometry								
Semester	I semester of first year of the Programme								
Course Objectives	1. To provide opticians know about basic concepts of light 2. To enlighten about the various optical parameters 3. To provide a depth knowledge of different spherical lenses and their uses in defects corrections.								
CO1	Describe the concept of light and its behavior in different media.								
CO2	Understand the phenomena of reflection and refraction of light								
CO3	Identify the reflection and refraction at spherical surfaces and subsequent image formation.								
CO4	Understand the principle of refraction and reflection in connection to its uses in human eye.								
CO5	Describe the use of various instruments related to optometry.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Ray Optics- <ul style="list-style-type: none"> • Introduction, • Definition and concept of light, • propagation of light, • regular and diffused reflections, • reflection on plane surfaces. 		9	Describe, illustrate and explain about Basics of light propagation				1,2	
II	Reflection and Refraction <ul style="list-style-type: none"> • Reflection and refraction of light, • laws of reflection and refraction, refractive index, • total internal reflection, • formation of mirage and looming. 		9	Describe, illustrate and explain about Laws of light				1,2	
III	Reflection and Refraction through spherical surfaces – <ul style="list-style-type: none"> • Spherical mirrors, image formation in spherical mirrors, • concept of real and virtual image, sign conventions, mirror equation. • Different types of convex and concave lenses, image formation in lenses, sign conventions, • lens equation, magnification of lenses, and power of lens, lens- maker's formula. 		9	Describe, illustrate the Basics of mirrors and lenses				1,2,3	
IV	Refraction and dispersion of light through prism- <ul style="list-style-type: none"> • Angular dispersion, dispersive power, • dispersion without deviation and deviation without dispersion, • achromatic prism and lenses, prism dioptric, • concept of aberrations and its correction 		9	Describe, illustrate & understand the Basics of light propagation through prism				1,2,3,4	

V	Optical instruments and Photometry- <ul style="list-style-type: none"> • Human eye, defects of vision (Myopia, Hypermetropia and Presbyopia) and corrections. • Spectrometer, microscopes, magnifying power of simple and compound microscopes, telescopes, resolving power of optical instruments. • Basic concepts and definitions in photometry, inverse square law, Bunsen's grease spot photometer 	9	Describe, illustrate optical instruments	1,2,4
Practical	<ul style="list-style-type: none"> • To determine the focal length of a focal mirror by UV method using optical bench • To determine the focal length of a convex lens by displacement method and hence determine the power of a lens • To determine the focal length and power of a concave lens by auxiliary lens method • To determine the refractive index (RI) of a glass slab using travelling microscope • Determination of refractive index (RI) of a liquid by using a plane mirror and a convex lens. 	30	Describe, illustrate & determine focal lengths and refractive index using various methods	

TEXT BOOKS:

T1. New simplified Physics , S. L. Arora

REFERENCE BOOKS:

R1: Text book on light, B. Ghosh & K. G. Mazumdar

OTHER LEARNING RESOURCES:

<https://youtu.be/-DEYZw7H9As?si=BvZ4-Xq2lpP4ZTj7>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe the concept of light and its behavior in different media.	1,6,8
2	Understand the phenomena of reflection and refraction of light	1,8
3	Identify the reflection and refraction at spherical surfaces and subsequent image formation.	6,8
4	Understand the principle of refraction and reflection in connection to its uses in human eye.	6,8
5	Describe the use of various instruments related to optometry.	1,6,8

SEMESTER – I									
Course Title	GENERAL AND OCULAR BIOCHEMISTRY								
Course code	24BOPT1103R	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 Optometry								
Semester	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 provide information and understanding on the basic idea about energy flow in the form of ATP in human body and cells and also to focus on the hereditary concepts of life. 3. To explain about essential macro and micronutrients, their roles and implications in human health and to understand insights about the biochemical events involved in vision, from the absorption of light by photoreceptor cells to the processing of visual signals in the brain.								
CO1	Understand carbohydrates, including their sources, structures, and biological significance.								
CO2	Discuss proteins, including amino acid classification, protein structure, enzyme functions, and protein metabolism.								
CO3	Classify lipids, including fatty acids, their structures, functions, and metabolism.								
CO4	Analyze and interpret the roles of these micronutrients in maintaining health and supporting vital cellular processes								
CO5	Explore the concept of ocular biochemistry, including the composition of ocular structures, the visual cycle, pigmentation, and acid-base balance								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	CARBOHYDRATES: Definition and classification of their sources and structures. Biological significance of Carbohydrate Carbohydrate metabolism: Glycolysis, Krebs cycle, Gluconeogenesis and Glycogenesis	6	Describe, illustrate and explain about classification and significance of carbohydrate					1,2, 3,4	
II	PROTEINS: <ul style="list-style-type: none"> Amino acid classification: Essential and Non- Essential, Basics of proteins Role of Enzymes in human body Protein Metabolism: Transamination, Deamination and Urea cycle. 	6	Describe, illustrate and explain about classifications of proteins					1,2, 3,4	
III	FATTY ACIDS AND LIPIDS: <ul style="list-style-type: none"> General Introduction on lipids and fatty acids. Biological Significance of Lipids. Lipids Metabolism: Beta oxidation and ketone bodies 	6	Describe, illustrate about significance of lipids					1,2, 3,4	

IV	VITAMINS, MINERALS AND NUCLEIC ACID: <ul style="list-style-type: none"> • General introduction on Vitamins, classification and its functions. • Minerals and its types, sources and its functions. • Structure and functions of DNA and RNA 	6	Describe, illustrate about types and functions of vitamins, minerals and nucleic acids	1,2,3,4
V	OCULAR BIOCHEMISTRY: <ul style="list-style-type: none"> • Cornea, lens, aqueous vitreous and retina. • Rhodopsin and Wald's Visual Cycle • Coloured Pigments • Acid, Base, pH and Buffers. 	6	Describe, illustrate about ocular biochemistry	1,2,3,4

TEXT BOOKS:

T1: "Biochemistry" by U Satyanaryana and U Chakrapani 6th Ed.

T2: "Text book of Biochemistry for medical students" by DM Vasudevan (Author), Sree Kumari S (Author), Kannan Vaidyanathan (Author), 7th 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, 3rd Ed

OTHER LEARNING RESOURCES:

https://drive.google.com/file/d/1cx5xt_WvkmEany-KxtoBUtPX_zODncl/view?usp=drive_link

<https://drive.google.com/file/d/1YuMlq01moQQXzfIF00YfT-gXjLMAm04r/view?usp=sharing>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand carbohydrates, including their sources, structures, and biological significance.	1,6,8
2	Discuss proteins, including amino acid classification, protein structure, enzyme functions, and protein metabolism.	1,8
3	Classify lipids, including fatty acids, their structures, functions, and metabolism.	6,8
4	Analyze and interpret the roles of these micronutrients in maintaining health and supporting vital cellular processes	6,8
5	Explore the concept of ocular biochemistry, including the composition of ocular structures, the visual cycle, pigmentation, and acid-base balance	1,6,8

SEMESTER – I									
Course Title	BASIC COMMUNICATIVE ENGLISH								
Course code	24UBPD1101R	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 Optometry								
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	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	Grammar <ul style="list-style-type: none"> • Parts of Speech • Articles • Affirmative and Negative Sentences 	12	Describe, illustrate about how to write speech, articles etc.					1,2,3,4,5	
II	Grammar <ul style="list-style-type: none"> • Determiners • Sentence Construction from jumbled words • Types of Sentences (Assertive, Imperative etc.) 	12	Describe, illustrate about how to write the sentence					1,2,3,4,5	
III	Building Vocabulary <ul style="list-style-type: none"> • Synonyms • Antonyms 	12	Describe, illustrate about how to change the word.					1,2,3,4,5	
IV	Speaking Skills <ul style="list-style-type: none"> • Introduction and greetings • Pronunciation • Asking and offering in formation • Video Recording for self-analysis 	12	Describe, illustrate about how to speaking.					1,2,3,4,5	
V	Communication Skills <ul style="list-style-type: none"> • Introduction to Communication, • Importance of Communication Skills, • Purpose of Communication, • Types of Communication, • Barriers to Communication, 	12	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 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:

<https://youtu.be/53SIKuCuHv0>

https://youtu.be/Ljjiw9mC_Cg

<https://youtu.be/xQfYiHbAjJo>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	The application of grammatical rules will enable the students to improve the speaking and writing skills.	5,7,8
2	It enables the learners to use the language effectively.	5,7,8
3	It will strength both listening and speaking skills.	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	OCULAR ANATOMY AND PHYSIOLOGY								
Course code	24BOPT1201R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 45T	3	0	0	0	0	0	4
Pre-requisite	COMPULSORY	Co-requisite	NIL						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	1. Identify ocular structures and describe their function 2. Discuss the physiology, conditions and evaluation that are associated with each ocular structure 3. Discuss the visual processing and factors that impact healthy vision 4. Identify directional terminology as it applies to the brain and eye								
CO1	Recognize the stages of embryogenesis leading to the development of various ocular structures.								
CO2	Understand the walls of the orbit, orbital fascia, and the composition of the orbit.								
CO3	Demonstrate the structure, blood supply, nerve supply and function of eye.								
CO4	Understand the importance of extra ocular muscles and lacrimal apparatus.								
CO5	Describe the ocular physiology in context of vision.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Embryology and development of Eye- <ul style="list-style-type: none"> Embryogenesis- development of various ocular structures The coats of the eyeball The chambers of the eye Dimensions of the eyeball 	9	Describe, illustrate and explain the essential aspects of ocular anatomy and development of the eye				1,2		
II	THE ORBIT- <ul style="list-style-type: none"> Bony Orbit- Dimensions and bones Walls of the orbit Orbital Fascia Content of orbit 	9	Describe, illustrate and explain the orbit and the associated anatomical structures				1,2		
III	OCULAR STRUCTURES- <ul style="list-style-type: none"> Eyelid- Structure, glands, blood supply, nerve supply, lid margin, canthi, palpebral aperture, function Conjunctiva- Structure, glands, blood supply and nerve supply Cornea- Structure, dimensions, blood supply, nerve supply, corneal transparency, metabolism, function Sclera- Structure, nerve supply, Episclera, tenon capsule Uveal Tissue- Parts of uveal tissue, Structure, blood supply, Function Lens- Dimensions, Refractive index, structure, Lens transparency, metabolism, Accommodation 	9	Describe, illustrate and explain the various structural and functional components of the eyeball and ocular adnexa				1,2		

IV	Extraocular Muscles: <ul style="list-style-type: none"> • Muscles • Origin and insertion • Field of action • Nerve supply LACRIMAL APPARATUS: <ul style="list-style-type: none"> • Glands • Lacrimal passages Tearfilm – structure, function, secretion, tear elimination	9	Describe, illustrate and explain the muscles responsible for various eye movements, the anatomical structures responsible for tear production and drainage	1,2
V	PHYSIOLOGY OF VISION: <ul style="list-style-type: none"> • Maintenance of clear ocular medias Physiology of vision- Visual perception (light sense, form sense, sense of contrast, colour sense)	9	Describe, illustrate and explain the physiological aspects of various ocular structures including physiology of vision	1,2

TEXT BOOKS:

- T1: Comprehensive Ophthalmology, A. K Khurana
 T2: Anatomy and Physiology of Eye, A.K Khurana & Indu Khurana

REFERENCE BOOKS:

- R1: Clinical Anatomy and Physiology of the Visual System, Lee Ann Remington
 R2: Clinical Ocular Anatomy and Physiology , Jan P.G. Bergmanson

OTHER LEARNING RESOURCES:

<https://thecrashcourse.com/courses/anatomy/?page=2>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Recognize the stages of embryogenesis leading to the development of various ocular structures.	1,6,8
2	Understand the walls of the orbit, orbital fascia, and the composition of the orbit.	1,8
3	Demonstrate the structure, blood supply, nerve supply and function of eye.	6,8
4	Understand the importance of extra ocular muscles and lacrimal apparatus.	6,8
5	Describe the ocular physiology in context of vision.	1,6,8

SEMESTER – II									
Course Title	OPHTHALMIC OPTICS								
Course code	24BOPT1202R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	BASICS OF OPTICS						
Programme	Bachelor of Optometry								
Semester	II semester of first year of the programme								
Course Objectives	1.To provide knowledge on various theories of light. 2.To learn about properties of light 3.To learn about light waves								
CO1	Understand the theories of light.								
CO2	Define interference, diffraction, and polarization in the context of optical phenomena.								
CO3	Understand the concepts of light and its scattering phenomena.								
CO4	Explain the concept of laser optics and its implementation in various laser operation.								
CO5	Understand holography and concept of spatial distribution of optical information.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	VARIOUS THEORIES OF LIGHT Newton’s corpuscular theory, Huygens’s wave theory, plane’s quantum theory, electromagnetic wave theory etc., dual nature of light.	9	Describe, illustrate and explain the various theories of light				1,2,4		
II	INTERFERENCE, DIFFRACTION and POLARISATION: Definition and interpretation, young’s double slit experiment, coherent sources, fresnel and fraunhoffer’s types of diffraction, light as transverse waves from polarization brewster’s law.	9	Describe, illustrate and explain different light waves				1,2,3,4		
III	SCATTERING AND SPECTRUM- Definition and interpretation of the phenomenon, example like blue colour of the sky, rayleigh’s scattering, Raman scattering, strokes and anti-strokes lines Spectrum: Definition of spectrum, pure and impure spectra, emission and absorption spectra, classifications, visible, ultraviolet (UV) and infrared (IR) spectrum, electromagnetic spectrum.	9	Describe, illustrate and explain light phenomenon				1,2,3,4		
IV	LASER OPTICS Laser Characteristics, Einstein’s co-efficient, Population inversion and pumping; types of Lasers (Ruby laser, He-Ne, dye laser, semi-conductor lasers), Application of lasers, Optical fibers, Propagation of light through optical fiber, losses, applications.	9	Describe, illustrate and explain the concept of Laser and its generation and propagation				1,2		
V	Holography: Introduction, construction, and reconstruction of images, Uses. Concept of spatial distribution of optical information.	9	Describe, illustrate and explain the construction and reconstruction of images				1,2		

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: 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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theories of light.	1,6,8
2	Define interference, diffraction, and polarization in the context of optical phenomena.	1,8
3	Understand the concepts of light and its scattering phenomena.	6,8
4	Explain the concept of laser optics and its implementation in various laser operation.	6,8
5	Understand holography and concept of spatial distribution of optical information.	1,6,8

SEMESTER – II									
Course Title	VISUAL OPTICS								
Course code	24BOPT1203R	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	II semester of first year of the programme								
Course Objectives	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 2. Deals with errors of refraction and measurement and corrections using fundamental principles of light and optics. 3. This course includes studying the behavior of light, refraction, and the way optical devices (like lenses and prisms) can be used to correct vision problems								
CO1	Describe various properties eyes and methods of eye measurements.								
CO2	Identify the various optical defects and parameters								
CO3	Understand the different types of refractive errors and its managements								
CO4	Discuss the principle and mechanism of eye accommodation.								
CO5	Review the principles of retinoscopy and its instrumentation.								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	MEASUREMENT OF EYE- <ul style="list-style-type: none"> • chemotic and reduced eyes and their properties. • Corneal curvature, refractive index and thickness. • Purkinjee Sanson 		9	Describe, illustrate and explain the measurement of eye using schematic and reduced model.			1,2,3		
II	OPTICAL DEFECTS OF THE EYE- <ul style="list-style-type: none"> • Optical axis, visual axis (angle alpha, fixation axis, angle gamma). • Aberration of the optical system of eye. • Depth of focus. • Diffraction & resolving power. • Retinal image size in uncorrected reduced eye 		9	Describe, illustrate and explain various defects of optical system of an eye			1,2		
III	DIFFERENT TYPES OF REFRACTIVE ERROR- <ul style="list-style-type: none"> • Emmetropia, myopia, hyperopia, astigmatism and Presbyopia. • Aphakia • Aniseikonia • Anisometropia & Asthenopia. 		9	Describe, illustrate and explain the types of refractive error			1,2		
IV	ACCOMMODATION- <ul style="list-style-type: none"> • Possible mechanism of accommodation. • Schiener disc experiment. • Theories of accommodation. • Modern theory- changes in the lens during accommodation. • The amplitude of accommodation. • The measurement of the amplitude of accommodation. • Depth of field. • Amplitude of accommodation versus age. 		9	Describe, illustrate and explain the mechanism and different theories of accommodation			1,2		

V	<p>RETINOSCOPY –</p> <ul style="list-style-type: none"> • Principle and use. • Clinical recording of standard of vision by visual acuity and the charts. • Review of subjective refractive methods. • Problem of review of objective refractive methods. • Contrast sensitivity of the eye. <p>Keratometry and Pachymetry-</p> <ul style="list-style-type: none"> • Principle • Types • Uses 	9	Describe, illustrate and explain the function and use of retinoscopy.	1,3,4
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TEXT BOOKS:

T1: Borish’s clinical refraction–I. M. Borish ,W.J. Benjamin–W.B .Saundersco.

T2: The ocular examination : measurement and findings – karlazadmik

REFERENCE BOOKS:

R1: Primary care optometry – theodore–butterworth-heinemann.

R2: Clinical procedures in optometry – eskridge, amos, bartlett.-j. B. Lippincottco.

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	Describe various properties eyes and methods of eye measurements.	1,6,8
2	Identify the various optical defects and parameters	1,8
3	Understand the different types of refractive errors and its managements	6,8
4	Discuss the principle and mechanism of eye accommodation.	6,8
5	Review the principles of retinoscopy and its instrumentation.	1,6,8

SEMESTER – II									
Course Title	INSTRUMENTATION AND INVESTIGATION I								
Course code	24BOPT1204R	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	1. This course covers commonly used optometric instruments, their basic principle, description, and uses in clinical practice. 2. In-depth knowledge of various investigation procedures in eye care services with basic instrumentations 3. This course includes gain knowledge of the scientific principles and technology behind different instruments used in eye care.								
CO1	Determine the abnormal head posture based on assessment of the patients' ocular alignment and identify methods to address concerns.								
CO2	Recognize the distinct features and applications of diagnostic instruments and their use in optometry								
CO3	Understand the concept of tonometry techniques and applying it to measure intraocular pressure in a clinical setting.								
CO4	Understand the test charts standards and use refractive instrument to address near vision difficulties with relevant units.								
CO5	Demonstrate the concept of retinoscopes, autorefractometers, and ophthalmoscopes.								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	OCULAR EXAMINATION AND DIAGNOSTIC TESTS HEAD POSITION– •Face turn, chin position, head tilt Patient counseling		6	Describe, illustrate and explain all the ocular examination			1,2		
II	DIAGNOSTIC INSTRUMENTS IN OPTOMETRY- •Keratometer, •Slit-lamp biomicroscope, •Gonioscope, •Corneal topography Brightness acuity test		6	Describe, illustrate and explain function and use of various diagnostic instruments			1,2,3		
III	TONOMETRY – •Indentation and applanation. TEST FOR COLOUR VISION. LENSOMETER		6	Describe, illustrate and explain the function and use of tonometry, lensometry & colour vision test			1,2,4		
IV	REFRACTIVE INSTRUMENTS- • Test chart standards, choice of test charts, trial set. • Refractor(phoropter), • Trial frame design, • Near vision difficulties with units and trial frame		6	Describe, illustrate and explain various refractive instruments			1,2,3		
V	DETAILED STUDY OF THE PRINCIPLES OF OPERATION, TYPES, OPTICAL PROPERTIES, CONSTRUCTION, ADJUSTMENT AND APPLICATION OF THE FOLLOWING INSTRUMENTS AND DEVICES– • Retinoscopes • Autorefractometer- Ophthalmoscopes		6	Describe, illustrate and explain the principle, uses, procedure of the instruments			1,2,3		

Practical	To study the operations of the following instruments: -	30	Describe, illustrate and apply the procedure of all the optometric instruments	1,2,3,4
	<ul style="list-style-type: none"> • Focimeter or lensometer. • Keratometer • Retinoscope • Autorefractometer • Ophthalmoscope 			

TEXT BOOKS:

- T1: Optics & refraction-L .P. Agarwal.
T2: Comprehensive Ophthalmology-A. K. Khurana

REFERENCE BOOKS:

- R1: Introduction to visual optics, Alan H. Tumadiffe(1987)
R2: Clinical optics- 2nd ed (1991)- A. R. Elington & H. J. Frank.
R3: Clinical optics-Borrish.
R4: Brien Holden Vision Institute-Luigi Bilotto, Pirindhavelle Govender

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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Determine the abnormal head posture based on assessment of the patients' ocular alignment and identify methods to address concerns.	1,4,8
2	Recognize the distinct features and applications of diagnostic instruments and their use in optometry	1,8
3	Understand the concept of tonometry techniques and applying it to measure intraocular pressure in a clinical setting.	4,8
4	Understand the test charts standards and use refractive instrument to address near vision difficulties with relevant units.	1,8
5	Demonstrate the concept of retinoscopes, autorefractometers, and ophthalmoscopes.	4,8

SEMESTER – II									
Course Title	Environmental science								
Course code	24UBES1201R	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 Critical and Intensive Care Technology								
Semester	II semester of first year of the programme								
Course Objectives	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								
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	
I	Multidisciplinary nature of environmental studies: <ul style="list-style-type: none"> • Definition • Scope and importance • Need for public awareness 	7	Explain the definition, scope, and importance of environmental studies and discuss the need for public awareness.					1,2	
II	Natural Resources: Renewable and non-renewable resources: <ul style="list-style-type: none"> • Forest resources • Water resources • Mineral resources • Food resources • Energy resources • Land resources sources. 	5	Describe different types of natural resources (renewable and non-renewable) and explain their uses and environmental impacts.					1,2,3	
III	Ecosystems Concept of an ecosystem: <ul style="list-style-type: none"> • Structure and function- Producers, consumers, and decomposers. • Energy flow • 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 	5	Describe the components of an ecosystem, explain energy flow and ecological succession, and compare different types of ecosystems.					1,2,3	

IV	Biodiversity and its conservation <ul style="list-style-type: none"> • Introduction – • Definition • Value of biodiversity • Threats to biodiversity • Conservation of biodiversity 	8	Discuss , explain biodiversity’s value and threats, and describe methods for its conservation.	1,2,3,4
V	Environmental Pollution <ul style="list-style-type: none"> • Definition Cause, effects, and control measures of: - Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards • Solid waste management • Disaster management 	5	Discuss , explain about the cause, effects of environmental pollution.	1,2,3,4,5

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 Standards, 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).

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Discuss the ethical, cross-cultural, and historical context of environmental issues.	6
2	Identify natural resource, its importance and environmental impacts of Human activities.	7
3	Discuss about environment and ecosystem.	8
4	Understand the concept of biodiversity.	4
5	Discuss the concepts of conservation of biodiversity, problems of environmental pollution, its impact on human and ecosystem.	8

SEMESTER – II									
Course Title	FUNCTIONAL ENGLISH								
Course code	24UBPD1201R	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
I	Grammar <ul style="list-style-type: none"> Interchange of Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences Types of Tenses Common Errors 				12	Describe, illustrate the types of tenses, sentences.			1,2,3
II	Vocabulary <ul style="list-style-type: none"> Homonyms Homophones 				12	Describe, illustrate about vocabulary			1,2,3
III	Reading Skills <ul style="list-style-type: none"> Techniques of Effective Reading Gathering ideas and information from a text 				12	Describe, illustrate about reading skills			1,2,3
IV	Conflict Management <ul style="list-style-type: none"> Definition Type of Conflict Management Effects of Conflict Management 				12	Describe, illustrate the type of conflict management			1,2,3
V	Time-Management Skills <ul style="list-style-type: none"> Introduction To Time Management, Importance of Time Management, Basic Tips to Maintain Time. 				12	Describe, illustrate the importance of time management.			1,2,3

TEXT BOOKS:

- T1: Wren, P. Cand 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 readings core, 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 – III									
Course Title	DISPENSING OPTICS I								
Course code	24BOPT2101R	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"> 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. 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. 3. This course will help to explain the distinctions among bifocal designs and progressive lenses. 								
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	CHARACTERISTICS OF LENSES- <ul style="list-style-type: none"> • Introduction, • Spherical lenses, plano - cylindrical lenses, sphero-cylindrical lenses, • Designation of lens power and power of lenses, • Write the prescription, • Base curve, • Aberration of lens, • Prism effects in a lens, • Neutralization. 				6	Describe, and explain characteristics of different lenses.			1,2,3
II	PROPERTIES OF LENSES- <ul style="list-style-type: none"> • Optical Properties • Mechanical Properties • Electrical Properties • Chemical Properties • Thermal Properties CURRENT MATERIALS- <ul style="list-style-type: none"> • Crown glass, • Cr-39, • Photochromatic materials • Cellulose acetate. • Polycarbonate lens Trivex lens 				6	Describe, and explain properties of lenses.			1,2,3

III	INTRODUCTION OF LENSES- <ul style="list-style-type: none"> • History of bi-focal design and its types • Progressive lens and its types. • Compression between bifocal, trifocal and progressive lens. • Marking of progressive lens. 	6	Describe, and explain basics of spectacle lenses.	1,2,3,4,5
IV	OPHTHALMIC LENS COATING AND ABSORPTIVE LENSES- <ul style="list-style-type: none"> • Anti-reflecting coating & protective coating • Classification of lens tints. • Effects in prescription on lens color. • Availability of tinted lenses 	6	Describe, and explain lens coating	1,2,3
V	IMPACT RESISTANT LENSES <ul style="list-style-type: none"> • Types of impact resistances lenses. Impact resistant dress- eyewear lenses. • Types of impact resistant lenses most beneficial of specific patients. 	6	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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the fundamental characteristics of lenses, prescription writing, prismatic effects, and neutralization	5,8
2	Distinguish different properties of lenses, and the characteristics of lens materials.	1,3
3	Understand the basic differences between bifocal designs, progressive lenses, and apply the concept in progressive lens marking.	1,3
4	Explain various types of lens coating and identify the concept of absorptive lenses	5,8
5	Understand about the impact-resistant lenses, and the most beneficial impact-resistant lenses for specific patient needs.	5,8

SEMESTER – III									
Course Title	Clinical optics & refraction I								
Course code	24BOPT2104R	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	Compulsory	Co-requisite	Nil						
Programme	Bachelor of Optometry								
Semester	III semester of second year of the programme								
Course Objectives	1. Understanding the eye as a dioptric device and related basic scientific knowledge. 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. 3. Understanding the concept of visual acuity, including its measurement and components, and discuss its clinical significance in assessing vision.								
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	OPHTHALMIC CASE HISTORY TAKING- <ul style="list-style-type: none"> 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. 			6	Describe ophthalmic case history.			1,2	
II	VISUAL ACTIVITY- <ul style="list-style-type: none"> 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 			6	Describe steps of Visual acuity.			1,2, 3,4, 5	
III	OBJECTIVE REFRACTION- Streak and spot retinoscopy: types, definitions, principles, procedures <ul style="list-style-type: none"> Static and dynamic retinoscopy: mem, Nott's, sheard's, bells and cross. Other methods of retinoscopy- radical, near retinoscopy. Autorefractometer. SUBJECTIVE REFRACTION: <ul style="list-style-type: none"> Subjective adjustment, Refinement, binocular balancing Cycloplegic refraction, cycloplegia, different types of cycloplegic drops and their applications. 			6	Describe, and explain different methods of objective refraction.			1,2, 3,4, 5	

IV	ACCOMMODATION- <ul style="list-style-type: none"> • Far point of accommodation, near point of accommodation, range of accommodation, amplitude of accommodation • Different methods of measuring amplitude of accommodation. • Correction of presbyopia: • different methods of calculating tentative presbyopic addition, amplitude of accommodation. 	6	Describe, and Explain accommodation its classification and anomalies.	1,2,3,4,5
V	SOME IMPORTANT WORKUP- <ul style="list-style-type: none"> • Occupational consideration during prescribing add power, • Calculation of add and near power, • Occupational consideration during prescribing add power, • Calculation of add and near power, • Measurement of IPD and its significance. 	6	Describe, and explain clinical workup.	1,2,3,4,5
Practical				
I	<ul style="list-style-type: none"> • History writing • Recording 	10		1,2,3,4
II	Practice of streak retinoscopy	10		1,2,3,4,5
III	<ul style="list-style-type: none"> • To prescribe add power. • To write a prescription. 	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. 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=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	OCULAR DISEASE I								
Course code	24BOPT2102R	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	Third								
Course Objectives	1. To impart an understanding of the pathophysiological processes underlying ocular disease. 2. By better understanding these processes, participants can better recognise disease states 3. Identify progression of disease.								
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	DISEASE OF THE LIDS AND LACRIMAL APPARATUS- <ul style="list-style-type: none"> • Definition • Etiology • Classification • Clinical features • Investigation & treatment 		6	Learn about the disease of eyelids and lacrimal apparatus.				1,2,3,5	
II	DISEASE OF THE CONJUNCTIVA AND SCLERA- <ul style="list-style-type: none"> • Definition • Etiology • Classification • Clinical features • Investigation & treatment 		6	Learn about conjunctiva and sclera, also the different types of disease associated with it.				1,2,3,5	
III	DISEASE OF THE CORNEA- <ul style="list-style-type: none"> • Definition • Etiology • Classification • Clinical features, • Investigation & treatment 		6	Learn about cornea and the diseases associated with it.				1,2,3,5	
IV	DISEASE OF THE IRIS- <ul style="list-style-type: none"> • Definition • Etiology • Classification • Clinical features • Investigation & treatment. 		6	Learn about iris and its disease.				1,2,3,5	
V	CATARACT AND GLAUCOMA- <ul style="list-style-type: none"> • Definition • Etiology • Classification • Clinical features • Investigation & treatment 		6	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 – III									
Course Title	INSTRUMENTATION AND INVESTIGATION II								
Course code	24BOPT2105R	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	Third								
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.								
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	MOTOR SIGNS IN SQUINT – <ul style="list-style-type: none"> Cover and uncover test. maddox wing to assess heterophoria ASSESSMENT OF DEGREE OF SQUINT– <ul style="list-style-type: none"> Prism bar test. Krimsky test. Synoptophore tests. 		6	Learn about squint and its assessments.				1,2,3,4,5	
II	REFRACTIVE ERROR CORRECTION Subjective and objective refraction		6	Learn about RE and its corrections.				2,3,4,5	
III	DETAILED STUDY OF THE PRINCIPLES OF OPERATION, TYPES, OPTICAL PROPERTIES, CONSTRUCTION, ADJUSTMENT AND APPLICATION OF THE FOLLOWING INSTRUMENTS AND DEVICES- <ul style="list-style-type: none"> Pachymeter IOL master Specular microscopy 		6	Know about the principles and properties of different type of ophthalmic instruments.				2,3,4,5	
IV	TONOMETER- <ul style="list-style-type: none"> Principles, Types CLINICAL IMPORTANCES AS ROUTINE PROCEDURE PERIMETER- <ul style="list-style-type: none"> Basics of perimetry Types, Interpretation of normal glaucoma field of definition. Amsler grid test Confrontation test 		6	Learn about different types IOP and visual field assessments				2,3,4,5	

V	ADVANCED INSTRUMENTS OF OPTOMETRY- <ul style="list-style-type: none"> • Ultrasonography (a-scan-b -scan) - principles and application. • F.F.A- principles and demonstration of film • Optical coherence tomography 	6	Know about the principles of instruments.	2,3, 4,5
Practical	<ol style="list-style-type: none"> 1. Slit lamp examination 2. Keratometer, Ophthalmoscope 3. Tonometer, Devices for color vision testing, Auto perimeter- normal HFA, printout, A-scan: - normal print out &analysis, B-scan: - normal print out &analysis 	30	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-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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe various methods & techniques to access the degree of squint	2,4,6,8
2	Understand and implement subjective and objective refraction procedures for refractive errors correction	4,6,8
3	Understand the concept, working principle and application of different optometric instruments.	4,6,8
4	Explain various methods and instruments for the measurement of IOP and visual field abnormalities.	2,4
5	Demonstrate the application of advanced optometric instruments for comprehensive eye examinations.	2,4

SEMESTER – III									
Course Title	PATHOLOGY AND MICROBIOLOGY								
Course code	24BOPT2103R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30 T	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	1. To prepare the students to gain essential knowledge about the bacteria, viruses, fungi and parasites. 2. To acquire the knowledge of the principle of sterilization and disinfection in hospital and ophthalmic practice. 3. To understand basic principle of diagnostic ocular microbiology d. Pathology of various eye parts and annexe.								
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	BACTERIA: CELL STRUCTURE- <ul style="list-style-type: none"> Elementary idea about classification and morphological basis. STAINING REACTIONS: <ul style="list-style-type: none"> Gram staining, Spore staining, Acid fast staining. BACTERIAL GROWTH: <ul style="list-style-type: none"> Nutritional requirements, Physical factor affecting culture media, and growth curve. ELEMENTARY IDEA ABOUT BACTERICIDAL AGENTS: <ul style="list-style-type: none"> Phenol, alcohol. Sterilization (principles, types & methods). PASTEURIZATION. ANTIBIOTICS: <ul style="list-style-type: none"> Bacteriostatic and bactericidal effects. VIRUS: <ul style="list-style-type: none"> Elementary knowledge of viral- morphology, Viral genome and classification, Viral replication. Herpesviruses, Hepatitis viruses, Miscellaneous viruses, Human immunodeficiency viruses. 			6	Describe, illustrate and explain bacterial cell structure and growth.				1,2, 3,4

II	MICROBIAL GROWTH & DEATH- <ul style="list-style-type: none"> • Laboratory culture, host pathogen interactions, antimicrobial chemotherapy, • Pathogenic mechanisms common to external ocular infections process –clinical pathology. • Treatment & epidemiology of infectious diseases caused by bacteria, virus, fungi & parasitic organisms with emphasis to disease with ocular manifestations & infectious eye diseases in hot climate as in India. • Aids & eye 	6	Describe, and explain microbial growth	1,2,3,4
PART B PATHOLOGY				
III	STRUCTURE & FUNCTION OF IMMUNE SYSTEM – <ul style="list-style-type: none"> • Structure and function of thymus, SPLEEN & RED BONE MARROW- <ul style="list-style-type: none"> • Immunity& its types, • Plasma proteins & immune reaction, • Cells involved in immune system. • Humoral immunity theories of antibodies formation. • Structure & function of lymph nodes. Structure & function of thymus, spleen & red bone marrow. Nonspecific immunity, • Antibody mediated immunity, • Specific immunity, • Cell modified immunity, • Active immunity, • Passive immunity. 	6	Describe, and explain immune system.	1,2
IV	THE ACUTE INFLAMMATORY REACTION – <ul style="list-style-type: none"> • Changes in acute inflammation, • Changes in the calibre of the blood vessels, • Changes in blood flow, • Changes associated with exudation. • Local sequel of acute inflammation. • The chemical mediators of acute inflammation. • Role of the mast cell in inflammation. • Role of the platelets in inflammation. • Chronic inflammation– cause, classification, general features 	6	Describe, and explain inflammatory reaction.	1,2
V	SOURCE OF INFECTION- <ul style="list-style-type: none"> • Transmission of organisms to the body. • Wound infections. • Wound healing. IMMUNE-PATHOGENESIS – <ul style="list-style-type: none"> • Type I, II, III & IV hypersensitivity. • Mechanism of autoimmunity. • Organ specific & non-organ specific auto immune disease. 	6	Describe, and explain source of infection and immune pathogenesis.	1,2

<ul style="list-style-type: none"> • The Hla system histocompatibility complex. • Pyogenic & bacterial infection. graft rejection- basic outline. <p>DISORDER OF GROWTH –</p> <ul style="list-style-type: none"> • Metaplasia, • Dysplasia, • Neoplasia. • Circulatory disturbances – thrombosis, infarction, ischemia, • Embolism. • Degeneration(calcification). 			
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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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Discuss about the cell structure, classification, staining reactions and method of sterilization of bacteria and viruses	1,8
2	Understand the viral morphology and its impact on ocular manifestations.	6,8
3	Discuss the structure and function of the immune system.	1,8
4	Explain about the acute inflammation changes along with their causes and features.	6,8
5	Understand the source of infection, immune- pathogenesis, and disorder of growth to diagnose, treat, and analyze infectious diseases.	1,8

SEMESTER – III									
Course Title	BASIC ACCLIMATIZING SKILLS								
Course code	24UULS2101R	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 Critical and Intensive Care Technology								
Semester	III semester of second year of the Programme								
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'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 household's amenities for day-to-day use.								
CO5	Students will develop an understanding of personal financial management and budgeting skills.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to Accommodation Management <ul style="list-style-type: none"> • Telephone handling technique • Organizing of Rooms. • Cleaning agents. • Cleaning equipment's and uses. • Bed making Process. 		7	Explains the techniques of accommodation management.				1,2	
II	Fundamentals of Cooking <ul style="list-style-type: none"> • Definition of cookery–Aim & Objectives of cooking. • Use of basic Cooking equipment's • Personal Hygiene and Safety • Use of Fire & Fuels 		5	Introduces the fundamentals of cooking including efficient and safety methods.				1,2,3	
III	Methods of Cooking <ul style="list-style-type: none"> • Different Cuts. • Use of Herbs and Spices. • Basic Food and Beverage Preparation. • Regional food Habits 		5	Illustrates different methods of cooking.				1,2,3	
IV	Forms & Format's <ul style="list-style-type: none"> • C –form • Reservation form • Registration form • Passport Application form Legal Rent Agreement 		8	Explains and illustrates various formats of writing forms like reservation, passport, etc.				1,2,3,4	

V	Introduction to Accommodation Management	5	Explains the techniques of accommodation management.	1,2,3,4,5
	<ul style="list-style-type: none"> • Telephone handling technique • Organizing of Rooms. • Cleaning agents. • Cleaning equipment's and uses. • Bed making Process. 			

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 McGraw Hill, 2013

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.	PO1
2	Students will gain the knowledge of organizing & Cleaning of Rooms.	PO6
3	Students will be able to gain the travel management concept.	PO7
4	Students will be able to acquire the knowledge of basic household's amenities for day- to- day use.	PO5
5	Students will develop an understanding of personal financial management and budgeting skills.	PO8

SEMESTER – III									
Course Title	BASIC DIGITAL LITERACY								
Course code	24UDL2101R	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	Third								
Course Objectives	<ol style="list-style-type: none"> To identify and analyse computer hardware, software and their uses. To use MS-Office suite for various purposes. 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	Apply MS-Office to solve basic information Management issues.								
CO3	Operate the Internet, social media and e-commerce sites efficiently and ethically.								
CO4	Analyse the cybercrimes on digital payments application.								
CO5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI.								
Unit- No.	Content		Contact Hour	Learning Outcome		KL			
I	Fundamentals of Computer Systems <ul style="list-style-type: none"> Components of a Computer and their functions. Different Types of Computers and their applications. 		6	Learn about Fundamentals of Computer Systems		1, 2			
II	Introduction to MS-Office <ul style="list-style-type: none"> Components of the MS-Office suite. Creating documents with MS-Word. Creating Presentations with MS- PowerPoint. Creating Spreadsheets with MS-Excel. 		6	Learn about Introduction to MS-Office		3,4			
III	Introduction to Internet & Cyber World: <ul style="list-style-type: none"> 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. 		6	Know about the Internet & Cyber World		1,2,3			
IV	Introduction to social media: <ul style="list-style-type: none"> The Power of social media, Relevance 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. 		6	Learn about social media		1,2,3			
V	Digital Payments <ul style="list-style-type: none"> Introduction to Digital Payment Systems. Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, UPI 		6	Learn about Digital Payments		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: Bala guru swamy, E. 2009 Fundamentals of Computers, Tata McGraw-Hill Education.

R2: Bala guru swamy, 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>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding of Computer Hardware, Software and Computer handling.	PO7, PO6
2	Apply MS-Office to solve basic information Management issues.	PO6
3	Operate the Internet, social media and e-commerce sites efficiently and ethically.	PO8
4	Analyse the cybercrimes on digital payments application.	PO6
5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI.	PO8

SEMESTER – III									
Course Title	EXECUTIVE ENGLISH								
Course code	24UBPD2101R	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	Third								
Course Objectives	1. Develop Writing Skills: To help students write clear paragraphs and applications. Enhance Grammar: To teach correct preposition use and active/passive voice. 2. Understand Non-Verbal Cues: To provide knowledge on body language types and meanings. Improve Discussion Skills: To equip students to effectively engage in group discussions. 3. Apply Communication Skills: To prepare students for real-world writing and communication.								
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.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Grammar i. Use of Prepositions Tag questions	5	Learn about Grammar				1, 2		
II	Grammar i. Active and Passive Voice ii. Direct and Indirect speech	5	Learn about Grammar				1,2		
III	Writing Skills i. The Basics of Writing; avoid ambiguity and vagueness ii. Paragraph Writing Resume, CV and Cover Letter	5	Know about the Writing Skills				1,2		
IV	Self-Management Skills ii. SWOT Analysis iii. Goal Setting Personal Hygiene	5	Learn about Self-Management Skills				1, 2		
V	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, v. Body Language Do's and Don'ts, Doubt Clearing Session.	5	Learn about Non- Verbal Communication- Sciences of Body Language				1,2		
VI	Group Discussion (Theory) i. Importance, ii. Planning, Elements, and Skills assessed; iii. Effectively disagreeing, Summarizing and Attaining the Objective.	5	Learn about Planning, Elements, and Skills assessed				1,2		

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: McDowell, Gayle Laakmann. 2008. Cracking the Coding Interview (Indian Edition).

REFERENCE BOOKS:

- R1: Zinsser, William. (2006) On Writing Well: The Classic Guide to Writing Nonfiction, Harper Perennial IIK
- R2: Lacinai, Antonio. (2016) Understanding Body Language: 51 gestures and what they signal, Books on Demand

OTHER LEARNING RESOURCES:

<https://www.thoughtco.com/what-is-nonverbal-communication-1691351>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate proficiency in writing structured paragraphs and formal applications.	5
2	Learn the use of prepositions and convert sentences between active and passive voice.	6
3	Identify and interpret various types of body language and their meanings.	8
4	Initiate, participate in, and summarize group discussions effectively.	8, 7
5	Apply writing, grammar, non-verbal communication, and group discussion skills in real- world contexts.	7

SEMESTER – IV									
Course Title	Contact lens-I								
Course code	24BOPT2201R	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	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- <ul style="list-style-type: none"> Contact lens history & development Benefit of cl over spectacle. Basic designs of contact lens. Oxygen Permeability (Dk) and Oxygen Transmissibility (Dk/t) Manufacturing method of contact lens. Slit-lamp examination technique 		6	Learn about the history, design, benefits of contact lens.			1,2		
II	OPTICAL PROPERTISE OF CONTACT LENS- <ul style="list-style-type: none"> Contact lens optics. Back vertex calculation. Cl & tear film lens system. 		6	Illustrate about the optics of CL and also vertex distance calculation.			1,2		
III	DIFFERENT CRITERIA OF CONTACT LENS- <ul style="list-style-type: none"> Classification of cl & FDA classification of contact lens Material of contact lens. Patient selection & prescreening. Indication and contra indication of cl 		6	Discuss & explain about the classification, materials, indications and contraindications of CL.			1,2,5		

IV	CONTACT LENS FITTING AND ASSESSMENT- <ul style="list-style-type: none"> • Soft spherical cl fitting & assessment and maintenance • Spherical RGP cl fitting & assessment • Soft and RGP contact lens insertion and removal procedure. 	6	Explain and demonstrate about the different types of CL and also its fitting and assessments.	1,3,4,5
V	SOME IMPORTANT WORKUP- <ul style="list-style-type: none"> • Push up test. • Taco method of soft contact lens • Total cl care and maintenance. 	6	Demonstrate about the different workup of CL.	1,3,4,5
Practical	<ul style="list-style-type: none"> • CL designs • Examination of slit lamp for CL fitting • Soft & RGP CL fitting & removal • Care of CL 	30	Demonstrate about the	1,2,3,4,5

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
1	Discuss the manufacturing methods, designs and benefits of contact lenses over spectacle.	3,5
2	Understand contact lens optics and back vertex calculations.	6,8
3	Describe the classification, selection of materials for the contact lens and its associated contraindications	5,8
4	Discuss about contact lens fitting and assessment.	3,5
5	Understand and implement of the push-up test and Taco method in the fitting and assessment of soft contact lenses.	6,8

SEMESTER – IV									
Course Title	OCULAR DISEASE -II								
Course code	24BOPT2202R	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	IV semester of second year of the programme								
Course Objectives	1. To impart an understanding of the patho physiological processes underlying ocular disease. By better understanding these processes, participants can better recognize disease states and identify progression of disease. 2. This course deals with ocular disease affecting various parts of the eyes. 3. It covers clinical signs and symptoms, cause, pathological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.								
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 injuries 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	DISEASES OF THE VITREOUS HUMOR: Congenital anomalies, vitreous opacities, hereditary vitreo–retinal degenerations. Vitreous hemorrhage, detachment of vitreous humor, vitreous surgery.	6	Describe and explain about various vitreous abnormalities, diagnosis and management					1,2,5	
II	DISEASE OF THE RETINA: 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, degenerations of the retina. Detachment of the retina, surgical procedures for retinal detachment, tumours of the retina, phakomatoses, injuries of the retina.	6	Describe, illustrate and explain various abnormalities of retina, congenital defect, diagnosis criteria, various management procedures					1,2,5	
III	DISEASE OF THE OPTIC NERVE: Congenital anomalies. Papilloedema, inflammation of the optic nerve (optic-neuritis). Ischemic optic neuropathy, optic atrophy, tumors of the optic 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	
IV	SYMPTOMATIC DISTURBANCES OF VISUAL FUNCTION : Visual field defects, amblyopia, amaurosis, night blindness, day blindness, defects in color vision, malingering.	6	Describe, illustrate and explain about Visual field defects, amblyopia, defects in color vision, malingering.					1,2,5	

V	NEURO –EYE DISEASE: 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 demyelination Para 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	6	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
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TEXT BOOKS:

T1: Comprehensive ophthalmology by A K Khurana

REFERENCE BOOKS:

R1: Clinical Ophthalmology-A. K. Khurana., Hand Book Of Ophthalmology-B. C. Chatterjee.

R2: 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	Understand anomalies of vitreous and analyze the causes and implications of it	2,5
2	Discuss congenital and developmental defects of the retina.	2,6
3	Understand anomalies and injures of the optic nerve.	6,8
4	Understanding various type of visual field and colour vision defect.	5,6
5	Discuss about the various types of Neuro eye diseases.	6,8

SEMESTER – IV									
Course Title	DISPENSING OPTICS II								
Course code	24BOPT2203R	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	Nil						
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 eye wear accordingly								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	SPECTACLE FRAME DESIGN AND ITS MATERIAL- <ul style="list-style-type: none"> Spectacle frame materials- plastic, metals frame types, combination of frames, half-eye frames, nylon-cord frame, Bifocal lens and its types Progressive lens 		10	Learn about different designs and materials of frame.			1,2,3		
II	SPECTACLE FRAME MEASUREMENTS AND SELECTION PROCEDURE- <ul style="list-style-type: none"> Frame measurements-the boxing system, the datum system, Comparison of two system, Frame selection-fashion, function, feel, conflicting needs, Price, standard alignment Lens selection-ground rule for selection, selection criteria 		10	Learn about measurements of spectacle frame and its selection procedures.			1,2,3,4		
III	IPD & FITTING MEASUREMENTS- <ul style="list-style-type: none"> Facial measurement-the PD, measuring inter pupillary distances, using PD ruler, Measuring monocular PD, Measuring near PD Bifocal lens fitting process Progressive lens fitting process. 		10	Learn about IPD and fitting measurements.			3,4,5		

IV	<p>PEDIATRIC FRAME AND LENS SELECTION-</p> <ul style="list-style-type: none"> • Pediatric dispensing- the changing image of spectacle, age differences. • Frame selection-technical criteria, fashion criteria, some tips on selection. • Lens selection- technical criteria, communicating with kids, • Facial measurements of the kids-PDs, centers, bi-focal. 	10	Learn about pediatric frame selection and lens selections.	3,4,5
V	<p>HOW WE DEALING DIFFERENT TYPES OF CLINET PROBLEMS AND EYE PROTECTION IN DEFFERENT PLACE-</p> <p>Dealing with common client’s problems and dealing with the laboratories, hazards in the work place, occupational health safety.</p> <p>EYE PROTECTION IN DEFFERENT PLACE-</p> <ul style="list-style-type: none"> • Industrial eye protection and standards covering eye protection, lens materials & impact resistance • Sports eye protection 	10	Learn about different client problems and eye protections.	1,2,3,5
Practical	<ol style="list-style-type: none"> 1. Datum and boxing system 2. IPD measurement-monocular, binocular and near PD 3. Bifocal lens fitting and progressive lens fitting <p>Pediatric pd and dispensing</p>	30	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’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.youtube.com/watch?v=NqR0j-ZGCXg>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand various spectacle frame designs and its materials.	1,3,5,8
2	Demonstrate the frame measurements using the boxing and datum system.	5,8
3	Identify the facial measurements and analyze the fitting process for bifocal and progressive lenses	1,3
4	Comprehend the unique aspects of pediatric dispensing.	5,8
5	Assess the occupational needs and suggest protective eye ware accordingly	1,3,5,8

SEMESTER – IV									
Course Title	CLINICAL OPTICS & REFRACTION II								
Course code	24BOPT2204R	Total credits: 5 Total hours: 60T+30P	L	T	P	S	R	O/F	C
			4	0	2	0	0	0	5
Pre-requisite	Compulsory	Co-requisite	Nil						
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- <ul style="list-style-type: none"> Anomalies of convergence, tests for measuring near point of convergence: raf ruler, pencil push up test, positive fusional vergence, negative fusional vergence. 		12	Basics about convergences and its anomalies.			1,2,3,4,5		
II	COLOR VISION AND ITS ASSESSMENT- <ul style="list-style-type: none"> Contrast sensitivity and its assessment Night – driving glasses 		12	Knowledge about colour vision and different types of color vision assessments.			1,2,3,4,5		
III	ELECTROMAGNETIC ENERGY – <ul style="list-style-type: none"> Cosmic rays, x-rays and light, radar radio-waves. Laser – introduction, applications Types of glares and assessment of glare. 		12	Basics about electromagnetic energy.			1,2,3,4,5		
IV	NEUTRALIZATION OF OPHTHALMIC LENS POWER- <ul style="list-style-type: none"> Manual and with help of lensometer Subjective refraction 		12	Knowledge about neutralization of lens power.			1,2,3,4,5		
V	INVESTIGATION- <ul style="list-style-type: none"> Measurements of intra papillary distance using pd ruler. Direct ophthalmoscopy types and assessment of fundus. 		12	Learn about investigation of fundus.			1,2,3,4,5		
Practical	1. Direct ophthalmoscopy-normal fundus 2. Subjective refraction– fogging, clockdial, fan, jcc, prism dissociation method, duo chrome, cyclodemia, slit, Refraction. 3. Measurement of amplitude of accommodation.		30	Learn the procedures of ophthalmoscopy, subjective refractions, also amplitude of accommodation.			1,2,3,4,5		

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 – the odore– 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-vpOpniY>

<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	Evaluate anomalies of convergence by implementing various convergence tests	2,3
2	Explain about contrast sensitivity and color vision tests	3,4
3	Understand the application of electromagnetic energy and lasers.	6,8
4	Describe the methods for the neutralization of ophthalmic lens power	4,6,8
5	Demonstrate ophthalmoscopy and their applications in the assessment of the fundus.	4,6,8

SEMESTER – IV										
Course Title	MEDICAL PSYCHOLOGY									
Course code	24BOPT2205R	Total credits: 1 Total hours: 15 T	L	T	P	S	R	O/F	C	
			1	0	0	0	0	0	1	
Pre-requisite	Compulsory	Co-requisite	Nil							
Programme	Bachelor of Optometry									
Semester	IV semester of second year of the programme									
Course Objectives	1. The objective of this course is to introduce students to the principle domains of psychology that are most relevant to medicine. 2. To teach students the key areas of psychology that would provide the basis for viewing people not only as biological but also as psychological beings. 3. To introduce students to the application of psychology in the wider practice of medicine.									
CO1	Explain the characteristics of health behavior, identifying patterns that contribute to overall well-being.									
CO2	Understand stress theories and ways to cope up with the stress methods									
CO3	Identify the role of health-enhancing behaviors such as exercise, nutrition, and stress management in promoting overall well-being									
CO4	Discuss about various chronic illness and its management									
CO5	Evaluate various psychological models, rehabilitation approaches, and their application in patient care and well-being.									
Unit- No.	Content		Contact Hour	Learning Outcome					KL	
I	Behaviour and Health Characteristics of health behavior, Barriers to health behavior, Theories of health behavior, Health compromising behavior, Smoking, Alcoholism and Substance abuse.		3	Describe, and explain about theories and characteristics of health behavior					1,2	
II	Stress and Coping: Theories of stress ‘Selye and Lazarus’, Stress and health sources of chronic stress, Stress related illness- PTSD and acute stress disorder, Digestive system disorder; coping with stress methods.		3	Describe about various theories stress					1,2	
III	Health Enhancing Behaviour and Pain: Exercise, nutrition, safety, stress management, Psychological factors and pain; Individual difference in reactions to pain, Types of pain, Assessment of pain,		3	Describe, and explain Health Enhancing Behaviour					1,2	
IV	Chronic illness and management Cardiovascular diseases, Cancer, AIDS, Living with chronic illness, quality of life, emotional response to chronic illness		3	Describe and explain about chronic diseases and its management					1,2	
V	Approaches and Interventions Psychological Models and Approaches to Rehabilitation: Medical and Neuropsychological Model, Bio-psychosocial and Social Model Psychodynamic Model Aspects of rehabilitation: Cognitive, Behavioural, Emotional and Psychosocial		3	Describe and explain approaches to Rehabilitation					1,2	

TEXT BOOKS:

T1: Health Psychology

T2: Theory, Research and Practice THIRD EDITION

REFERENCE BOOKS:

R1: David F. Marks - Arles, France

R2: Michael Murray - University of Keele, UK

OTHER LEARNING RESOURCES:**RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES**

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain the characteristics of health behavior, identifying patterns that contribute to overall well-being.	1,6,8
2	Understand stress theories and ways to cope up with the stress methods	1,8
3	Identify the role of health-enhancing behaviors such as exercise, nutrition, and stress management in promoting overall well-being	6,8
4	Discuss about various chronic illness and its management	1,6,8
5	Evaluate various psychological models, rehabilitation approaches, and their application in patient care and well-being.	1,6,8

SEMESTER – IV									
Course Title	OCULAR PHARMACOLOGY								
Course code	24BOPT2206R	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	IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> 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. 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. 3. This course will help to understand the routes of ocular drug administration and differentiate between various dosage forms used in ophthalmic pharmacology. 								
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, para sympathomimetics, and parasympatholytics in the context of ocular pharmacology.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	GENERAL PHARMACOLOGY- <ul style="list-style-type: none"> • General concept of pharmacology • Factors modifying drug dose • Pharmacodynamics • Pharmacokinetics • Routes of drug administration 	6	Describe, and explain about general pharmacology.	1,2					
II	PRINCIPLES OF OCULAR PHARMACOLOGY- <ul style="list-style-type: none"> • General principles • Dosage forms • Routes of ocular drug administration 	6	Describe, about ocular pharmacology.	1,2					
III	DRUGS USED IN MANAGEMENT OF OPHTHALMIC DISEASES- <ul style="list-style-type: none"> • Mydriatics • Miotics • Antibiotics • Drugs for glaucoma-drugs for ocular hypertension, drugs that enhance aqueous outflow, inhibitors of aqueous secretion • Anti-inflammatory agents • Topical anesthetics 	6	Describe, and explain basics of drugs used in ophthalmology.	1,2					
IV	OTHER SPECIFIC AGENTS- <ul style="list-style-type: none"> • CNS stimulants • CNS depressants • Anticoagulants • Diuretics • Cardio vascular drugs • Histamines and antihistamines • Prostaglandins 	6	Describe, and explain about other specific agents.	1,2					

V	PANTOMIMIC DRUGS- <ul style="list-style-type: none"> • Sympathomimetics • Sympatholytics • Parasympathomimetics • Parasympatholytics 	6	Describe, and explain pantomimic drugs.	1,2
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TEXT BOOKS:

T1: K D TRIPATHI: Essentials of Medical Pharmacology. 4th,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-Qtd6RhVVA>

<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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Discuss the general concept of pharmacology and factors in modifying drug dose	1,6,8
2	Comprehend general principles of ocular pharmacology, including various dosage forms and routes of ocular drug administration	1,8
3	Describe the use of various drugs in the management of ocular diseases	6,8
4	Understand the mechanism of action of each class of therapeutic agents in addressing ocular disorders	1,6,8
5	Explain sympathomimetics, sympatholytics, para sympathomimetics, and parasympatholytics in the context of ocular pharmacology.	1,6,8

SEMESTER – IV									
Course Title	BASIC LIFE SAVING SKILLS (BLSS)								
Course code	24UULS2202R	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	<ol style="list-style-type: none"> To learn and demonstrate essential Basic Life Support (BLS) techniques for assisting in medical emergencies before professional help arrives. To enhance communication, teamwork, and conflict resolution skills to improve personal and professional interactions. To Understand the Triage system, recognize different levels of triage, and classify common medical emergencies to prioritize patient care effectively. 								
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 relive 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	Basic Life Support (BLS) <ul style="list-style-type: none"> Introduction of BLS Chain of survival ABCs Assessment CPR and Ventilation Technique AED Choking for adult and children 		9	Students will Know about basic life support		1, 2			
II	First Aid <ul style="list-style-type: none"> Golden rules of First aid First aid Kits 		9	Students will be able to learn about first aid		3, 4			
III	Trauma emergencies <ul style="list-style-type: none"> Introduction Priorities of Initial approach in pre- hospital care <ol style="list-style-type: none"> Scene safety Primary assessment Bleeding control Extrication of victims and safe transfer Cervical spine stabilization and C- collar application Splinting of broken Limbs 		9	Students will learn about the trauma emergencies		3, 4			
IV	Triage system <ul style="list-style-type: none"> Introduction Flow chart approach of Triage Triage of Single and Multiple Casualties in Pre-Hospital setting 		9	Students will understand the triage system		1, 2, 3			

V	Medical emergencies <ul style="list-style-type: none"> • Introduction • Victim centered approach and Management of: - <ul style="list-style-type: none"> a) Seizures b) heart attack c) asthma d) diabetic emergencies e) emergency childbirth f) Respiratory distress and failure 	9		1, 2, 3
VI	Environmental Emergency <ul style="list-style-type: none"> • 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, Snake bite. 	2		1, 2, 3
VII	Safety of people in the event of fire <ul style="list-style-type: none"> • 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 	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

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

SEMESTER – IV									
Course Title	PERSONAL FINANCIAL PLANNING								
Course code	24UUFL2201R	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	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	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	Introduction: <ul style="list-style-type: none"> • 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. 	12	Students will Know about Meaning, need and importance of Financial Literacy	1, 2					
II	Financial Planning: <ul style="list-style-type: none"> • 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 from surplus, sources for meeting deficit. • Informal Society funds and crowd funding 	12	Students will be able to learn about Financial Planning	3, 4					
III	Accounts; formalities to open various accounts <ul style="list-style-type: none"> • Different types of Post Office saving schemes: Recurring deposit, savings, term deposit; NSC; Kisan Vikas Patra; Monthly Income scheme (MIS) Account, • Public Provident Funds (PPF), Senior citizen savings scheme (SCSS), Sukanya Samriddhi Accounts, 	12	evolution of money	3, 4					

	<ul style="list-style-type: none"> • Indian Postal Order; International Money transfer service; Forex Services; • Money remittance services; Jansuraksha Scheme. 			
IV	<p>Insurance - As financial service provider:</p> <ul style="list-style-type: none"> • Different types of Risks and their Management, Diversification of risk; • Meaning, need and importance of Insurance; Types of Insurance – Life Insurance, Health Insurance, General Insurance, Term Insurance, • Pension and retirement policies; • Post office life insurance schemes, Postal life insurance and rural postal life insurance. 	10	Students will understand the Different types of Risks and their Management	1, 2, 3
V	<p>Transformations in Digital Money market:</p> <ul style="list-style-type: none"> • Various functions & innovative services of Banks; Mobile Banking, NEFT, IMPS, RTGS, • Money transfer, Different types of cards- Debit & Credit, E-Banking, Unified payment interface (UPI), • Credit Scoring - CIBIL, Digital Banking, crypto currency and related transactions, Fintech, Block chain; Understanding Digital Payments. 	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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.	5,7,8
2	Understand the need and various kind of banking institutions' instrument and their utilities.	5,7,8
3	Describe the importance of insurance services as social security measures.	5,7,8
4	Learn to manage the money and debt more effectively.	5,7,8
5	Understand the Transformations in Digital Money market.	5,7,8

SEMESTER – IV									
Course Title	PERSONALITY DEVELOPMENT SKILL FOR EMPLOYABILITY (COMMUNICATIVE ENGLISH & SOFTSKILLS)								
Course code	24UBPD2201R	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 mock in view 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 • Introduction • Essential characteristics of ago presentation • Preparation of ago of presentation		8	Introduction to skills				1,3,5	
II	Public Skills • Fear of Public Speaking, • Understanding and Overcoming Fear of Public Speaking, • Confidence and Control, • Tips for Presentations and Public Speaking, • Tips for Using Visual Aids in Presentations, • Delivering Presentations Successfully, • Doubt Clearing and Summary of Main Points		8	Learn about public skills				1,3,5	
III	Practical session on Resume, Curriculum Vitae, Writing cover letter& Linked In Profile • Preparation, submission& screening of Resume. • Practical session on cover letter screening session • Creating profile in LinkedIn • How to utilize it		8	Know about Preparation, submission & screening of Resume				1,3,5	
IV	Leadership & Management Skills • Concepts of Leadership • Leadership Styles • Manager VS Leader • How to be an Effective Leader • Doubt Clearing Session.		10	Know about Concepts of Leadership				1,3,5	

V	<p>Interview Skills & Dress code Ethics</p> <ul style="list-style-type: none"> • Types of interviews- telephonic, virtual & face to face • Online interview, personal interview • Panel interview • Group interview • Types of interview questions- traditional/common interview question • General Strategies for answering questions, • Preparation before the interview, • How to dress up for an interview, • How to maintain eye contact and positive body language • Interview do's and don'ts, • Introduction to Dress Code Ethics, • Purpose and Importance • What to Wear During Interview Any Other Formal Meetings –Male& Female 	10	Learn about interview skills	1,3,5
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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

R2: Weiser, Ryan, (2021)Winning Interview: An Ultimate Guidebook of Tricks, Strategies andTipsonInterviewPreparationsandAnsweringQuestionstoGettheJobYouWant!:1(Job Interview), Charlie Creative Lab Ltd Publisher

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 – V									
Course Title	BINOCULAR VISION AND OCULAR MOTILITY								
Course code	24BOPT3101R	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	V semester of third year of the Programme								
Course Objectives	<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>								
CO1	Explain about binocular vision and its grades.								
CO2	Discuss about the various anomalies of binocular vision, its investigations and management.								
CO3	Describe the diagnosis and treatment of the anomalies of convergence & accommodation.								
CO4	Discuss convergence insufficiency and other reading difficulties.								
CO5	Explain the gross anatomy & physiology of extra ocular muscles and its functions								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	GRADES OF BINOCULAR VISION: Simultaneous perception, fusion, stereopsis advantages of binocular vision; Corresponding point and normal retinal correspondence; Physiological diplopia stereoacuity tests.	6	Describe and explain about grades of BV, Corresponding point and normal retinal correspondance, diplopia test				1,2,3		
II	BINOCULAR DEFECTS: 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	6	Describe, illustrate and explain various binocular optical defects, cause, differential test and management				2,3,4		
III	ACCOMMODATION AND CONVERGENCE ANOMALIES: Symptoms of heterophoria & treatment strabismus & treatment; Vertical squint-dissociated vertical divergence.	6	Describe and learn about different type of squint; Symptoms of heterophoria & treatment strabismus & treatment.				2,3,4		

IV	THE RELATION BETWEEN ACCOMMODATION AND CONVERGENCE AND OTHER READING DIFFICULTIES: Insufficiency of convergence; Convergence through a spectacles lens; Prismatic effects in Spectacle lenses.	6	Describe, illustrate and explain about the relation between accommodation and convergence and other reading difficulties, prismatic effect of spectacle, treatment	2,3,4
V	EYE MOVEMENT: The orbit anatomy of the extra-ocular muscles. Intractive dynamics & orbital mechanisms and neurophysiology; Physiology of ocular movement – basic kinematics; Ocular movement- monocular movement & binocular movement	6	Explain and learn about the anatomy of EOM, physiology of ocular movement	2,3,4
Practical	1. Demonstration of following orthoptic instruments/method and their uses- • Prism bar, synoptophore, Maddox wing, Maddox rod, red green goggles, raf gauge, flipper 2. Orthoptic investigative- • Accommodative evaluation; squint evaluation 3. Case records	30	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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain about binocular vision and its grades.	2,3,5,8
2	Discuss about the various anomalies of binocular vision, its investigations and management.	5,8
3	Describe the diagnosis and treatment of the anomalies of convergence & accommodation.	3,5
4	Discuss convergence insufficiency and other reading difficulties.	5,8
5	Explain the gross anatomy & physiology of extra ocular muscles and its functions	3,5

SEMESTER – V									
Course Title	LOW VISION AID AND VISUAL REHABILITATION								
Course code	24BOPT3102R	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	<ol style="list-style-type: none"> 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. It is important to assist in counselling and rehabilitating the low vision patient. 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. 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. 								
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	DEFINITION: Old, new, proposed, grades of low vision, statistics / epidemiology, relation between disorder, impairment & handicapped <ul style="list-style-type: none"> Causes of low vision 	6	Describe and explain about definition and causes of LV, grades of LV				1,2		
II	LOW VISION OPTICS- MAGNIFICATION -relative distance / relative size/ angular/electrooptical <ul style="list-style-type: none"> OPTICAL LOW VISION AIDS – Galilian & keplarian telescope advantage/ disadvantage, spectacle magnifier-disadvantage/ advantage, stand magnifier-advantage and disadvantage, hand held magnifier-advantage and disadvantage, significance of equivalent viewing distance & calculations. TELESCOPE- Distance/ near, prism/ half eye/ prism correction/ CCTV/ magni-cam/ v-max / implantable miniature telescope 	6	Describe, illustrate and explain various optical non optical devices, uses of magnification, telescope.				1,2, 3,5		

	<p>•NON- OPTICAL LOW VISIONAIDS - 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.</p>			
III	<p>LOW VISION EXAMINATION-</p> <ul style="list-style-type: none"> • Task/ goal-oriented history-medical/ visual/ psychological history/ task analysis/ mobility/distance vision / near vision / daily living/ illumination/ work & school. • Visual acuity measurement-distance/ near/ use of log mar chart (distance & near)/ lighthouse, picture chart/ visual field test/contrast sensitivity/ overview of glare testing. • Low vision refraction. 	6	Describe and learn about different low vision examination, low vision examination tool	1,2, 3,4, 5
IV	<p>ASSESSMENT & PRESCRIPTION OF LOW VISION DEVICES-OPTICAL/ NON-OPTICAL / REHABILITATION SERVICES-</p> <ul style="list-style-type: none"> • Non-optical devices-pen/ typoscope/ boldline note book/ illumination/ letter writing guide/environmental modification/ signature guide/ needle threader/ eccentric viewing strategies/cane/sighted guide <p>Counseling of low vision patient/ parents/guardians/relatives</p>	6	Describe, illustrate and explain about assessment & prescription of low vision devices-optical/ non-optical / rehabilitation services	1,2, 3,4,5
V	<p>OVERVIEW OF REHABILITATION SERVICES-</p> <ul style="list-style-type: none"> • Definition/ implementation/ vocational guidance/educational guidance / mobility & orientation training / special teacher/ special school/ braille system / integrated system/referral center- activity/ support/ loan. <p>Overview of systematic / retinal diseases in relation to low vision: - acro matopsia/ lmbb syndrome/ labers congenital anomaly/ down syndrome/ retinitis pigmentosa/ Diabetic retinopathy/ optic atrophy/ albinism/ aniridia</p>	6	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

Practical	LVA- <ul style="list-style-type: none"> • Case history. • Assessment. • Application of devices. Rehabilitation	30	Describe, explain, evaluation and apply different low vision assessment, application of LVA. Discuss about different case studies.	1,2,3,4,5
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TEXT BOOKS:

T1: Low Vision Aids Practice 2nd Edition 2007 By Bhootra

T2: Low Vision Aids 1st Edition 2010 By Monica Chaudhry

REFERENCE BOOKS:

R1: The art & practice of low vision, by freeman & jose, butterwortpub.

R2: Understanding low vision, afbpublication.

R3: 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	CLINICAL EXAMINATION OF EYE I								
Course code	24BOPT3103R	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	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 2. Interpretation o the findings of the various clinical optometry procedures 3. This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment examination, neurophthalmic examination, glaucoma evaluation.								
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	HISTORY OF THE OPHTHALMIC SUBJECTS- <ul style="list-style-type: none"> Ocular symptoms Visual acuity testing- distance and near vision Colour vision- methods of testing, significance 	12	Describe and explain about <i>ophthalmic subjects, VA Testing, colour vision testing</i>					1,2	
II	SLIT LAMP EXAMINATION- <ul style="list-style-type: none"> Examination of eyelids, conjunctiva and sclera Examination of cornea Examination of iris, ciliary body and pupil Examination of lens 	12	Describe, illustrate and explain about different types of illumination technique, overall eye examination					3,5	
III	CLINICAL OPTOMETRY- <ul style="list-style-type: none"> Color coding in optometry workup Abbreviation in optometry Eye related headache Dry eye assessment test Examination of near point of convergence 	12	Describe and learn about dry eye assessment, color coding in optometry workup, Abbreviation in optometry					2,3,5	
IV	INVESTIGATION OF GLAUCOMA- <ul style="list-style-type: none"> Examination of intraocular pressure Examination of angle of anterior chamber 	12	Describe, illustrate and explain about differential diagnosis of glaucoma					1,2,3,4,5	
V	INVESTIGATION OF SQUINT- <ul style="list-style-type: none"> Examination of muscle Hirschberg test & krimsky Perks three steps test. Diplopia charting 	12	Explain and learn about differential diagnosis of squint.					1,2,3,4,5	

Practical	<p>1.HISTORY WRITING-</p> <ul style="list-style-type: none"> • Recording VA • Practice of streak retinoscopy • Direct ophthalmoscopy -normal fundus <p>2.SUBJECTIVE REFRACTION –</p> <ul style="list-style-type: none"> • Fogging, clock dial, fan, jcc, binocular balancing, duochrome, slit refraction • Measurement of amplitude of accommodation. • Presbyopic add power calculation • Writing prescription <p>3.SOME IMPORTANT INVESTIGATION-</p> <ul style="list-style-type: none"> • Paediatric optometry- assessment of children vision & paediatric evaluation, diagnosis &dispensing. • Strabismus &amblyopia • Non- strabismic binocular disorders. 	30	Evaluation and apply comprehensive test of patient like history taking, subjective and objective refraction, paediatric vision assessment	1,2, 3,4,5
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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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify the ocular symptoms, colour vision in clinical settings and develop ability to perform visual acuity testing	2,3
2	Describe various ocular structures by using slit lamp examination.	4,5,7,8
3	Describe various ocular structures by using slit lamp examination.	7,8
4	Recognize techniques for examining intraocular pressure.	7,8
5	Identify the investigative techniques for assessing squint.	4,5,7,8

SEMESTER – V										
Course Title	CONTACT LENS II									
Course code	24BOPT3104R	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	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 theoretical 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	DIFERENT TYPES OF CONTACT LENS FITTING: 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		6	Describe, illustrate and explain about different therapeutical contact lens fitting, cl fitting in children, care and maintenances of cl					1,2, 3,5	
II	SOME MORE BENEFICIAL CONTACT LENS AND ITS CONTACT LENS SOLUTION: 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	CONTACT LENS IMPORTANTS WORKUP: 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	OCULAR PROSTHETIC: Prosthetic eye fitting procedures and conformers		6	Describe, illustrate and explain about prosthetic eye and their fitting procedure.					1,3, 4,5	
V	CONTACT LENS MODIFICATIONS: Finger lishing; Re-cn(cleaning) of the front surface edge ; Re-blending the posterior periphery ; Polishing of the front or back surfaces		6	Explain about learn about CL modifications					1,3, 4,5	
Practical	1. Soft contact lens fitting 2. RGP contact lens fitting 3. Do's and don'ts of contact lens 4. Basic designs of contact lens		30	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	BIostatistics								
Course code	24BOPT3105R	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	<ol style="list-style-type: none"> To provide the knowledge about biostatistics and its importance in health sciences studies. To provides a comprehensive concept of statistical tools related to paramedical sciences 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	INTRODUCTION ABOUT BIOSTATISTICS: 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	CLASSIFICATION & PRESENTATION OF DATA: 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	DESCRIPTIVE STATISTICS- <ul style="list-style-type: none"> Descriptive Statistics: Measures of location, Measures of Dispersion, Coefficient of variation, Introduction to Correlation Sampling statistics: sampling & sampling distribution, errors is sample survey-sampling and non- sampling. 		6	Describe and learn about descriptive statistics, sampling statistics				1,2,4	
IV	PROBABILITY DISTRIBUTION: 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	TESTING OF HYPOTHESIS- <ul style="list-style-type: none"> • Testing of hypothesis- Null hypothesis, alternative hypothesis, Types of errors • Introduction and uses of statistical tests Chi-square test, Student's t-test, F-test etc. 	6	Explain and learn about testing hypothesis, types of error, introduction and uses of statistical test	1,2, 4
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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 – VI									
Course Title	APPLIED OPTOMETRY AND ORTHOPTICS								
Course code	24BOPT3201R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 45T+30P	3	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					
I	ORTHOPTIC INSTRUMENTS- <ul style="list-style-type: none"> Prism bar Synoptophore Maddox wing Maddox rod Red & green goggles Hess screen Risley prisms Non strabismic binocular vision anomalies ASSESSMENT OF DEGREE OF SQUINT- <ul style="list-style-type: none"> Hirschberg test. Prism bar test. Krims key test SYNOPTOPHORE TEST	9	Describe, illustrate and explain about orthoptic instruments	1,2,3,4,5					
II	MOTOR SIGNS IN SQUINT- <ul style="list-style-type: none"> Head position: face turn, chin position, head tilt. Cover test & cover-uncover tests Maddox wing to assess heterophoria Alphabetical patterns 	9	Describe, illustrate and explain the clinical, diagnostic and management of the squint.	1,2,3,4,5					
III	ASSESSMENT OF OCULAR MOTILITY STATUS- <ul style="list-style-type: none"> Hess chart Diplopia testing Bielschowskys head tilting test 	9	Describe, illustrate and explain clinical and management of ocular motility.	1,2,3,4,5					

IV	MECHANISMS LEADING TO SQUINT- TYPES OF SQUINT– <ul style="list-style-type: none"> • Latent/ manifest • Horizontal/ vertical paralytic/ concomitant ASSESSMENT OF VISUAL SENSORYSTA TUSINSQUINT. <ul style="list-style-type: none"> • Amblyopia • Suppression MANAGEMENT OF– <ul style="list-style-type: none"> • Binocular single vision– SMP, fusion, stereopsis. • Convergence insufficiency • Amblyopia • Suppression • ARC • Use of prism - For exercise & correction 	9	Describe, illustrate and explain about clinical, diagnostic and management of squint.	1,2,3,4,5
V	AMBLYOPIA <ul style="list-style-type: none"> • Definition. Neuropathology. • Classification. Clinical features. TREATMENT- <ul style="list-style-type: none"> • Occlusion. • Penalisation. • Role of drugs 	9	Describe and explain about the amblyopia.	1,2,3,4,5
Practical	DEMONSTRATION OF FOLLOWING ORTHOPTIC- Instruments/method and their uses- Covertest, Hirschberg test, krimsky test, diplopia charting, Hess charting, visuoscopy, bagolini straited glasses, synoptophore Therapeutic procedure Case records	30	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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate the use of various orthoptic instruments in clinical settings.	2,3
2	Evaluate the motor signs in squint, understand and implement the methods in assessing the degree of squint.	5,7,8
3	Demonstrate various types of charts to assess ocular motility status	5,7,8
4	Determine the visual sensory status of squint and its management.	3,5,7
5	Discuss the clinical features of amblyopia and its management.	3,5,7

SEMESTER – VI									
Course Title	SYSTEMIC CONDITIONS AND THE EYE								
Course code	24BOPT3202R	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. 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	ARTERIAL HYPERTENSION- Pathophysiology, classification, clinical examination, diagnosis, complications, management. Hypertension and the eye	6	Describe, illustrate and explain about hypertension.					1,2	
II	DIABETES MELLITUS- • Pathophysiology, classification, clinical features, diagnosis, complications, management. • Diabetes mellitus and the eye. • Vitamin deficiency and the eye	6	Describe, illustrate and explain about the types, diagnosis, complication and management of diabetes mellitus.					1,2	
III	ACQUIRED HEART DISEASE– • Embolism • Rheumatic heart disease • Sub-acute bacterial endocarditic. • Heart disease & the eye.	6	Describe, illustrate and explain about the understanding pathophysiology, diagnostic and prognosis of acquired heart disease.					1,2	
IV	THYROID DISEASE- • Anatomy and physiology of the thyroid gland. • Classification of thyroid disease Diagnosis, complications, clinical features, management of thyroid disease involving eye.	6	Describe, illustrate and explain the types, diagnosis, complication and management of thyroid disease.					1,2	
V	TUBERCULOSIS- • Etiology, pathology, clinical features, Pulmonary tb, diagnosis, complications, treatment of Tuberculosis involving the eye. TROPICAL DISEASE AND THE EYE- • Leprosy. • Syphilis. • Malaria.	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-heniman)

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	CLINICAL EXAMINATION OF EYE II								
Course code	24BOPT3203R	Total credits: 6 Total hours: 60T+60P	L	T	P	S	R	O/F	C
			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	1.Master the techniques of ophthalmoscopy and develop skills to effectively examine the fundus. 2.Understand and apply various clinical investigation techniques, accurately interpreting results for ocular diagnosis. 3.Perform neuro-ophthalmological examinations, including ptosis evaluation and visual field charting, and understand their clinical implications.								
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	POSTERIOR SEGMENT EXAMINATION- <ul style="list-style-type: none"> • Ophthalmoscopy-direct and indirect • Examination of fundus • Examination of vitreous • Examination of optic disc • Examination of choroid 		12	Describe, illustrate and explain about examination of fundus.				1,2,3,5	
II	CLINICAL INVESTIGATION- <ul style="list-style-type: none"> • Examination of lacrimal system • Examination of the orbit • Macular function test • Contrast sensitivity test INTERPRETATION OF FOLLOWING INSTRUMENTS- <ul style="list-style-type: none"> • FFA • OCT • ICG • Fundus photo Humphrey visual field 		12	Describe, illustrate and explain the FFA and OCT.				1,2,3,4,5	
III	NEUROLOGICAL INVESTIGATION- <ul style="list-style-type: none"> • Neuro-ophthalmological examination • Ptosis evaluation • Visual field charting 		12	Describe, illustrate about the investigation				1,2,3,5	
IV	COLOR CODING IN OPHTHALMOLGY- Different color code in ocular diseases Different color code in ocular medications		12	Describe, illustrate and explain about colour coding.				1,2,3,5	

V	OCULAR INVESTIGATION AND HEADACHE- <ul style="list-style-type: none"> • Introduction of headache • Headache in relation with eye • Investigation 	12	Describe, illustrate and explain about headache and ocular investigation.	1,2,3,4,5
Practical	1. Evaluation, diagnosis & optometric management Of children with mental retardation c.p. dyslexia, Multiple sensory motor handicaps. Visual disorders in senior citizens, evaluation, diagnosis. 2. Refraction in special cases (pseudophakia, aphakia, irregular corneal astigmatism, coloboma of iris, choroids, retina, nystagmus, post r.k., prk, lasik, congenital cataract, glaucoma). 3. Sports vision.	60	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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify the techniques of ophthalmoscopy and apply the skills in examining the fundus.	2,3
2	Discuss the various clinical investigations techniques and interpretation of result	4,5
3	Discuss neuro-ophthalmological examination techniques, and demonstrate ptosis evaluation and visual field charting.	7,8
4	Describe different color codes associated with ocular diseases and medications.	4,5
5	Discuss headache and its relation to the eye.	7,8

SEMESTER – VI									
Course Title	PUBLIC HEALTH AND COMMUNITY OPTOMETRY								
Course code	24BOPT3204R	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	CONCEPT OF PUBLIC HEALTH- <ul style="list-style-type: none"> Principles of primary, secondary and tertiary care. Dimension, determinants and indicators of health 		6	Describe, illustrate and explain about Introduction to public health				1,2	
II	EPIDEMIOLOGY OF BLINDNESS – <ul style="list-style-type: none"> Defining blindness and visual impairment Vision screening 		6	Describe, illustrate and explain about the basic principles of epidemiology.				1,2	
III	VISION 2020- <ul style="list-style-type: none"> The right to sight NPCB and refractive blindness- optometrist's role as primary health care provider 		6	Describe, illustrate and explain about the vision 2020				1,2	
IV	HEALTH ECONOMICS- <ul style="list-style-type: none"> Health system Health care's in service including role of TPA (Third Party Administrator). 		6	Describe, illustrate and explain about health economics				1,2	
V	OCULAR EMERGENCIES – <ul style="list-style-type: none"> Foreign body Eye pain Watering Injuries-perforating, on perforating & chemical 		5	Describe, illustrate and explain about eye emergencies				1,2	

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>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify and differentiate between different levels of health care.	1,5,7,8
2	Explain the epidemiological concepts of blindness and visual impairment	1,5,7,8
3	Explain the various initiative programs sought to eliminate the causes of avoidable blindness	1,5,7,8
4	Discuss about the components of health economy and the role of Third-Party Administrators (TPA).	1,5,7,8
5	Explain the process of handling ocular emergencies in different types of eye injuries.	1,5,7,8

SEMESTER – VI									
Course Title	PROFESSIONAL PRACTICE MANAGEMENT								
Course code	24BOPT3205R	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. 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	LAWS AND OPTOMETRY- • Laws governing medical and paramedical professions. • International optometry • Ethics			6	Describe, illustrate and explain about laws and optometry			1,2	
II	BASIC ACCOUNTANCY– • Introduction • Principles of accountancy • Journal and ledger • Trial balance • Subsidiary book. • Petty cash book. • Sales books. • Purchase register. • Stock register. • Bank reconciliation and banking procedures • Balance sheet (profit & loss accounts) • General ideas about income tax and sales tax			6	Describe, illustrate and explain about accountancy.			1,2	
III	PUBLICRELATION (PR)- • Definitions • PR-its function from publicity & advertising • Internal and external aspects • PR-analysis, promotion of product. • Public relation with press relation (media). • Public relation with printed work media			6	Describe, illustrate and explain public relation.			1,2	
IV	VISUALREHABILITATION- • Rehabilitation services-definition, • Implementation-mobility & orientation training			6	Describe, illustrate and explain about visual rehabitee.			1,2	
V	EYEBANKING AND EYE DONATION			6	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=ZMQvjJY2IFA>

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, practices, and taxation concepts.	5,6,7,8
3	Discuss about public relations and its functions	5,6,7,8
4	Understand and implement the visual rehabilitation services	5,6,7,8
5	Discuss the essential requirements necessary to facilitate the eye donation process.	5,6,7,8

SEMESTER – VII									
Course Title	CLINICAL OBSERVATION -I (HOSPITAL POSTING)								
Course code	24BOPT4101R	Total credits: 18	L	T	P	S	R	O/F	C
			0	0	36	0	0	0	18
Pre- requisite	COMPULSORY	Co-requisite	NIL						
Programme	Bachelor of Optometry								
Semester	VII semester of fourth year of the programme								
Course Objectives	The clinical observation time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis.								
Course Outcome	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.								
Content									
General OPD (History taking- DO)	150cases	Weekly 1case report to be submitted							
Contact Lens	10 cases (5RGP+5Soft)	Minimum 3 different case reports To be submitted at the end of the Postings							
Optical	50cases	Weekly1 case report To be submitted							
Low Vision care Clinic	5cases	Minimum 3 different case reports to be submitted at the end of the Postings							
Binocular Vision clinic	5cases	Minimum 3 different case reports to be submitted at the end of the Postings							
Ophthalmology clinic (Common eye conditions)	25cases	Minimum 3 different case reports to be submitted at the end of the Postings							

SEMESTER – VII									
Course Title	Case Report-I								
Course code	24BOPT4102R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 120P	0	0	8	0	0	0	4
Pre-requisite	COMPULSORY	Co-requisite	NIL						
Programme	Bachelor of Optometry								
Semester	VII semester of fourth year of the Programme								
Course Objectives	Students can accurately and comprehensively document their practical experiences and demonstrate their understanding and application of theoretical knowledge through verbal articulation. This objective emphasizes the development of both written and oral communication skills, critical thinking, and the ability to synthesize and present information effectively.								
Course Outcome	Students will be able to demonstrate their proficiency in documenting practical experiences and effectively communicate their understanding and analysis of these experiences. This outcome ensures that students not only gain practical skills but also develop the ability to articulate their knowledge and insights clearly and confidently during an oral examination.								

SEMESTER – VII									
Course Title	OPTOMETRY ETHICS								
Course code	24BOPT4103R	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	VII semester of fourth year of the programme								
Course Objectives	<ol style="list-style-type: none"> Equip students with comprehensive ethical frameworks and principles essential for professional optometric practice. Develop critical analytical skills to identify, assess, and resolve ethical challenges in clinical settings. Foster a professional ethos that prioritizes patient rights, confidentiality, and ethical decision-making. 								
Course Outcome	<ol style="list-style-type: none"> Ethical Reasoning Proficiency: Develop advanced skills in applying ethical principles and theories specific to optometric practice. Professional Integrity Framework: Demonstrate comprehensive understanding of professional conduct standards and ethical responsibilities in clinical environments. Patient Rights and Confidentiality Protection: Implement robust strategies to safeguard patient autonomy, privacy, and confidential medical information. Ethical Decision-Making Competency: Critically analyze complex ethical dilemmas and develop systematic approaches to resolving challenging clinical scenarios. Ethical Leadership in Healthcare: Cultivate a proactive approach to ethical practice that promotes trust, transparency, and patient-centered care. 								
Unit No.	Content	Teaching Hours	Learning Outcome				Blooms Taxonomy		
Unit 1	Introduction to Ethics in Optometry	12 hours	Understand the importance of ethics in optometry practice				Remembering		
Unit 2	Ethical Principles and Theories	12 hours	Identify and apply ethical principles and theories in optometry				Understanding		
Unit 3	Professional Conduct and Responsibility	12 hours	Demonstrate professional conduct and responsibility in clinical settings				Applying		
Unit 4	Patient Rights and Confidentiality	12 hours	Uphold patient rights and maintain confidentiality				Analyzing		
Unit 5	Ethical Dilemmas and Decision Making	12 hours	Analyze and resolve ethical dilemmas in optometry practice				Evaluating		

SEMESTER – VIII									
Course Title	CLINICAL OBSERVATION -II (HOSPITAL POSTING)								
Course code	24BOPT4201R	Total credits: 1 Total hours:540	L	T	P	S	R	O/F	C
			0	0	36	0	0	0	18
Pre- requisite	COMPULSORY	Co-requisite	NIL						
Programme	Bachelor of Optometry								
Semester	VIII semester of fourth year of the programme								
Course Objectives	The clinical observation time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis.								
Course Outcome	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.								
Content									
General OPD (History taking- DO)	150 cases	Weekly 1case report to be submitted							
Contact Lens	10 cases (5RGP+5Soft)	Minimum 3 different case reports to be submitted at the end of the Postings							
Optical	50 cases	Weekly1 case report to be submitted							
Low Vision care Clinic	5 cases	Minimum 3 different case reports to be submitted at the end of the Postings							
Binocular Vision clinic	5 cases	Minimum 3 different case reports to be submitted at the end of the Postings							
Ophthalmology clinic (Common eye conditions)	25 cases	Minimum 3 different case reports to be submitted at the end of the Postings							

SEMESTER – VIII									
Course Title	Case Report-II								
Course code	24BOPT4202R	Total credits: 4 Total hours: 120P	L	T	P	S	R	O/F	C
			0	0	8	0	0	0	4
Pre-requisite	COMPULSORY	Co-requisite	NIL						
Programme	Bachelor of Optometry								
Semester	VIII semester of fourth year of the programme								
Course Objectives	Students can accurately and comprehensively document their practical experiences and demonstrate their understanding and application of theoretical knowledge through verbal articulation. This objective emphasizes the development of both written and oral communication skills, critical thinking, and the ability to synthesize and present information effectively.								
Course Outcome	Students will be able to demonstrate their proficiency in documenting practical experiences and effectively communicate their understanding and analysis of these experiences. This outcome ensures that students not only gain practical skills but also develop the ability to articulate their knowledge and insights clearly and confidently during an oral examination.								

SEMESTER – VIII									
Course Title	OCCUPATIONAL BEHAVIOURS OF OPTOMETRY								
Course code	24BOPT4202R	Total credits: 1 Total hours:	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	VIII semester of fourth year of the programme								
Course Objectives	The clinical observation time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis.								
Course Outcome	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.								

SEMESTER – VIII									
Course Title	LOGBOOK AND VIVA-II								
Course code	24BOPT4203R	Total credits: 1	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	VIII semester of fourth year of the programme								
Course Objectives	Students can accurately and comprehensively document their practical experiences and demonstrate their understanding and application of theoretical knowledge through verbal articulation. This objective emphasizes the development of both written and oral communication skills, critical thinking, and the ability to synthesize and present information effectively.								
Course Outcome	Students will be able to demonstrate their proficiency in documenting practical experiences and effectively communicate their understanding and analysis of these experiences. This outcome ensures that students not only gain practical skills but also develop the ability to articulate their knowledge and insights clearly and confidently during an oral examination.								



Assam down town University

Curriculum and Syllabus

Bachelor of Radiography and Advanced Imaging Technology

**OUTCOME BASED EDUCATION FRAMEWORK
CHOICE BASED CREDIT SYSTEM**

Version: 2.2

**FACULTY OF PARAMEDICAL
SCIENCES**

July, 2024

PREAMBLE

Assam down town University is a premier higher educational institution which offers 57 Bachelor and Master and Ph.D. degree programmes across 10 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 courses and related extracurricular and co-curricular activities for completing the course and to be eligible for the degree. This volume also includes the prescribed literature, study materials, texts and reference books under different courses as a guidance for the students to follow.

Recommended by the Board of Studies (BOS) meeting of the Faculty of Paramedical Sciences held on dated 22/06/2024 and approved by the 51st Academic Council (AC) meeting held on dated 26/07/2024.



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 multi-disciplinary 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 inter disciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stake holders 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 in stills 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 5th & 6th 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):

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: Techno-Professional Efficiency: Apply a comprehensive understanding of radiological and imaging concepts for accurate investigations providing enhancing diagnosis with quality images in healthcare services.

V. Programme Outcome (POs):

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.

VI. Total Credits to be earned: 131

- P/T: One credit for every two hours of laboratory and practical.
- CR: One credit for every three hours of clinical training / clinical rotation posting.
- RP: One credit for every two hours of Research Project per week – Max credit 20-25.

VII. Career Prospects:

- Diagnostic Radiographers & technologist are employed in hospitals in both privates and governments 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 Programme coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the Programme 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 Programme 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 Programme 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.

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

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^{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^{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 voice 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.

****“As a prerequisite for award of the degree, the students have to undergo a compulsory rotatory internship of six months after successful completion of academic Curriculum”**

Breakdown of Credits

Sl. No	Category		Total number of Credits
1	University Core (UC)	Skill Enhancement Course (SEC)	9
		Ability Enhancement Course (AEC)	8
		Field Training	
		Discipline Specific Elective (DSE)	
		Value Added Course (VAC)	6
2	University Elective (UE)	Multidisciplinary Course (MDC)	9
		Value Added Course (VAC)	
3	Programme Core (PC)	Discipline Specific Core (DSC)	88
		Field Training	1
		Research /Industry Internship	6
		Summer Internship	4
4	Programme Elective (PE)	Discipline Specific Elective (DSE)	2
		Value Added Course (VAC)	
5	Faculty Core (FC)	Skill Enhancement Course (SEC)	
		Ability Enhancement Course (AEC)	
Total			133

Breakdown by categories of courses

Sl no	Category	Credits	%
1	Paramedical Sciences	124	93.23 %
2	FOCT	2	1.50 %
3	Commerce and Management	1	0.75 %
4	CLPDP	6	4.51 %
Total		133	100%

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
Semester I	1	24BRIT1101R	Human Anatomy & Physiology I	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200
	2	24BRITT1102R	General Biochemistry	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3	24BRIT1103R	Basic Principles Of Hospital Practice And Patient Care	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
	4	24UBPD1101R	Basic Communicative English	AEC	0	0	2	0	0	0	1	0	0	100	100
	5	24BRIT1101M/ 24BRIT1102M/ 24BRIT1103M	Introduction to Public Relations and the Media Specialization Learn /English: Beginning Grammar Specialization/ Global Warming I: The Science and Modeling Climate Change	VAC	2	0	0	0	0	0	2	100	0	0	100
	6	24BRIT1104R	Medical Psychology	MDC	3	0	0	0	0	0	3	40	60	0	100
	7	24BRIT1105R	Techno-Professional Skills I	SEC	0	0	2	0	0	0	1	0	0	100	100
	8	24UBEC1101	Extra-Curricular Activities	Extra - Curricular	0	0	0	4	0	0	1	0	0	100	100
	Total					14	0	10	4	0	0	20	260	240	500
Semester II	1	24BRIT1201R	Human Anatomy and Physiology II	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200
	2	24BRIT1202R	Biochemistry: Biomolecules & Their Metabolisms	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3	24BRIT1203R	Fundamental of Patient Care & Safety	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
	4	24UBPD1201R	Functional English	AEC	0	0	2	0	0	0	1	0	0	100	100
	5	24BRIT1204R	Self-Study (Seminar/Presentation)	AEC	0	0	2	0	0	0	1	0	0	100	100
	6	24UGGP1201R	General Pathology	MDC	3	0	0	0	0	0	3	40	60	0	100
	7	24UBES1201R	Environmental Science	VAC	2	0	0	0	0	0	2	40	60	0	100
	8	24UBCC1201	Co-Curricular Activities	Co-Curricular	0	0	0	4	0	0	1	0	0	100	100
	Total					14	0	10	4	0	0	20	200	300	500

S. No	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
1	24BRIT2101R	Radiation Physics	DSC (Major)	4	0	0	0	0	0	0	4	40	60	0	100
2	24BRIT2102R	Darkroom & Image Processing Techniques	DSC (Major)	3	0	2	0	0	0	0	4	40	60	100	200
3	24BRIT2103R	Electronics & Instrumental Physics	DSC (Minor)	3	0	4	0	0	0	0	5	40	60	100	200
4	24BRIT2104R	Radiation Protection	DSC (Minor)	3	0	0	0	0	0	0	3	40	60	0	100
5	24UGGM2101R	General Microbiology	MDC	1	0	0	0	0	0	0	1	40	60	0	100
6	24UBPD2101R	Executive English	AEC	0	0	2	0	0	0	0	1	0	0	100	100
7		Design Thinking And Entrepreneurship	SEC	1	0	0	0	0	0	0	1	40	60	0	100
8	24BRIT2105R	Techno-Professional Skills II	SEC	0	0	2	0	0	0	0	1	0	0	100	100
9	24UDLS2101R	Digital Literacy	VAC	0	0	2	0	0	0	0	1	0	0	100	100
10	24UULS2101R	Basic Acclimatization Skills	MDC	0	0	2	0	0	0	0	1	0	0	100	100
11	24BRIT2109R	Field Training	FT	0	0	0	0	0	0	8	1	0	0	100	100
Total				15	0	14	0	0	0	8	23	240	360	700	1300

S. No	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
1	24BRIT2201R	Magnetic Resonance Imaging	DSC (Major)	3	0	0	0	0	0	0	3	40	60	100	200
2	24BRIT2202R	Computed Tomography	DSC (Major)	3	0	0	0	0	0	0	3	40	60	100	200
3	24BRIT2203R	Clinical Radiography	DSC (Major)	3	0	0	0	0	0	0	3	40	60	0	100
4	24BRIT2204R	Physics of Radiology	DSC (Major)	3	0	2	0	0	0	0	4	40	60	100	200
5	24BRIT2205R	Contrast & Special Radiography	DSC (Major)	3	0	0	0	0	0	0	3	40	60	0	100
6	24BRIT2206R	Self-Study (Seminar/Presentation)	AEC	0	0	2	0	0	0	0	1	0	0	100	100
7	24UBPD2201 R	Enhanced Professional Skills	AEC	0	0	2	0	0	0	0	1	0	0	100	100
8	24BRIT2206R	Techno-Professional Skills IV	SEC	0	0	2	0	0	0	0	1	0	0	100	100
9	24UUFLL2201R	Financial Literacy	MDC	0	0	2	0	0	0	0	1	0	0	100	100
Total				15	0	10	0	0	0	0	20	200	300	700	1200

S. No	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
				Semester V											
1	24BRIT3101R	Clinical Observation I	DSC (Major)	0	0	0	20	0	0	5	0	0	100	100	
2	24BRIT3102R	Clinical Observation II	DSC (Major)	0	0	0	20	0	0	5	0	0	100	100	
3	24BRIT3103R	Clinical Observation III	DSC (Major)	0	0	0	24	0	0	6	0	0	100	100	
4	24BRIT3104R	Case Presentation	Research	0	0	0	0	12	0	2	0	0	100	100	
5	24BRIT3105R	Internship (Summer Training)	Internship	0	0	0	16	0	0	4	0	0	100	100	
6	23BRITSI01	Summer Internship	Summer Internship	0	0	0	0	0	24	3	0	0	100	100	
7	23BRITDT01	Digital Tech	VAC	2	0	0	0	0	0	2	100	0	100	100	
Total				2	0	0	80	12	24	27	100	0	700	700	
Semester VI															
S. No	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
1	24BRIT3201R	Digital Imaging Technology	DSC (Major)	3	0	0	0	0	0	3	40	60	0	100	
2	24BRIT3202R	Ultrasound & Mammography	DSC (Major)	3	0	0	0	0	0	3	40	60	0	100	
3	24BRIT3203R	Equipment of Advanced Modalities & Quality Assurance	DSC (Major)	4	0	0	0	0	0	4	40	60	0	100	
4	24BRIT3204R	Interventional Radiology & Nuclear Medicine	DSC (Major)	3	0	0	0	0	0	3	40	60	0	100	
5	24BRIT3205R	Patient Care in Diagnostic Radiology	DSC (Major)	3	0	0	0	0	0	3	40	60	0	100	
6	24BRIT3206R	Lab Based Research Project	Research	0	0	0	0	24	0	4	0	0	100	100	
7		Finishing School	AEC	0	0	4	0	0	0	2	0	0	100	100	
8	24BRIT3207R	Techno-Professional Skills V	SEC	0	0	4	0	0	0	2	0	0	100	100	
9	24BRIT3208R	Quality Assurance & Quality Control In Diagnostic Radiology	SEC	2	0	0	0	0	0	2	40	60	0	100	
Total				18	0	8	0	24	0	26	240	300	300	900	

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

SEMESTER-I									
Course Title	HUMAN ANATOMY & PHYSIOLOGY I								
Course code	24BRIT1101R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 45T+30P	4	0	4	0	0	0	6
Pre-requisite	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	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 learn about the anatomical positions, gross and microscopic structure of the organs and skeleton in the human body.								
CO1	Understand the anatomical terms and basic structure and function of cells.								
CO2	Explore knowledge of Musculoskeletal system and bones along with their special features and functions.								
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 anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body.								
Unit-No.	Content	Contact Hour	Learning Outcome				KL		
I	Introduction To Anatomical Terms, Basic Structure and Function of Cell • Level of Organization– Body Parts and Areas, Planes and Sections. Common anatomical terminology • Structure and Function of Cell Membrane, Cellular Transport	7	The students will be able to do Anatomical Position & planes of the body and knowledge on the structure of cell.				1,2,3		
II	Musculo-Skeletal System and Bones Bones: Classification & types According to morphology. Tissue and its types Cartilage Joints: definition, classification, and movements of joints. Muscle and its types. For Specific Programmes Radiology: Importance of different bones of human body.	10	The students will be able to comprehend the knowledge on Musculo- skeletal system of the human body.				1,2,3		
III	Digestive System- Anatomy of gastrointestinal tract and Accessory organs of digestive system. Composition and functions of gastric, pancreatic, intestinal, and biliary secretion.	8	The students will be able to comprehend the knowledge on the anatomy of gastrointestinal tract and accessory organs of digestive system.				1,2,3		
IV	Respiratory System- Anatomy of the Respiratory tract Mechanisms and Regulation of respiration. Gaseous exchange in lung and tissues. Lung volumes, and capacities. Respiratory abnormalities: Hypoxia,	10	The students will be able to understand the knowledge on the anatomy of human respiratory system and its mechanisms.				1,2,3		

	cyanosis, dyspnea, Asphyxia, hyperventilation, hypoventilation, tachypnoea and bradypnea.			
V	Cardiovascular System and Blood: Mediastinum–division Structure of heart and blood vessels. Systemic circulation, pulmonary circulation, and coronary circulation Cardiac output, cardiac cycle, conducting system of heart. Heart sounds, pulse, blood pressure and their regulation. Composition and functions of blood, plasma, and body fluids. Functions of RBC, WBC, and Platelets, Hemoglobin, Blood hemostasis, Blood groups	10	The students will be able to understand the knowledge on Cardiovascular system and the functions of blood.	1,2,3
Practical	1. Study of Skull, Vertebrae, Ribs and bones of upper limb. 2. Study of compound Microscope. 3. Measurement of blood pressure, arterial pulse. 4. Bleeding time (BT) Clotting time (CT). 5. Hemoglobin estimation.	30	The students will be able to apply the knowledge of anatomy & physiology 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: 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 PROGRAMME OUTCOMES

COPO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the anatomical terms and basic structure and function of cells.	1,7,8
2	Explore knowledge of Musculo skeletal system and bones along with their special features and functions.	1,7,8
3	Describe the composition of the human digestive system and their specific functions.	1,7,8
4	Explain respiratory system and classify various respiratory disorders.	1,7,8
5	Understand the anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body.	1,7,8

SEMESTER – I									
Course Title	GENERAL BIOCHEMISTRY								
Course code	24BRIT1102R	Total credits: 4 Total hours: 45T+30P	L	T	P	S	R	O/F	C
			3	0	2	0	0	0	4
Pre-requisite	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	CARBOHYDRATES-Definition and classification of carbohydrates. Common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch) and their sources. Biological significance of Carbohydrate.		10	To understand the knowledge about Carbohydrates and its classification			1,2,3		
II	PROTEINS-Definition of Proteins along with the biological significance. Amino acids and its classification. Essential and non-essential amino acids.		8	To understand the knowledge about Proteins, and its classification			1,2,3		
III	LIPIDS-Definition and classification of lipids. Classification of Fatty Acids. Examples and functions of some common lipids (Phospholipids, Glycollipids, Steroids).		8	To understand the knowledge about Lipids, it's classification and functions.			1,2,3		
IV	NUCLEIC ACIDS-Basic idea of the structure of DNA and RNA. Function of DNA and RNA.		8	To understand the knowledge about DNA and RNA			1,2,3,4		
V	ACID-BASE BUFFERS Basic idea of acids, bases, Ph, buffer. Acid base balance.		8	To understand the knowledge about acids, base and buffers			5,6		
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). 3. Qualitative test for carbohydrates: • To perform Molisch's test for determination		30	To apply the knowledge of basic biochemistry in the practical fields.			1,2,3		

	of sugar in an unknown sample. • To perform Fehling’s test for determination of reducing and non-reducing sugar in an unknown sample. • To perform Benedict’s test for determination of reducing and Non reducing sugar in an unknown sample.			
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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 PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the sources, functions and metabolism process of Carbohydrates.	1,7,8
2	Identify various classification of amino-acids and recognize the significance of Protein.	1,7,8
3	Describe the significance, classification and functions of lipids.	1,7,8
4	Comprehend the structure and functions of Nucleic Acids.	1,7,8
5	Explain the fundamentals and importance of acid, base and buffers	1,7,8

SEMESTER – I									
Course Title	BASIC PRINCIPLES OF HOSPITAL PRACTICE AND PATIENT CARE								
Course code	24BRIT1103R	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 RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ 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. 4. To give a comprehensive knowledge on how to be a first aider in handling emergency situations poisoning, shock, hyper and hypo glycaemia. 5. To incorporate a gross knowledge about laboratory investigation and laboratory set up.								
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	Hospital And Records & Reports <ul style="list-style-type: none"> Hospital and records & reports 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	To understand the knowledge about the hospitals, it's functions and record writing & record keeping.				1,2,3		
II	Medical Professional And Legal Hazards Of Medical Profession <ul style="list-style-type: none"> First aid 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 Scorpion bite, Dog bite Foreign bodies in various organs Burns & scalda, Haemorrhage 	8	Understand the knowledge about the aims and objectives of first aid.				1,2,3		

III	HYGIENE AND BASIC CARE 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.	8	Understand the knowledge about maintaining the hygiene and safety in the hospitals.	1,2,3
IV	CONSUMER PROTECTION ACT FOR MEDICAL : Professional Act of commission, rashness, negligence & damage Advantage & disadvantage of the act. SHOCK Types of shock General Features of shock Instigations of shock Initial management & first aid of shock	8	To understand the knowledge about consumer act for medical.	1,2,3,4
V	HYPERGLYCEMIA AND HYPOGLYCEMIA : Clinical features Diabetes laboratory tests for diabetes Different types of glycosuria Ketone bodies, Glucose tolerance test. Etiology, Clinical Features Investigation and Management Hypoglycemia	8	Understand the knowledge on hyperglycemia and hypoglycemia .	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 PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand different functions, process of record keeping, reporting and essential components of hospital management.	4,7
2	Comprehend the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	1,6,7
3	Understand and apply fundamental knowledge of patient safety and care to ensure basic care needs of patients.	1,6,7,8
4	Assessment of common laboratory accidents and its effective management.	1,5,7
5	Assess vital signs and effectively manage the abnormalities.	1,2

SEMESTER – I										
Course Title	BASIC COMMUNICATIVE ENGLISH									
Course code	24UBPD1101R	Total credits: 2	L	T	P	S	R	O/F	C	
		Total hours: 30P	0	0	4	0	0	0	2	
Pre-requisite	Co-requisite		Nil							
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY									
Semester	Fall/ 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	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	Module 1- Grammar 1. Parts of Speech 2. Articles 3. Affirmative and Negative Sentences				6	Learn about how to write speech, articles etc.			1,2,3, 4,5	
II	Module 2- 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	Module 3- Building Vocabulary 1. Synonyms 2. Antonyms				8	Learn about how to change the word.			1,2,3, 4,5	
IV	Module 4- Speaking Skills 1. Introduction and greetings 2. Pronunciation 3. Asking and offering information 4. Video Recording for self-analyze				6	Learn about how to speak.			1,2,3, 4,5	
V	Module 5- 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. Sultan Chand 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:

<https://youtu.be/53SIKuCuHv0>

https://youtu.be/Ljjiw9mC_Cg

<https://youtu.be/xQfYiHbAjJo>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	The application of grammatical rules will enable the students to improve the speaking and writing skills.	1,6,8
2	It enables the learners to use the language effectively.	1,6,8
3	It will strength both listening and speaking skills.	1,6,8
4	It will strengthen their vocabulary and use of words.	1,6,8
5	It will give an introduction on the concept of communication, its importance and barriers.	1,6,8

SEMESTER – I									
Course Title	MEDICAL PSYCHOLOGY								
Course code	24BRIT1104R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 45T	3	0	0	0	0	0	3
Pre-requisite		Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ I semester of first year of the Programme								
Course Objectives	1. Aims to provide students with a comprehensive understanding of human behavior and mental processes. 2. Explore various psychological domains such as cognitive, developmental, social, and abnormal psychology, gaining insights into how individuals think, feel, and act. To be equipped with critical thinking skills and an appreciation for the complexities of human behavior, enabling them to apply psychological concepts to real-world situations.								
CO1	Understand the significance, history, scope and branches of psychology.								
CO2	Discuss the biology of human behavior and sensation.								
CO3	Identify the different stages of human growth and development and the factors influencing it.								
CO4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.								
CO5	Apply skills to assess mental health and identify the warning signs of poor mental health.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to Psychology <ul style="list-style-type: none"> • Definition of psychology • Evolution of modern psychology • Branch of psychology 		9	Introduces the knowledge of psychology its evolution in modern world and different branches of it.				1,2,3,4,5	
II	Biology of Behavior <ul style="list-style-type: none"> • Body mind relationship modulation process in health and illness • Brain and behavior: nervous system, neurons and synapse, • Association cortex, Right and Left hemispheres. 		9	Explains the biology of behavior the mindset and all the complex function.				1,2,3,4,5	
III	Growth and Development <ul style="list-style-type: none"> • Life span: different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age) • Heredity and environment: role of heredity and environment in physical and psychological development. . 		9	Describes the growth and development of a person.				1,2,3,4,5	
IV	Motivation and Emotional Processes <ul style="list-style-type: none"> • Motivation: meaning, concepts, types, theories, motives and behavior. 		9	Explains the techniques of keeping one motivated and maintaining emotional processes.				1,2,3,4,5	
V	Emotion: definition, components, changes in emotions, theories, emotional adjustments, emotions in health and illness.		9					1,2,3,4,5	

TEXT BOOKS:

T1: Andrew W. Ellis, Anne H. Goodall, and Philip R. Houghton "Medical Psychology: A Clinical Introduction"

REFERENCE BOOKS:

R1: John L. O’Leary and Michael A. L. Hawkins, "Principles and Practice of Behavioural Medicine"

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the significance, history, scope and branches of psychology.	1,2
2	Discuss the biology of human behavior and sensation.	1,3
3	Identify the different stages of human growth and development and the factors influencing it.	1,4,7
4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.	3,5
5	Apply skills to assess mental health and identify the warning signs of poor mental health.	3,5

SEMESTER – I									
Course Title	TECHNO PROFESSIONAL SKILLS I								
Course code	24BRIT1105R	Total credits: 1	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	Fall/ I 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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:

1. www.mrimaster.com

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Describe and identify cross-sectional anatomy in the sagittal, coronal, and axial planes on CT and MR Images.	1,6,8
2	Describe the proper diagnostic anatomy.	1,6,8
3	Students will be able to efficiently search the Internet for required information.	1,6,8
4	Differentiate normal anatomy, and build a personal resource system for future study.	1,6,8

SEMESTER – I									
Course Title	EXTRA CURRICULAR ACTIVITIES								
Course code	24UBCC1101	Total credits: 1	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite		Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ I 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	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.				60	Improved verbal and non-verbal communication through presentations, group discussions, or performances.		1	

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Explore different activities organized by various clubs, such as dance, music, photography, drama, and literacy.	6,7,8
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	6,7,8
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	6,7,8
4	Explore new platform to learn from invited experts in their respective fields.	6,7,8
5	Evaluate overall growth alongside academic development.	6,7,8

SEMESTER – II									
Course Title	HUMAN ANATOMY AND PHYSIOLOGY II								
Course code	24BRIT1201R	Total credits: 6	L	T	P	S	R	O/F	C
		Total hours: 45T+60P	4	0	4	0	0	0	6
Pre-requisite	Human Anatomy And Physiology I	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
Course Objectives	1. To provide a comprehensive concept of all the anatomical position and physiological function of the human body 2. To understand the underlined mechanism and regulation of the human body. 3. To understand the anatomy and physiology of the excretory, sensory, immune, reproductive, and endocrine systems, and their roles in maintaining homeostasis and health.								
CO1	Understand the structure and function of excretory system.								
CO2	Comprehend sensory organs and nervous system along with their functions								
CO3	Identify different types of immune cells and lymphatic system in the body.								
CO4	Understand the structure and functions of male and female reproductive system.								
CO5	Develop fundamental knowledge of the endocrine system and their regulation.								
Unit-No.	Content		Contact Hour	Learning Outcome		KL			
I	Urinary System <ul style="list-style-type: none"> Structure of kidney, ureter, urinary bladder, male and female urethra. Functions of kidneys, nephron. Urine formation.		8	Knowledge about anatomy and physiology of urinary system in human body.		1,2			
II	Nervous System <ul style="list-style-type: none"> Classification of Nervous system. Central Nervous system – Brain and Spinal cord, blood supply of brain. Cranial nerves and spinal nerves Introduction of motor system, sensory system and Autonomic Nervous System. Functions of brain, and spinal cord Synapse, reflex arc Cerebrospinal fluid Sensory Organs: Skin, Ear, Nose, Tongue Eye 		12	Knowledge about Nervous system.		1,2,3			
III	Lymphatic and Immunological System <ul style="list-style-type: none"> Structure of lymphatic system and functions. Immunity – Antigen, Antibody, and Immune response. Acquired immunity		5	To understand about lymphatic and Immunological System.		1,2			
IV	Reproductive System <ul style="list-style-type: none"> Structure of male and female reproductive 		10	To understand about		1,2,			

	organs. • Structure of breast • Changes during puberty • Ovulation, • Menstrual cycle Pelvic cavity with its boundaries and contents		Reproductive system	3
V	Endocrine System • Different endocrine glands • Hormones and functions of endocrine glands Regulation of secretion hormones.	10	To understand about the Endocrine System.	1,2,3
Practical	1. Study of pelvic bones and bones of lower limbs of human body. 2. Study of organs: Brain, heart, lung, liver, kidney 3. Blood group 4. DLC 5. Total count of RBC and WBC	30	To apply the knowledge of anatomy and physiology in the practical fields	1,2,3,4,5

TEXT BOOKS:

T1: Fundamentals of Anatomy Pamela K Levangie, Cynthia C Norkin JP Bros Medical Publishers, New Delhi

T2: Fundamentals of Medical Anatomy Duane nudson 2nd ed. Publisher Springer, 2007

T3: A book of Physiology Dr Khurana CBS Publishers & Distributors

T4: Ross and Wilson Anatomy and Physiology Anne Waugh, Allison Grant 12th edition, ElsevierHealth Sciences

REFERENCE BOOKS:

R1: Medical anatomy JP Bros Medical Publishers, Bangalore 1st Indian Ed 1997

R2: Clinical Anatomy JP Bros Medical Publishers, Bangalore 5th Ed 1996, 1st Indian Ed 1998

R3: Ganong's Review of Medical Physiology Kim E. Barrett 26th Edition, McGrawHill

R4: Best & Taylor Physiological basis of Medical practice Y. Tripathi O.P. Tandon 13th edition, Wolters Kluwer

OTHER LEARNING RESOURCES:

<https://openstax.org/books/anatomy-and-physiology-2e/pages/1-1-overview-of-anatomy-andphysiology>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the structure and function of excretory system.	1
2	Comprehend sensory organs and nervous system along with their functions	1
3	Identify different types of immune cells and lymphatic system in the body.	1,2
4	Understand the structure and functions of male and female reproductive system.	1,7
5	Develop fundamental knowledge of the endocrine system and their regulation.	1,8

SEMESTER – II										
Course Title	BIOCHEMISTRY: BIOMOLECULES AND ITS METABOLISM									
Course code	24BRIT1202R	Total credits: 4	L	T	P	S	R	O/F	C	
		Total hours: 45T+60P	3	1	2	0	0	0	4	
Pre-requisite	General Biochemistry	Co-requisite	Nil							
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY									
Semester	Autumn/ 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 on ATP in the human body and cells. 3. To give a practical knowledge for the qualitative determination of carbohydrate, proteins and lipids.									
CO1	Comprehend knowledge on classification, mechanism of enzymes, and factors affecting enzyme actions.									
CO2	Comprehend 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: Definition and classification of enzyme. Basic idea of co-enzyme, iso-enzyme. Mechanism of enzyme Action. Factors affecting enzyme action				10	knowledge about enzymes			1,2	
II	CARBOHYDRATE METABOLISM Glycolysis, Kreb's Cycle, Gluconeogenesis, Glycogenesis, Glycogenolysis.				10	knowledge about carbohydrates metabolism			3,4,5	
III	PROTEIN METABOLISM Transamination Deamination Urea Cycle and its Significance LFT (Liver Function Tests) RFT (Renal Function Tests)				10	knowledge about protein metabolism			2,3,4,5	
IV	LIPID METABOLISM β oxidation of Fatty Acids. Ketone bodies Ketosis and ketoacidosis				10	knowledge about lipid metabolism			1,2,3,4	
V	VITAMINS AND MINERALS: Definition and classification of vitamins according to solubility. Sources and functions of individual vitamins and its Deficiency. Individual minerals (calcium, phosphorus, iron, magnesium, copper, selenium, molybdenum etc) –their sources, function and properties.				16	knowledge about vitamins and minerals			1,2,3,4,5	
Practical	Qualitative tests for the determination of Proteins: • Heller's Test • Heat and Acetic acid test for protein • Precipitation test • Lipid solubility Tests				30	To apply the knowledge of basic biochemistry in the practical fields.			1,2,3,4,5	

TEXT BOOKS:

T1: Biochemistry U Satyanarayana and U Chakrapani 5th Edition (2020)

T2: Practical Clinical Biochemistry Shruti Mohanty 1st Ed

T3: Essentials of Practical Biochemistry Gupta Prem Prakash Gupta Neelu Jaypee Brothers Medical Publishers (P) Ltd

REFERENCE BOOKS:

R1: Leininger Principles of Biochemistry David L Nelson and Michael M Cox 7th edition

R2: Haper's Illustrated Biochemistry Robert Murray, Daryl K Granner et al 29th edition

R3: Biochemistry Lubert Stroyer, Jeremy M Berg, et al 5th edition

R4: Biochemistry David E Metzler 2nd edition

OTHER LEARNING RESOURCES:

ERP notes

Online study materials

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Comprehend knowledge on classification, mechanism of enzymes, and factors affecting enzyme actions.	1
2	Comprehend the mechanism of carbohydrate metabolism in the body.	1
3	Explain the metabolism of protein and its significant effects on different organs of body.	1
4	Describe the process of Lipids metabolism and associated clinical conditions.	1,7
5	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body.	1,8

SEMESTER – II									
Course Title	FUNDAMENTAL OF PATIENT CARE AND SAFETY								
Course code	24BRIT1203R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30T	2	0	0	0	0	0	2
Pre-requisite	Basic Principle Of Hospital Practice And Patient Care	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
Course Objectives	1.To impart knowledge on meeting the highest standards of professional quality in health sector. 2.To bring efficiency to the work 3.To teach the value and ethics of working in a health sector.								
CO1	Describe signs and symptoms of common poisonings and its immediate management.								
CO2	Understand medical ethics and its importance on the healthcare system.								
CO3	Identify the different types of shock along with the management.								
CO4	Determine the signs and symptoms of hyperglycemia and hypoglycemia and its immediate management.								
CO5	Proficient in performing quality laboratory investigation process and laboratory management.								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	Poisoning: <ul style="list-style-type: none"> • Definition • Causes of poisoning • Sources of Poisoning • Symptoms of poisoning • First aid & Management • Antidotes • Common drugs poisoning • Carbon monoxide poisoning Legal Responsibility: <ul style="list-style-type: none"> • Act of commission • Act of omission • Act of rashness, negligence & damage • Legal liabilities of medical profession Advantage & disadvantage of the act.		8	To understand the knowledge about the hospitals, it's functions and record writing& record keeping.			1,2,3,4,5		
II	<ul style="list-style-type: none"> • Malpractice • Civil negligence • Clinical negligence • Corporate negligence • Preparation of patients • Preparation of equipment's collection of specimen of urine, stool, sputum, blood, CSF, Pericardial fluid, Peritoneal fluid, Pleural fluid, etc. 		5	Understand the knowledge about the aims and objectives of first aid.			1,2,3		
III	<ul style="list-style-type: none"> • Definition • Types of shock • General Features of shock 		6	Understand the knowledge about maintaining the hygiene and			2,3		

	<ul style="list-style-type: none"> • Instigations of shock • Initial management & first aid of shock • Definition • Clinical features <p>Diabetes laboratory tests for diabetes.</p> <ul style="list-style-type: none"> • Different types of glycosuria • Ketone bodies • Glucose tolerance test. • Definition • Etiology & Clinical Features <p>Investigations for hypoglycaemia</p>		safety in the hospitals.	
IV	<ul style="list-style-type: none"> • Definition • Names & classification of drugs • Different preparations of drugs • Effects of drugs • Adverse effects of drugs • Tolerance, Abuse, addiction of drug • Different routes of drug administration <p>Storing of medicine Units of standard measurement</p>	4	To understand the knowledge about the safety uses of equipment's in the laboratory	1,2,3,4
V	<ul style="list-style-type: none"> • Function of medical Professional • Qualities of good professional • Ethics of Medical Profession • Laboratory designing • Laboratory management • Different laboratory • Functions of receptionist, Head of section, laboratory specialist, business manager, quality officer, safety officer • Disposal of yeasts • Reporting of tests of laboratory • Quality control and accreditation • Control of fire, infection, corrosive chemicals, toxic fumes, broken glasses, carcinogen. • Legal and ethical regulation. 	9	Determine the knowledge about the vital signs	1,2,5

TEXT BOOKS:

T1: National Health Programmes of India National Policies and Legislations Related to Health J. Kishore 14th edition

T2: A Dictionary of Public Health Paperback J Kishor 1st edition

T3: Health System in India: Crisis & Alternatives, National Coordination Committee Jan Swasthya Abhiyan 1st edition

REFERENCE BOOKS:

R1: In Search of the Perfect Health System Mark Britnell January 1, 2015 by Palgrave MacMillan

R2: Fundamental Concepts and Skills for the Patient Care Technician- Text and Workbook Package Kimberly Townsend 1st edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Describe signs and symptoms of common poisonings and its immediate management.	1,5,7
2	Understand medical ethics and its importance on the healthcare system.	1,6,7
3	Identify the different types of shock along with the management.	1
4	Determine the signs and symptoms of hyperglycemia and hypoglycemia and its immediate management.	1,2,8
5	Proficient in performing quality laboratory investigation process and laboratory management.	4,5,6,7

SEMESTER – II									
Course Title	FUNCTIONAL ENGLISH								
Course code	24UBPD1201R	Total credits: 2	L	T	P	S	R	O/F	C
		Total hours: 30p	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	<ol style="list-style-type: none"> To introduce the students to the basics of English grammar and their application. To enhance communication skills through listening and speaking exercises. To learn and understand the importance of pronunciation of words. 								
CO1	The learner will be able to analyze 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	Module 1- 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	Module 2 - Vocabulary Homonyms Homophones	6	Learn about vocabulary	1,2,3,4,5					
III	Reading Skills Techniques of Effective Reading Gathering ideas and information from a text	8	Learn about the reading skills	1,2,3,4,5					
IV	Module 4 - Conflict Management Definition Type of Conflict Management Effects of Conflict Management	6	Learn about conflict management	1,2,3,4,5					
V	Module 5 - Time-Management Skills 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 PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	The application of grammatical rules will enable the students to improve the speaking and writing skills.	1,6,8
2	It enables the learners to use the language effectively.	1,6,8
3	It will strength both listening and speaking skills.	1,6,8
4	It will strengthen their vocabulary and use of words.	1,6,8
5	It will give an introduction on the concept of communication, its importance and barriers.	1,6,8

SEMESTER-II									
Course Title	SELF STUDY (SEMINAR & PRESENTATION)								
Course code	24BRIT1204R	Total credits: 1 Total hours: 15T	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Pre- requisite		Co-requisite							
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/II semester of first year of the Programme								
Course Objectives	1. Develop Independent Learning Skills – Enhance self-motivation, time management, and research abilities to explore topics independently. 2. Improve Research and Analytical Abilities – Strengthen the ability to gather, analyze, and synthesize information from various sources critically. 3. Enhance Presentation and Communication Skills– Develop written and verbal communication skills through reports, discussions, and presentations.								
CO1	Develop the ability to learn independently, manage time effectively, and explore topics with minimal guidance.								
CO2	Strengthen research and analytical skills by gathering, evaluating, and synthesizing information from credible sources.								
CO3	Enhance written and oral communication skills through structured reports, presentations, and discussions.								
CO4	Improve critical thinking and problem-solving abilities by analyzing complex issues and proposing logical solutions.								
CO5	Improve self-discipline and time management for learning.								
SL No.	CONTENTS								
1.	Reflex actions and their significance.								
2.	Effect of hormonal imbalance in the body.								
3.	DNA replication: How genetic information is copied.								
4.	Importance of hygiene and infection control in hospitals.								
5.	Use of personal protective equipment (PPEs) in patients' care.								
6.	Enzymes: Mechanism of Action and Regulation.								
7.	Gene Regulation and Expression								
8.	Cellular Respiration and ATP Production								
9.	Biochemical Basis of Diabetes Mellitus								
10.	Liver Function Tests and Their Biochemical Basis								
11.	Renal Function Tests and Clinical Significance								
12.	Biochemistry of Anemia and Hemoglobinopathies								
13.	Skeletal System: Bones, Joints, and Their Functions								
14.	Muscular System: Types of Muscles and Their Movements								
15.	Cardiovascular System: Anatomy of the Heart and Blood Circulation								
16.	Respiratory System: Anatomy of Lungs and Mechanism of Breathing								
17.	Digestive System: Structure and Function of Major Organs								
18.	Urinary System: Anatomy of Kidneys and Excretion Process								
19.	Endocrine System: Glands and Hormonal Regulation								

20.	Anatomy of the Human Brain and Cranial Nerves
21.	Lymphatic System and Immunity
22.	Anatomy of the Eye and Visual Pathway
23.	Anatomy of the Ear and Mechanism of Hearing
24.	Anatomy of the Skin and Its Functions
25.	Types of Bones and Bone Formation (Ossification)
26.	Functional Areas of the Brain and Their Roles
27.	Reflex Actions and Neural Pathways
28.	Spinal Cord: Anatomy and Functions
29.	Structure of Arteries, Veins, and Capillaries
30.	Heart Valves and Blood Flow Through the Heart
31.	Blood Composition and Functions
32.	Lymphatic Circulation and Its Role in Immunity
33.	Lungs and Their Lobes: Structure and Function
34.	Mechanism of Gas Exchange in the Lungs
35.	Control of Breathing by the Brain
36.	Structure and Function of the Diaphragm
37.	Oxygen Transport in Blood and Tissue Respiration
38.	Role of Salivary Glands and Digestion of Food
39.	Small Intestine: Structure and Absorption of Nutrients
40.	Large Intestine and the Process of Waste Elimination
41.	Nephron: Structure and Function in Urine Formation
42.	Adrenal Glands and Their Hormonal Functions
43.	Thyroid Gland: Anatomy and Hormonal Regulation
44.	Pituitary Gland: Master Gland of the Body
45.	Male vs Female Reproductive Anatomy
46.	Anatomy of the Tongue and Sense of Taste
47.	Olfactory System: Anatomy of the Nose and Sense of Smell
48.	Structure of the Retina and Vision Processing
49.	Anatomy of the Ear: Hearing and Balance Mechanism
50.	Skin Receptors and the Sense of Touch
51.	Roles and Responsibilities of Healthcare Professionals in a Hospital
52.	Basic Patient Care Skills: Hygiene, Mobility, and Nutrition
53.	Effective Communication with Patients and Families

54.	Infection Control and Hospital Hygiene Practices
55.	Medical Ethics and Patient Rights in Healthcare
56.	Hospital Waste Management and Biohazard Disposal
57.	Vital Signs Monitoring and Interpretation
58.	Handling Patients in Shock and Trauma Cases
59.	Intensive Care Unit (ICU) Patient Management
60.	Hospital Acquired Infections (HAIs) and Their Prevention
61.	Body Fluid Compartments and Electrolyte Balance
62.	Acid-Base Balance and Its Regulation
63.	Synaptic Transmission and Neurotransmitters
64.	Heart Sounds and ECG Interpretation
65.	Microcirculation and Capillary Exchange
66.	Shock and Its Physiological Mechanisms
67.	Role of Enzymes in Digestion and Absorption
68.	Liver Physiology and Detoxification
69.	Renal Clearance and Glomerular Filtration Rate (GFR)
70.	Adrenal Gland Hormones and Their Effects
71.	Physiology of Growth Hormone and Development
72.	Menstrual Cycle and Hormonal Regulation
73.	Lipoproteins and Their Role in Atherosclerosis
74.	Allosteric Enzymes and Their Regulation
75.	Glycogen Metabolism: Glycogenesis and Glycogenolysis
76.	Ketogenesis and Its Role in Starvation and Diabetes
77.	Electron Transport Chain and Oxidative Phosphorylation
78.	Lipid Profile and Its Clinical Significance
79.	General Management and First Aid for Poisoning Cases
80.	Medical Negligence and Malpractice: Causes, Consequences, and Prevention
81.	Occupational Hazards in Hospitals: Safety and Legal Considerations
82.	Essentials of Setting Up a Clinical Laboratory
83.	Good Laboratory Practices (GLP) and Quality Control
84.	Laboratory Accreditation and Certification Standards (NABL, CAP, ISO 15189)
85.	Waste Disposal and Biohazard Management in Laboratories
86.	Chemical Spill Management and Emergency Protocols
87.	Consumer Protection Act and Its Impact on Medical Laboratories

88.	Pulse Rate and Its Variations: Normal vs. Abnormal Conditions
89.	Ketone Bodies: Formation, Functions, and Role in Diabetes
90.	Diabetic Ketoacidosis (DKA): Causes, Symptoms, and Treatment
91.	Diabetes Mellitus: Definition, Causes, and Risk Factors
92.	Management and Treatment Strategies for Hypoglycemia
93.	Essential Minerals in Human Nutrition: Macro and Microminerals
94.	Deficiency Disorders Related to Vitamins and Minerals
95.	Vitamin A: Functions, Deficiency Disorders, and Sources
96.	Vitamin D: Role in Bone Health and Calcium Absorption
97.	Vitamin E: Antioxidant Properties and Health Benefits
98.	Vitamin K: Role in Blood Clotting and Bone Metabolism
99.	Role of Vitamins and Minerals in Preventing Chronic Diseases
100.	Dietary Sources and Bioavailability of Vitamins and Minerals
101.	Vitamin and Mineral Deficiencies in Special Populations (Pregnancy, Elderly, Athletes)

SEMESTER – II									
Course Title	General Pathology								
Course code	24UGGP1201R	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	II semester of first year of the Programme								
Course Objectives	1. To get familiar with general pathology and its role in radiology 2. To obtain an overview of cell, injury, inflammation in the body 3. To understand the neoplasia and carcinogens.								
CO1	The students will learn about the history of pathology, sources of infection, healing and transmission of organism in the body.								
CO2	The students will learn about cell injury, mechanisms and its morphology.								
CO3	The students will learn organs and cells involved in immunity.								
CO4	The student will learn about different types of inflammation and its causes								
CO5	To learn about neoplasia, tumor types, and carcinogenesis.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	INTRODUCTION TO PATHOLOGY History Sources of infection Transmission of organism to the body Wound infection, Wound healing	5	Students will understand the basics of pathology and its role in disease diagnosis.				1, 2, 3,		
II	CELL INJURY Cell injury Mechanism of cell injury Morphology of cell injury Cellular adaptation of growth & differentiation	10	Students will understand the causes, mechanisms, and effects of cell injury, along with cellular adaptations to growth and differentiation.				1, 2, 5		
III	IMMUNITY Immunity Organs of immune system Thymus, Spleen, Bone marrow Cells of immune system B cell, T cell, NK cell, Macrophages.	10	Students will learn about the immunity, organs, and cells involved in the immune response.				1, 3		
IV	INFLAMMATION Definition, signs, types Acute and Chronic Inflammation: Definitions, Causes, Features Chemical mediators of inflammation	10	Students will be able to define inflammation, recognize its signs and types, differentiate between acute and chronic inflammation, and identify the chemical mediators involved.				1, 2, 3,		
V	NEOPLASIA Definition Characteristics of tumors Carcinogens & carcinogenesis Difference between benign and malignant tumors	10	Students will understand the concept of neoplasia, distinguish between benign and malignant tumors, and learn about carcinogens and the process of carcinogenesis.				1,2, 3, 4		

TEXT BOOKS:

1. Textbook Of Pathology by Harsh Mohan
2. KUBY Immunology 6th /7th edition

REFERENCE BOOKS:

1. Robbins And Cotran Pathologic Basis of Disease" by Kumar, Abbas, And Aster

OTHER LEARNING RESOURCES

1. <https://www.youtube.com/@DrDeveshMishra>
2. Miller MA, Zachary JF. Mechanisms and Morphology of Cellular Injury, Adaptation, and Death. Pathologic Basis of Veterinary Disease. 2017:2–43. e19. doi: 10.1016/B978-0-323-35775-3.00001-1. Epub 2017 Feb 17. PMID: PMC7171462.
3. Stone WL, Basit H, Zubair M, et al. Pathology, Inflammation. [Updated 2024 Aug 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK534820/>
4. <https://www.sciencedirect.com/journal/neoplasia>

SEMESTER – II									
Course Title	ENVIRONMENTAL SCIENCE								
Course code	24UBES1201R	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 RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ II semester of first year of the Programme								
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. 3. To develop a world population 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	Understand 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	Understand 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	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		1,2,3,4	
II	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				8	Learn about applications of natural resources		1,2,3,4	

	<p>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.</p> <p>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>			
III	<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>	8	Learn about Ecosystem	1,3,4,5
IV	<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</p> <p>Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts. Endangered and endemic species of India.</p> <p>Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.</p>	7	Knowledge about Biodiversity	3,4,5
V	<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 prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides</p> <p>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.</p>	5	Knowledge about various environmental pollutions.	3,4,5

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 Standards, 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)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the importance of Environment Studies and the need for public awareness.	1,5,8
2	Identify natural resource, its importance, and its impacts on the environment.	1,8
3	Explore in-depth knowledge on concept of ecosystem.	1,8
4	Understand the value of biodiversity and the various methods of conservation of biodiversity.	1,8
5	Explain various environmental pollution and its impact on human and ecosystem.	1,5,8

SEMESTER – II									
Course Title	CO-CURRICULAR ACTIVITIES								
Course code	24UBCC1201	Total credits: 1	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	Autumn/ II 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				KL	
I	AdtU encourages a range of activities outside the regular curriculum intended to meet learner's interest.		60	Enhanced ability to connect with peers, work in groups,				3,4,5	
II	These activities are aimed to develop the social and soft skills and promote a holistic development of the learners.			Ability to prioritize tasks, Balance multiple commitments,					
III	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.			Ability to communicate effectively in various formats, such as public speaking, team discussions, or performances.					
IV	The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.			Understanding of professionalism, ethics, and workplace behaviours.					
V	The student members of the club are trained represent AdtU in various inter University student and national level competitions.			Improved self-awareness of personal interests,					

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	The students will be engaged in different activities headed under different clubs namely dance, music, photography, drama, literacy, etc.	6,7,8
2	The students will participate in regular club activities like workshops, competitions as per their interest and hobbies.	6,7,8
3	The students will be trained to represent ADTU in variscite university, state and national level competitions.	6,7,8
4	The students will be given a platform to earn from invited experts in their respective fields.	6,7,8
5	The students will get an exposure of 360-degree learning methodology considering the overall growth along with the academics.	6,7,8

SEMESTER – III											
Course Title	RADIATION PHYSICS										
Course code	24BRIT2101R	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 RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY										
Semester	Fall/ III semester of second year 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	Understanding of the physics related to diagnostic imaging.										
CO2	Understanding of X-ray equipment, circuits, and fundamental properties, including their units and quantities.										
CO3	Comprehensive Understanding the physical properties of X-rays and the construction of X-ray tubes.										
CO4	Comprehensive understanding of the intricate interactions between radiation and matter, with a focus on principles of radioactivity.										
CO5	Proficient in the use and understanding of X-ray equipment.										
Unit- No.	Content	Contact Hour	Learning Outcome	KL							
I	BASIC CONCEPT: Heat, Acoustics, power, work, force, energy <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 	13	Learn about the basic concepts of Physics	1,2,3							
II	X-RAY CIRCUITS: Energy bands in solids <ul style="list-style-type: none"> • 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 	12	Learn about the x-ray circuits	4,5							
III	X-RAYS: History <ul style="list-style-type: none"> • Nature of X-rays 	13	Learn about the History, production and properties of	1,2,3,4,5							

	<ul style="list-style-type: none"> • 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 <p>X-ray Tube: General features of X-ray tube</p> <ul style="list-style-type: none"> • 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 		x-rays.	
IV	<p>INTERACTION OF RADIATION WITH MATTER: Attenuation, attenuation co-efficient, absorption and scattering Photo electric absorption</p> <ul style="list-style-type: none"> • 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 • HVT – TVT <p>RADIOACTIVITY: Unstable atoms</p> <ul style="list-style-type: none"> • Radioactive series • Radioactive transformation • Decay constant • Half-life • Average life • Radioactive elements 	12	Knowledge about interaction of x-rays with Matter and about the history and basic nuclear physics.	1,2,3,4
V	<p>X- RAY EQUIPMENT'S:</p> <ul style="list-style-type: none"> • X-ray table and types • Grids and its types • Cassette and intensifying screens <p>Fluoroscopy and its equipment</p>	10	Knowledge on x-ray machine and its components.	1,2,4

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 OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understanding of the physics related to diagnostic imaging.	1
2	Understanding of X-ray equipment, circuits, and fundamental properties, including their units and quantities.	1,2
3	Comprehensive Understanding the physical properties of X-rays and the construction of X-ray tubes.	1,2
4	Comprehensive understanding of the intricate interactions between radiation and matter, with a focus on principles of radioactivity.	1
5	Proficient in the use and understanding of X-ray equipment.	1,2

SEMESTER – III										
Course Title	DARKROOM & IMAGE PROCESSING TECHNIQUES									
Course code	24BRIT2102R	Total credits: 4 Total hours: 45T+15P	L	T	P	S	R	O/F	C	
			3	0	2	0	0	0	4	
Pre-requisite	Nil	Co-requisite	Nil							
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY									
Semester	Fall/ III semester of second year of the Programme									
Course Objectives	1.To learn the basic principle of darkroom, its design and layout and its approach in imaging techniques. 2.To learn about the construction of Cassettes, Intensifying screen & X-ray film. 3.To educate the students in detail about various photographic processes, image standard, radiographic quality, imaging standard, quality.									
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	Darkroom Planning & Activity: <ul style="list-style-type: none"> • Introduction to Dark Room • Construction and layout • Dark room accessory & chemical • Dry Bench- Hopper, drawer, cupboard & hangers, Hatches & Dryer • Wet Bench- Processing tanks • Safelight • Cassette • X-ray films 	9	Learn about introduction of Darkroom	1,2,3						
II	Film processing and storage: <ul style="list-style-type: none"> • Manual Processing • Automatic Processing • Film storage and handling • Safelight test • Latent image formation 	9	Knowledge about x-ray films, cassettes and hangers	3,4						
III	Photochemistry: <ul style="list-style-type: none"> • Preparation of chemicals • Apparatus Control of Temperature • Acidity, alkalinity, pH, the processing cycle • replenishment, checking and adjusting • Replenishment rates in manual and automatic processing • Silver Recovery 	9	Learn about working of wet and dry bench	2,3,4						
IV	Cassettes, Intensifying screen & X-ray film: <ul style="list-style-type: none"> • Construction of cassette • Loading and unloading of cassette 	9	Learn about automatic processing	3,4,5						

	<ul style="list-style-type: none"> Care and maintenance. Construction of intensifying screen; layer Intensifying factor crossover effect Characteristics of intensifying screen; determination of relative speeds film screen contact Effects of kV and mA on variation of emitted radiation intensity. Construction of X-ray film Composition & its types Characteristics of x-ray film 			
V	Image Quality: <ul style="list-style-type: none"> Factors affecting Image Quality Density, contrast, resolution, magnification, focal spot blur Image distortion Image unharnesses Optimal image quality 	9	Learn about radiographic image formation	3,4,5
Practical	<ol style="list-style-type: none"> Manual processing-Loading & Unloading Safelight test 	15	Learn about film handling and darkroom processing in practical aspect.	3,4

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 OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Describe the construction and the accessories used in the darkroom.	1,3,5
2	Demonstrate the methods & techniques of x-ray film processing and effective storage techniques for films.	1,3
3	Proficient in preparation of chemicals and effective storage techniques for processing chemicals.	1,2,3
4	Understand the construction and maintenance of cassettes, X-ray film and intensifying screens.	1,2,3
5	Demonstrate the factors affecting radiographic images and its quality.	2,3

SEMESTER – III									
Course Title	ELECTRONICS AND INSTRUMENTAL PHYSICS								
Course code	24BRIT2103R	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 RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ III semester of second year of the Programme								
Course Objectives	1. To provide an overview of electronic device components to BRAIT students 2. To provide an overview of Basic knowledge of Digital electronics 3. To provide an overview of Transducers and Sensors								
CO1	Understand the various semiconductor devices and its application.								
CO2	Explain the principles and applications of amplifiers.								
CO3	Comprehend design, analysis, and applications of various timing circuits and oscillators.								
CO4	Describe the fundamentals of digital electronics, principles of microprocessors, microcontrollers and their applications.								
CO5	Explain various circuit designs for transducer and its importance.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Semiconductor Devices and Applications: <ul style="list-style-type: none"> • Introduction to P-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. 	6	Learn about Introduction to basic electronics	1,2,3,4					
II	Operational amplifier and its applications: <ul style="list-style-type: none"> • 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 IC741 • Inverting and non- inverting amplifier applications: summing and difference amplifier unity gain buffer, comparator, integrator and differentiator. 	8	Learn about amplifiers and its applications	1,2,3,4					
III	Timing Circuits and Oscillators: <ul style="list-style-type: none"> • RC-timing circuits • IC 555 and its applications as a stable and mono-stable multi vibrators • Positive feedback, Barkhuizen’s criteria for oscillation R-C phase shift and Wein bridge oscillator. 	6	Learn about timing Circuits and Oscillators	2,3,4,5					

IV	Digital Electronics Fundamentals: <ul style="list-style-type: none"> • 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, flipflops, shift registers, counters Block diagram of microprocessor/microcontroller and their applications.	8	Knowledge about digital electronics used in x-ray and ultrasound circuits	3,4,5
V	Transducers and Instrumentation: LVDT, A.C and D.C Tachometers, Capacitance transducers, Thermistor based thermometers, Strain gauge, Ultrasonic transducer and their electrical 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).	6	Knowledge about Rectifiers, capacitors, transistors etc.	3,4,5
Practical	1.To study the behavior of half wave, full wave and bridge rectifier. 2.To study the behavior of a filter circuit. 3.To plot the graph of forward and reverse bias characteristics of a Si junction diode.	64	Learn about practical knowledge electronics and instrumental physics	3,4,5

TEXT BOOKS:

- T1. J.B Gupta “Electronic Device and Circuits” Kitson 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 Imaging by Akash Ganguly and Rezaul Karim. R4. Fundamental of X-Ray and Radiation Physics by Joseph Selman.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the various semiconductor devices and its application.	1
2	Explain the principles and applications of amplifiers.	1
3	Comprehend design, analysis, and applications of various timing circuits and oscillators.	1
4	Describe the fundamentals of digital electronics, principles of microprocessors, microcontrollers and their applications.	1
5	Explain various circuit designs for transducer and its importance.	1,3

SEMESTER – III									
Course Title	RADIATION PROTECTION								
Course code	24BRIT2104R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Co-requisite		Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ III semester of second year of the Programme								
Course Objectives	1. To introduce the students about the concepts related to radiation dose, exposure, effective dose etc. 2. To introduce the students about the concepts related to effect of radiation on human being. 3. To learn the students about various regulatory bodies, guidelines and safety standards.								
CO1	Understand the radiation quantities and units.								
CO2	Understand the biological effects of ionizing radiation.								
CO3	Identify the various types of radiation detectors and their uses.								
CO4	Describe radiation hazards and principle of radiation protection.								
CO5	Discuss the importance of various regulatory bodies, guidelines and safety standards.								
Unit-No.	Content		Contact Hour	Learning Outcome			KL		
I	Radiation Quantities and Units: 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		6	To learn about the Radiation and its types, and also units and measurement of radiation.			1,2		
II	Biological Effects of radiation: Ionization, 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 fetus-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.		6	To acquire knowledge about the biological effects of ionizing radiation.			1,2,3,4,5		
III	Radiation detection and Measurements: 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		8	To acquire knowledge on radiation detectors-			1,2,3,4,5		

	principle-function and uses. Advantages & disadvantages of various detectors & its appropriateness of different detectors for different type of radiation measurement.			
IV	Radiation protection: 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.	4	To learn about ALARA principle.	1,2,3,4,5
V	Radiation Hazard evaluation and control: 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.	4	To learn about hazards of radiation and take safety measures for radiation protection.	1,2,3,4,5

TEXT BOOKS:

T1: Radiological Science for Technologist: Physics, Biology and Protection, 8th Edition, 2004, Bushong, Stewart C.

T2: Safety code for medical diagnostic X-ray equipment and installations, 1986, Radiological Safety Division, AERB.

T3: Radiological safety in Enclosed Radiography 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 PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the radiation quantities and units.	1,5
2	Understand the biological effects of ionizing radiation.	1,5,8
3	Identify the various types of radiation detectors and their uses.	3,5,7
4	Describe radiation hazards and principle of radiation protection.	1,5,6,7
5	Discuss the importance of various regulatory bodies, guidelines and safety standards.	1,5,6,7

SEMESTER - III									
Course Title	MOOCs								
Course code	24BRIT2101M/ 2102M/ 2103M	Total credits:1 Total hours: 15	L	T	P	S	R	O/F	C
			1	0	0	0	0	0	1
Prerequisite	Compulsory	Co-requisite	NIL						
Programme	Bachelor of Radiography & Advanced Imaging Technology								
Semester	Fall/ III semester of second 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 worldwide popularity								
CO1	A massive open online course (MOOC) is an online course aimed at large – scale interactive participation and open access via the web.								
CO2	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).								
CO3	MOOCs area recent development in distance education.								
CO4	By completing a MOOC, students gain knowledge through accessible, peer-supported learning without the need for specific academic prerequisites.								
CO5	Students usually don't need to buy any books for these courses, because al reading is either be provided within the MOOC content or is linked to open access texts.								
Unit No.	Content	Contact Hour	Learning Outcome					K L	
I	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.	3	Learners gain a solid understanding of specific subjects or skills					1,2	
II	A standard class becomes in a MOOC asset of videos of 5-10minutes each. The learning of students in a MOOCS is usually assessed by multiple-choice questions.	3	Learners gain a solid understanding of specific subjects or skills,					1,2,3	
III	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. Peer-to-peer: students evaluate and grade themselves.	3	Learners gain a solid understanding of specific subjects or skills,					1,2	
IV	Another component is the forum, where students post questions that other students can answer. 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 aren't important.	3	Learners gain a solid understanding of specific subjects or skills,					1,2,3	
V	Students usually don't need to buy any books for these courses, because al reading is either be provided within the MOOC content or is linked to open access texts.	3	Learners gain a solid understanding of specific subjects or skills,					1,2,3	

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	A massive open online course (MOOC) is an online course aimed at large – scale interactive participation and open access via the web	6,7,8
2	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).	6,7,8
3	MOOCs area recent development in distance education.	6,7,8
4	By completing a MOOC, students gain knowledge through accessible, peer-supported learning without the need for specific academic prerequisites.	6,7,8
5	Students gaining knowledge through provided resources, with no need for additional textbooks.	6,7,8

SEMESTER – III									
Course Title	EXECUTIVE ENGLISH								
Course code	24UBPD2101R	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 RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ III semester of second 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 for time consuming to a certain								
CO1	It will develop their writing skills through various techniques of language use.								
CO2	It will enable the learners to manage behaviors, thoughts, and emotions in a conscious and productive way.								
CO3	It will develop their critical thinking ability and develop an independency in their professional career								
CO4	Accurately to convey ideas and information with clarity and precision.								
CO5	Utilizing appropriate language, tone, and style for diverse audiences and contexts.								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	Grammar i.Use of Prepositions ii.Tag questions		6	Basics of grammar			1,2		
II	Grammar i.Active and Passive Voice ii.Direct and Indirect Speech		5	Introduction of grammar			2,3		
III	Writing Skills i.The Basics of Writing; avoid ambiguity and vagueness ii.Paragraph Writing iii.Resume, CV and Cover Letter		8	Learn about writing skills			1,2,3,4		
IV	Self-Management Skills i.SWOT Analysis ii.Goal Setting iii.Personal Hygiene		8	Introduction of self-management skill			3,4,5		
V	Non-Verbal Communication- Sciences of Body Language i.What is Non- Verbal Communication & Body Language, ii.Typesof Body Language, iii.Importance and Impact of Body		10	Learn about body languages			3,4,5		
VI	Group Discussion (Theory) i.Importance, ii.Planning, Elements, and Skills assessed, iii.Effectively disagreeing, iv.Summarizing and Attaining the Objective		8	Learn about effective communication skill.			2,3,4,5		

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 OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	It will develop their writing skills through various techniques of language use.	6,7,8
2	It will enable the learners to manage behaviors, thoughts, and emotions in a conscious and productive way.	6,7,8
3	It will develop their critical thinking ability and develop an independency in their professional career	6,7,8
4	Accurately to convey ideas and information with clarity and precision.	6,7,8
5	Utilizing appropriate language, tone, and style for diverse audiences and contexts.	6,7,8

SEMESTER – III									
Course Title	TECHNO PROFESSIONAL SKILLS II								
Course code	24BRIT2105R	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 Radiography & Advanced Imaging Technology								
Semester	Autumn/ III semester of second of the programme								
Course Objectives	<ol style="list-style-type: none"> To have knowledge about human anatomy and its terminology. To enhance proficiency in using advanced features of industry-standard software and tools. To develop skills in resource allocation, risk management, and project documentation. 								
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	Analyse 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				KL	
I	Radiological anatomy of Skull & Vertebrae and its blood supply: • 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	Radiological anatomy of thorax and abdomen and its blood supply: 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	Radiological anatomy of pelvis and its blood supply: 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 OUTCOMES

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Describe and identify cross-sectional anatomy in the sagittal, coronal and axial planes on CT and MR Images.	1,2,3
2	Describe the proper diagnostic anatomy. Differentiate normal anatomy, and build a personal resource system for future study.	1,2,3
3	Analyse and interpret data using advanced data analysis techniques and tools	1,2,3
4	Utilize project management software to track progress, manage resources, and communicate with stakeholders.	1,6,7
5	Demonstrate advanced skills in using industry-standard software, tools, and programming languages.	3,7,

SEMESTER – III									
Course Title	DIGITAL LITERACY								
Course code	24UDLS2101R	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 RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall/ III semester of second year of the Programme								
Course Objectives	1. Students will be able to identify and analyze computer hardware, software and their uses. 2. Students will be able to use MS-Office suite for various purposes. 3. Students will be able to use the Internet efficiently for required information as well as for digital financial transactions.								
CO1	Students will have basic understanding of 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.								
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 identify reliable sources, detect misinformation, and ensure data accuracy and integrity.				1,2,3, 4	
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 identify reliable sources, detect misinformation, and ensure data accuracy and integrity.				1,2,3, 4,5	
III	Introduction to Internet & CyberWorld 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 identify reliable sources, detect misinformation, and ensure data accuracy and integrity.				1,2,3, 4,5	
IV	Introduction to Social Media The Power of Social Media, Relevance 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.		3	To identify reliable sources, detect misinformation, and ensure data accuracy and integrity.				1,2,3, 4,5	

TEXT BOOKS:

T1: Computer Fundamentals: Concepts Systems& Applications Sinha Pradeep K. and Priti Sinha
3rd edition

T2: Computer Fundamentals Goel, A Pears on India

REFERENCE BOOKS:

R1: Fundamentals of Computers Bala Guruswamy, E Tata Mc Graw-Hill Education

R2: Fund of Comp & Programming Bala Guruswamy Ed Sem. I

R3: Introduction to social media, Oklahoma State University Lawson, C. 2022

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Students will have basic understanding of Computer Hardware, Software and Computer handling	6,7,8
2	Students will be able to solve basic information management issues using MS-Office Products	6,7,8
3	Students will be able to efficiently search the Internet for required information.	6,7,8
4	Students will be able to use computing technically ethically, safely, Securely and legally for day-to-day use.	6,7,8

SEMESTER – III									
Course Title	BASIC ACCLIMATIZING SKILLS								
Course code	24UULS2101R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours:	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	1. To impart knowledge of the fundamentals of Hospitality industry and its application 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 households								
CO5	Students will be able to the physiological and psychological processes involved acclimatization.								
Unit No.	Content	Contact Hour	Learning Outcome	KL					
I	Introduction to Accommodation Management <ul style="list-style-type: none"> • Telephone handling technique • Organizing of Rooms. • Cleaning agents. • Cleaning equipment and uses. • Bed making Process 	6	To acquire knowledge on accommodation Management.	1,2,3					
II	Fundamentals of Cooking <ul style="list-style-type: none"> • Definition of cookery– Aim & Objectives of cooking. • Use of basic Cooking equipment's • Personal Hygiene and Safety • Use of Fire & Fuels 	6	To acquire knowledge on cooking and personal hygiene and its safety.	1,2,3,4					
III	Methods of Cooking Different Cuts. Use of Herbs and Spices. Basic Food and Beverage Preparation. Regional food Habits	6	To acquire knowledge the knowledge of different types of herbs and spices in cooking.	1,2,3,4					
IV	Forms & formats <ul style="list-style-type: none"> • C –form • Reservation form • Registration form • Passport Application form Legal Rent Agreement	2	To gain knowledge about forms and formats.	1,2,3,4					

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) - Introduction 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)

COPO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Students will have basic knowledge of cooking methods.	6,7,8
2	Students will gain the knowledge of organizing & Cleaning of Rooms.	6,7,8
3	Students will be able to gain the travel management concept.	6,7,8
4	Students will be able to acquire the knowledge of basic household's amenities for day-to-day use	6,7,8
5	To support safe acclimatization in challenging environments	6,7,8

SEMESTER – III										
Course Title	FIELD TRAINING									
Course code	24BRIT2105R	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C	
			0	0	0	0	0	8	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"> 1. Understanding Healthcare Systems and Hospital Operations. 2. Exploring Patient Care and Clinical Procedures. 3. Exposure to Medical Equipment and Technology 									
CO1	Students will be able to describe the structure and functioning of a hospital, including the roles of various departments and the workflows within the healthcare system.									
CO2	Students will be able to explain the basics of patient care and clinical procedures, observing how protocols are followed to ensure safe and effective treatment.									
CO3	Students will identify and understand the purpose of key medical equipment and technologies, recognizing their role in diagnostics, treatment, and patient monitoring.									
CO4	Students will be able to identify the roles of various healthcare professionals and explain how interdisciplinary teams work together to deliver patient care.									
OC05	Students will reflect on professional behaviors and effective communication observed during the visit, highlighting the importance of empathy, teamwork, and patient-centered communication.									
Unit No.	Content		Contact Hour	Learning Outcome				KL		
I	<ul style="list-style-type: none"> • Overview of healthcare systems • Introduction to the field environment and work culture • Safety protocols and emergency procedure • Code of conduct, ethics, and professionalism in the workplace 		10	Ability to assess situations, identify challenges, and devise solutions on the spot.				1,2,3,4,5		
II	<ul style="list-style-type: none"> • Overview of key tasks specific to the field • Training on specific tools, equipment, or technology relevant to fieldwork • Hands-on practice with supervision 		8	Improved ability to communicate effectively				1,2,3,4,5		
III	<ul style="list-style-type: none"> • Practical exercises to develop job-specific technical skills • Emphasis on accuracy, efficiency, and best practices 		6	Ability to organize, prioritize, and complete tasks.				1,2,3,4,5		
IV	<ul style="list-style-type: none"> • Development of interpersonal skills for interacting with colleagues, supervisors, and clients • Training in professional communication, both verbal and written 		5	Demonstration of a professional attitude and respect for workplace				1,2,3,4,5		
V	<ul style="list-style-type: none"> • Self-assessment exercises to reflect on learning and improvement areas • Reflection on field experiences, lessons learned, and personal growth 		5	Ability to reflect on experiences to identify personal strengths				1,2,3,4,5		

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOME (PO)

COPO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Students will be able to describe the structure and functioning of a hospital, including the roles of various departments and the workflows within the healthcare system	5,6,7
2	Students will be able to explain the basics of patient care and clinical procedures, observing how protocols are followed to ensure safe and effective treatment.	5,6,7
3	Students will identify and understand the purpose of key medical equipment and technologies, recognizing their role in diagnostics, treatment, and patient monitoring.	5,6,7
4	Students will be able to identify the roles of various healthcare professionals and explain how interdisciplinary teams work together to deliver patient care.	5,6,7
5	Students will reflect on professional behaviors and effective communication observed during the visit, highlighting the importance of empathy, teamwork, and patient-centered communication.	5,6,7

SEMESTER – IV									
Course Title	MAGNETIC RESONANCE IMAGING								
Course code	24BRIT2201R	Total credits: 3 Total hours: 45T	L 3	T 0	P 0	S 0	R 0	O/F 0	C 3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
SEMESTER	Autumn/ IV semester of second year of the Programme								
Course Objectives	1. Providing knowledge about basic principle of MRI, equipmentation and its application and its use in diagnostic imaging. 2. Providing knowledge on advancement in MRI techniques. 3. Ability to perform various techniques such as plain and contrast examination, MR Angiography, Diffusion weighted/tensor Imaging, Perfusion and MR Spectroscopy.								
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 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.	11	Knowledge on encoding the signal in its spatial location by carefully application of gradients, formation of image and factors affecting the image.	2,3					

III	Instrumentation, Equipment's and Layout of MRI: Magnetism – Permanent magnets, Electromagnets, Super conducting-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://mrimaster.com/>

https://r.search.yahoo.com/_ylt=AwrxfMAfIJmcgQAvza7HAX.;_ylu=Y29sbwNzZzMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1721037057/RO=10/RU=https%3a%2f%2fmrimaster.com%2f/RK=2/RS=IMdph5.GRdt8yMqpgKcPDycWPXA-

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the basic principles of MRI and characteristics of MR contrast media.	1,2,6
2	Analyze encoding, data collection & image formation.	1,2,4
3	Describe the instrumentation of MRI and it's layout.	3,5
4	Explain the process of MR Flow phenomena, vascular and cardiac imaging.	1,2
5	Comprehend on MRI protocols and meaningful application of various techniques.	1,2,3,8

SEMESTER – IV									
Course Title	COMPUTED TOMOGRAPHY								
Course code	24BRIT2202R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ IV semester of second year of the Programme								
Course Objectives	1. To introduce the students about the concepts of Computed Tomography and physical principles to qualitative image quality. 2. To introduce the students about the diagnostic imaging procedures and techniques used in Computed Tomography. 3. To introduce the students about the room layout and instrumentation of CT scanner.								
CO1	Discuss the history and basic principle of CT scan.								
CO2	Implement the CT protocols and techniques in diagnostic imaging.								
CO3	Perform the data acquisition system and post processing of image.								
CO4	Describe the instrumentation of CT scanner and its advancements								
CO5	Comprehensive assessment of CT parameters and image artifacts.								
Unit- No.	Content				Contact Hour	Learning Outcome		KL	
I	CT scan systems: •History-generations of CT scanners •CT technology- helical/spiral & multi slice C.T. parameters - image quality and methods of image reconstruction. •Radiation dose measurements Calibration and image acquisition.				12	Knowledge about Basic principle of CT along with its history.		1,2,3	
II	CT scan 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, sequence - image display – patient care – utilization of available techniques & image processing facilities to guide the clinician-CT anatomy and pathology of different organ systems.				8	Knowledge about data encoding and Image formation of CT with protocols.		1,2,3	
III	Image processing & Display systems: Recent advances, concepts and applications in processing of images in digital form using computer-based systems.				8	Knowledge about CT image processing and recent advancements.		1,2,3	
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	Knowledge about CT instrumentation		1,2,3	

V	Image Post -processing and Image Quality – <ul style="list-style-type: none"> • Definition • Techniques • Windowing - Window Width and Window Level • Image Artifact –types • Quality Control 	7	Knowledge about CT post – processing.	1,2,3
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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 Lois Roman 1st Edition (2010)

R2: Essentials of Computed Tomography George Roy 1st Edition (2007) **R2:** Essentials of Computed Tomography George Roy 1st Edition (2007)

OTHER LEARNING RESOURCES:

https://r.search.yahoo.com/_ylt=AwrX_jvpgYJmKgQAqTq7HAX.;_ylu=Y29sbwNzZzMEcG9zAzEEdnRpZAMEc2VjA3Nj/RV=2/RE=1721038569/RO=10/RU=https%3a%2f%2fradiopaedia.org%2farticles%2fcomputed-tomography%23%3a~%3atext%3dComputed%2520tomography%2520%2528CT%2529%252C%2520al%2520known%2520as%252C%2520especially%2520in%2520cto%2520build%2520cross-sectional%2520images%2520%2528%2522slices%2522%2529%2520of%2520the%2520body./RK=2/RS=iHvan7OCZYSHxNZYdIM37.oabaw-

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Discuss the history and basic principle of CT scan.	1,3,5
2	Implement the CT protocols and techniques in diagnostic imaging.	1,2,3,6
3	Perform the data acquisition system and post processing of image.	1,3
4	Describe the instrumentation of CT scanner and its advancements	1,3,4
5	Comprehensive assessment of CT parameters and image artifacts.	1,2,3

SEMESTER – IV									
Course Title	CLINICAL RADIOGRAPHY								
Course code	24BRIT2203R	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/ IV semester of second year of the Programme								
Course Objectives	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.								
CO1	Explain the radiographic procedures and techniques of upper and lower extremities.								
CO2	Understand the various radiographic procedures and techniques of different parts of vertebrae.								
CO3	Describe the various techniques and procedures of skull radiography.								
CO4	Explain the different views and techniques for chest radiography.								
CO5	Understand and implement the various techniques and procedures of abdomen, pelvis and dental radiography.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	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 Spine Radiography- Vertebral column–Atlanta occipital articulation- cervical spine- dorsal spine - lumbar spine – sacrum - vertebral canal-vertebral foramen.	17	Knowledge about Basic principle of CT along with its history.	1,2,3					
II	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.	8	Knowledge about data encoding and Image formation of CT with protocols.	1,2,3					
III	Chest Radiography –Basic views (PA & AP) - inspiratory & expiratory films- special chest views & their significance – larynx- trachea- thoracic inlet - Sternum - Ribs – Heart and great vessels – mediastinum -Diaphragm – double exposure technique.	5	Knowledge about CT image processing and recent advancements.	1,2,3					
IV	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.	8	Knowledge about CT instrumentation	1,2,3					
V	Special Radiography: Stereo Radiography: Principle–tube shifting relation of patient – correct making and viewing of stereo	10	Knowledge about CT post – processing.	1,2,3					

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			
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TEXT BOOKS:

T1: Merrill's Atlas of Radiographic Positioning & Procedures Frank, long, Smith 11th Edition

T2: Clark's positioning in Radiology Clark 12th Edition

T3: Medical X-ray Techniques in Diagnostic Radiology, Vander Plaals 3rd Edition

REFERENCE BOOKS:

R1: Radiographic Anatomy and Positioning: An integrated approach Comuelle, Andrea Gauthier 1st Edition

R2: Special Techniques in Orthopedic Radiology Stripp W 4th Edition

OTHER LEARNING RESOURCES:

<https://radiopaedia.org/articles/clinical-radiology-journal>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Explain the radiographic procedures and techniques of upper and lower extremities.	1
2	Understand the various radiographic procedures and techniques of different parts of vertebrae.	1,2
3	Describe the various techniques and procedures of skull radiography.	3
4	Explain the different views and techniques for chest radiography.	2,3
5	Understand and implement the various techniques and procedures of abdomen, pelvis and dental radiography.	1,2,3

SEMESTER IV									
Course Title	PHYSICS OF RADIOLOGY								
Course code	24BRIT2203R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours:	3	0	2	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 introduce the students to the concepts related to radiation quantities and dosimetry.								
CO1	Demonstrate on the electromagnetic spectrum, quantum theory, and their applications in the field of radiology.								
CO2	Understand atomic and nuclear structures, principles and applications of radioactivity								
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 dosimetry 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, Fraunhofer 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	
II	Atomic Structure and Radioactivity: Concept of Atoms, Molecules and Nucleus, Structure of Atoms and Nucleus. Radioactivity, α , β and γ -rays and their Properties, Radioactive Displacement Law, Decay constant, Half- life Period, Unit Radioactivity, Medicinal use of Radioactive Nuclides		7	Learn about atoms and radioactivity.				1,,3,5	
III	Fundamentals of Electricity: 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, Kirchhoff'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		8	Learn about electricity				1,2, 3,4	

IV	Fundamentals of Electronics: 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	5	Learn about rectifiers	1,3,5
V	Radiation Quantities: 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.	8	Learn about radiation units and measurements.	2,4,5

TEXT BOOK:

T1: X-ray Physics and Equipment, Ashworth.

T2: Computed Radiography, MJ Brooker.

T3: The Fundamentals of X-ray and radium Physics, 6th Edition, Selman

REFERENCE BOOK:

R1: Clinical Sonography, A Practical guide, 1998, Roger Sanders.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	Demonstrate on the electromagnetic spectrum, quantum theory, and their applications in the field of radiology.	1
2	Understand atomic and nuclear structures, principles and applications of radioactivity.	1
3	Understand the basic fundamentals of electricity and its application in the field of radiology.	1
4	Comprehend the function of essential electronic components such as resistors, capacitors, inductors, diodes, and transistors.	1
5	Describe the radiation quantities and dosimetry in the diverse contexts of diagnostic radiology.	1,5

SEMESTER – IV									
Course Title	CONTRAST AND SPECIAL RADIOGRAPHY								
Course code	24BRIT2205R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ IV semester of second year of the Programme								
Course Objectives	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. 2. Differentiation and emphasis on sterilization techniques and radiological procedures. 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.								
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	
I	Pediatric Imaging: • 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. Geriatric radiography: • Equipment and accessories – exposure factor considerations in special care. Elderly patients’ profile - difficulties during radiography – technical considerations-projections with unconventional special positioning. Trauma/Emergency Radiography: • Selection of suitable X-Ray equipment – patient position - radiographic projections and sequence for each patient – modification of routine positioning– radiation protection – patient care. Operation theatre radiography: • O. T Procedures - Operative cholangiography – orthopedic 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- preoperative fluoroscopy		10	Knowledge about paediatric radiography.				1,2,3	

	<p>studies - patient care-radiation protection of all staff. Responsibility of Radiographer during Radiological Procedure</p> <ul style="list-style-type: none"> • Preparation of Patient for Different Procedures. • Contrast Media - Positive and Negative, Ionic & Non -Ionic • Adverse Reactions to Contrast Media and Patient Management •Emergency Drugs in the Radiology Department • Emergency Equipment In the Radiology Department • Aseptic technique. 			
II	<p>Procedure for gastrointestinal tract:</p> <ul style="list-style-type: none"> • Fluoroscopy, general considerations, responsibility of radiographers. • Barium swallow • Barium meal and follow through. • Hypotonic Duodenography. • Small bowel enema. • Barium Enema routine projections for colon and rectum, colonic activators; double. • Contrast studies; colostomy. Special techniques for specific disease to be examined. • Water soluble contrast media - eg. Gastrograffin studies • Sinography Fistulogram 	10	Knowledge about Procedure for gastrointestinal tract	1,2,3
III	<p>Procedures for Salivary glands and Biliary system:</p> <ul style="list-style-type: none"> • Sialography. • Intravenous cholangiography. • Percutaneous cholangiography. • Endoscopic retrograde Cholangio - pancreatography (ERCP). • Operative cholangiography. • Post -Operative cholangiography (T – tube Cholangiography). Percutaneous Transhepatic Biliary Drainage (PTBD) 	10	Knowledge about Procedures for Salivary glands and Biliary system	1,2,3
IV	<p>Procedures for Urinary system and Female reproductive system:</p> <ul style="list-style-type: none"> • Intravenous urogram/Intravenous pyelogram (IVU/IVP) • Retrograde pyelography (RGU) • Antegrade pyelography. • Cystography and Micturating cysto-urethrography. • Urethrography(ascending). • Renal puncture • Female reproductive system: • Hysterosalpingography & FTR • Arthrography Discography 	10	Knowledge about Procedures for Urinary system and Female reproductive system	1,2,3
V	<p>Macro radiography, Soft Tissue Radiography, High kV Radiography & Localization of foreign bodies:</p> <ul style="list-style-type: none"> • General principles. • Requirement. • Equipment's. 	8	Knowledge about Macro radiography	1,2,3

	<ul style="list-style-type: none"> • Techniques. Soft Tissue Radiography: • High and low kilo voltage technique; differential filtration. • Non - screen technique - simultaneous screen and non – screen technique. • Multiple radiography. • Uses of soft tissue radiography. <p>High kV Radiography:</p> <ul style="list-style-type: none"> • General principles Relation to patient dose • Change in radiographic contrast. • Scatter limitations; beam collimation; grid ratio. • Speed and type of grid movement. • Radiographic factor; application and uses. <p>Localization of Foreign body:</p> <ul style="list-style-type: none"> • General Principle. • Ingested; inhaled; inserted; embedded foreign bodies. • Foreign bodies in eye. • Preparation of the area to be investigated. <p>Appropriate projection for all Techniques to locate non- opaque foreign body.</p> <ul style="list-style-type: none"> • Composition and functions of blood, Plasma, and body fluids. • Functions of RBC, WBC, and platelets • Hemoglobin. • Blood hemostasis Blood groups 		
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TEXT BOOKS:

T1: Radiological Procedures – A Guideline by Bhushan N. Lakhar

T2: Guide to Radiological Procedures by Chapman & Nakielny'

REFERENCE BOOKS:

R1: A Guide on Special Radiographic Investigations &

Techniques Paperback – 1 January 2019 by Dr. Kushal Gehlot (Author), Lalit Agarwal (Author)

OTHER LEARNING RESOURCES:

<https://radiopaedia.org/articles/abdominal-radiography>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the contrast media and its types.	1,2,3,5,6,7
2	Demonstrate the various radiographic techniques and procedures for gastrointestinal tract.	1,2,3,6
3	Discuss the various radiographic techniques and procedures of salivary glands and biliary system.	1,2,3,6
4	Utilize various radiographic techniques of urinary system and female reproductive system.	1,2,3
5	Explain the impact of high kV techniques on image quality, and management of soft tissue radiography.	1,2,3,5,6

SEMESTER – IV									
Course Title	ENHANCE PROFESSIONAL SKILLS								
Course code	24UBPD2201 R	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 RADIOGRAPHY & ADVANCED IMAGING 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	It will be able the students to understand key leadership concepts and to identify and apply various leadership styles.								
CO5	It will prepare the students to handle different interview formats, answer questions effectively, and present themselves professionally, dress codes, positive body language, and feedback skills								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Presentation Skills i. Introduction ii. Essential characteristics of a good presentation iii. Preparation of a good presentation		8	Get knowledge on presentation skills				1,2,3	
II	Public Skills 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	Get knowledge on Public Skills				1,2,3	
III	Practical session on Resume, Curriculum Vitae, Writing cover letter & Linked In Profile i. Preparation, submission & screening of Resume. ii. Practical session on cover letter screening session iii. Creating profile in LinkedIn iv. How to utilize it.		8	Get practical knowledge on resume, cover letter.				2,3,4	

IV	Leadership & Management Skills i. Concepts of Leadership ii. Leadership Styles iii. Manager VS Leader iv. How to be an Effective Leader v. Doubt Clearing Session	10	Get knowledge on leadership & management	1,2,3,4
V	Interview Skills & Dress code Ethics 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 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 What to Wear During Interviews or Any Other Formal Meetings –Male & Female	10	Get knowledge on Interview Skills & Dress code Ethics	1,2,3,4
VI	Mock Interview i. Practical Mock Interview ii. Feedback – Receiving Feedback iii. Giving Feedback iv. Advantages of Effective Feedback, How to deal with negative feedback	6	Get knowledge on Mock Interview	

TEXT BOOKS:

T1: 1995. High School English Grammar and Composition Wren, P. C and Martin, H. S Chand Publishing

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

REFERENCE BOOKS:

R1: Handbook on Public Speaking, Presentation & Communication Skills: Principles & Practices to create high impact presentations & meaningful conversations Patil, Shailesh

R2: Winning Interview: An Ultimate Guidebook of Tricks, Strategies and Tips on Interview Preparations and Answering Questions to

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	It will prepare the learners to speak with greater control and charisma in front of others.	6,8
2	It will have a positive impact in their thought process and problem-solving skills.	6,8
3	It will enable students to prepare a professional resume and present themselves in an effective manner.	6,8
4	It will be able the students to understand key leadership concepts and to identify and apply various leadership styles.	6,8
5	It will prepare the students to handle different interview formats, answer questions effectively, and present themselves professionally, dress codes, positive body language, and feedback skills	6,8

SEMESTER – IV									
Course Title	Techno Professional Skills III								
Course code	24BRIT2206R	Total credits:1	L	T	P	S	R	O/F	C
		Total hours: 15P	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	<ol style="list-style-type: none"> To understand the basics of emergency care and life support skills. To Manage an emergency including moving a patient. To help prevent harm to workers, property, the environment and the general public. 								
CO1	Acquire knowledge on healthcare quality improvement and patient safety principles, concepts, and methods at the micro-, meso-, and macro-system levels.								
CO2	Understanding the concept of infection control .								
CO3	Understanding the concept of control and prevention of bio medical waste .								
CO4	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		8	Learn about the infection and it's control.				1,2,3,4	

	infection control Programme, Guidelines (NABH and JCI) for Hospital Infection control.			
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, 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.	12	To acquire the knowledge about the history of antibiotics, types of resistance and bacteria control	1,2,3,4

TEXT BOOKS:

1. Understanding Patient Safety, Second Edition by Robert Wachter
2. Handbook of Healthcare Quality & Patient Safety Author: Girdhar J Gyani, Alexander Thomas

REFERENCE BOOKS:

1. Washington Manual of Patient Safety and Quality Improvement Paperback by Fondahn, 2016
2. Researching Patient Safety and Quality in Healthcare: A Nordic Perspective Karina Aase, Lene Schibevaag
3. Old Handbook of Healthcare Quality & Patient Safety by Gyani Girdhar J

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
S.N	Course Outcome (CO)	Mapped Programme Outcome
1	Acquire knowledge on healthcare quality improvement and patient safety principles, concepts, and methods at the micro-, meso-, and macro-system levels.	1,2
2	Understanding the concept of infection control	1
3	Understanding the concept of control and prevention of bio medical waste	1,8
4	Understanding the knowledge of life saving drugs.	1,2
5	Understanding the concept of different norms and guidelines of patient safety.	2,5

SEMESTER – IV									
Course Title	BASIC LIFE SAVING SKILLS								
Course code	24UULS2201R	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 RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ IV semester of second year of the Programme								
Course Objectives	1.To provide the learners with basic knowledge and practical skills needed in an emergency fire situation 2.To provide appropriate basic management and treatment for injuries 3. Develop the ability to assess and prioritize emergency situations								
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): i. Introduction of BLS ii. Chain of survival iii. ABCs Assessment iv. CPR and Ventilation Technique v. AED vi. Choking for adult and children	4	Get knowledge on Basic Life Support	1,2,3,4					
II	First Aid: Golden rules of First aid First aid Kits	4	Get knowledge on First Aid	1,2,3,4					
III	Trauma emergencies: • Introduction • Priorities of Initial approach in pre-hospital 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 f Splinting of broken Limbs	4	Get practical knowledge on Trauma emergencies	1,2,3,4					
IV	Tri age system: • Introduction • Flow chart approach of Triage • Triage of Single and Multiple Casualties in Pre- Hospital setting	4	Get knowledge on Tri age system	1,2,3,4					

V	<p>Medical emergencies:</p> <ul style="list-style-type: none"> • Introduction • Victim centered approach and Management of:- a. Seizures b. Heart attack c. asthma d. diabetic emergencies e. emergency childbirth f. Respiratory distress and failure 	4	Get knowledge on medical emergencies	1,2,3,4
VI	<p>Environmental Emergency:</p> <ul style="list-style-type: none"> • 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. 	2	Get knowledge on Environmental Emergency	1,2,3,4
VII	<p>Safety of people in the event of fire:</p> <ul style="list-style-type: none"> • Recognition of possible fire sources and emergency procedures, construction techniques for eliminating fire. • Types of detecting devices and extinguishing agents and systems <p>Devising procedures in the event of fire and react to fire danger.</p>	2	Get knowledge on Safety of people in the event of fire	1,2,3,4

TEXT BOOKS:

T1: Nancy Caroline’s Emergency Care in the streets Jones and Bartlett 8th Edition

T2: First Aid book LC Gupta 7th Edition

REFERENCE BOOKS:

R1: Advance Cardio vascular life support and Basic life support provider manual American Heart Association (AHA)

OTHER LEARNING RESOURCES:

<https://www.redcross.org/take-a-class/lp/7-lifesaving-skills-everyone-should-know>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

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

SEMESTER – IV											
Course Title	FINANCIAL LITERACY										
Course code	24UUFL2201R	Total credits: 1 Total hours: 30P			L	T	P	S	R	O/F	C
			0	0	2	0	0	0	0	1	
Pre-requisite	Nil		Co-requisite			Nil					
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED 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.										
CO5	The Student will gain knowledge on Transformations in Digital Money market										
Unit- No.	Content			Contact Hour	Learning Outcome			KL			
I	Introduction: <ul style="list-style-type: none"> • 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. 			6	Get knowledge on Financial Literacy			1,2,3,4,5			
II	Financial Planning: <ul style="list-style-type: none"> • 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 from surplus, sources for meeting deficit. • Informal Society funds and crowd funding 			6	Get knowledge on Financial Planning			1,2,3,4,5			

III	<p>Banks & Post Office - As financial service provider:</p> <ul style="list-style-type: none"> • Meaning and evolution of money • Banks – meaning, types & functions; types of accounts; Formalities to open various accounts. • Different types of Post Office saving schemes: Recurring deposit, savings, term deposit; NSC; Kisan Vikas Patra; Monthly Income scheme (MIS) Account • Public Provident Funds (PPF), Senior citizen savings • scheme (SCSS), Sukanya Samriddhi Accounts, • Indian Postal Order; International Money transfer service; Forex Services; • Money remittance services; Jan Suraksha Scheme. 	6	Get knowledge Banks & Post Office - As financial service provider	1,2,3,4,5
IV	<p>Insurance - As financial service provider:</p> <ol style="list-style-type: none"> Different types of Risks and their Management, Diversification of risk; Meaning, need and importance of Insurance; Types of Insurance – Life Insurance, Health Insurance, General Insurance, Term Insurance, Pension and retirement policies; Post office life insurance schemes, Postal life insurance and rural postal life insurance 	6	Get knowledge on Insurance - As financial service provider	1,2,3,4,5
V	<p>Transformations in Digital Money market:</p> <ol style="list-style-type: none"> Various functions & innovative services of Banks; Mobile Banking, NEFT, IMPS, RTGS, Money transfer, Different types of cards- Debit & Credit, E- Banking, Unified payment interface (UPI), Credit Scoring - CIBIL, Digital Banking, crypto currency and related transactions, Fintech, Block chain; Understanding Digital Payment 	6	Get knowledge on Transformations in Digital Money market	1,2,3,4,5

TEXT BOOKS:

- T1: The Young Adult's Guide to Financial Success- How to Manage Your Money & Live Better on Less Edward M. Wolpert
- T2: Financial Freedom with Financial Control Jagmohan Singh Pendown Press
- T3: The Richest Man in Babylon (Deluxe Hardbound Edition) George S. Clason ixia Press Garden City, New York

REFERENCE BOOKS:

- R1: Financial literacy to financial planning Dr.Purvi Kothari and Mr. Keyur Meht
- R2: Ernst & Young's Personal Financial Planning Guide: Take Control of Your Future and Unlock the Door to Financial Security Young, Robert J. Garner, Robert B. Coplan, Barbara J

OTHER LEARNING RESOURCES:

<https://in.search.yahoo.com/search?fr=mcafee&type=E210IN714G0&p=financial+literacy>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Programme Outcome
1	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
2	The students would be able to understand the need and various kind of banking institutions' instrument and their utilities.	7
3	The student would be able to describe the importance of insurance services as social security measures.	5
4	The student would be able to manage the money and debt more effectively.	8
5	The Student will gain knowledge on Transformations in Digital Money market	7,8

SEMESTER – V									
Course Title	CLINICAL OBSERVATION I								
Course Code	24BRIT3101R	Total Credit: 5	L	T	P	S	R	O	C
			0	0	0	20	0	0	5
Pre-Requisite		Co-requisite							
Anti-requisite	Nil								
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall / V semester of third year of the Programme								
Course Objectives	1. Gain expertise in interpreting plain radiographic images of the musculoskeletal system, chest, and gastrointestinal tract for accurate diagnosis. 2. Develop skills in performing and analyzing imaging studies to identify abnormalities and pathologies effectively. 3. Develop fundamental skills for interacting with patients respectfully, addressing patient concerns, and ensuring comfort.								
CO1	Demonstrate the ability to analyze and interpret radiographic images of various anatomical regions, applying knowledge of anatomy and pathology.								
CO2	Execute proper positioning techniques and safety procedures during radiographic procedures, integrating understanding of procedural protocols.								
CO3	Evaluate radiographic findings in correlation with clinical data to formulate accurate diagnoses and treatment plans.								
CO4	Differentiate between normal and abnormal radiographic results, utilizing critical thinking skills to guide patient care.								
CO5	Utilize knowledge of imaging modalities and techniques to optimize visualization and assessment of anatomical structures and pathologies.								
Unit No.	Content	Contact Hour	Learning outcome				KL		
1	Radiography – plain views of the upper limb. <ul style="list-style-type: none"> • Hands. • Fingers. • Thumb • Wrists • Forearm • Elbow • Humerus 	9	Evaluate radiographic findings on upper extremity x-rays				1,2,3		
2	Radiography – plain views of the shoulder: <ul style="list-style-type: none"> • Shoulder Joint • Acromio – clavicular joint Scapula • Various Views and Projections. Clavicle • Sterno – Clavicular joint. 	10	Evaluate radiographic findings on shoulder and clavicle x-rays				1,2,3, 4		
3	Radiography – plain views of Lower Limb: <ul style="list-style-type: none"> • Foot • Toes Tarsus & os calcis • Ankle Tibia, fibula & Patella • Knee joint Pelvis & Sacro-iliac joint 	9	Evaluate radiographic findings on lower extremity and pelvis x-rays				1,2,3		
4	Radiography of Vertebrae: <ul style="list-style-type: none"> • Cervical spine upper, cervical spine lower • Cervico-thoracic, • Thoraco Lumbar • Lumbo-Sacral 	10	Evaluate radiographic findings on vertebrae x-rays				2,3,4, 5		

	<ul style="list-style-type: none"> • Sacrum & Coccyx • Ribs Upper & Lower • Sternum 			
5	Radiography of skull plain views: <ul style="list-style-type: none"> • AP, Lateral & Towns • Sinuses, Mandible, Teeth. • Mastoids. Radiography of Chest: <ul style="list-style-type: none"> • Lungs & Trachea; Heart-Diaphragm Radiography of G.I. Tract <ul style="list-style-type: none"> • Plain X-rays Abdomen-Erect; Liver, Spleen. 	7	Evaluate radiographic findings on skull, chest and abdomen x-rays	4,5,6

TEXT BOOKS:

T1: John Lampignano and Leslie E. Kendrick ‘Radiographic Positioning and Related Anatomy’

REFERENCE BOOKS:

R1: Joseph Selman ‘The fundamentals of X-ray and Radium Physics’ 5th Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Demonstrate the ability to analyze and interpret radiographic images of various anatomical regions, applying knowledge of anatomy and pathology.	1,2,3
2	Execute proper positioning techniques and safety procedures during radiographic procedures, integrating understanding of procedural protocols.	1,2,3
3	Evaluate radiographic findings in correlation with clinical data to formulate accurate diagnoses and treatment plans.	1,2,3
4	Differentiate between normal and abnormal radiographic results, utilizing critical thinking skills to guide patient care.	1,2,3
5	Utilize knowledge of imaging modalities and techniques to optimize visualization and assessment of anatomical structures and pathologies.	1,2,3

SEMESTER – V									
Course Title	CLINICAL OBSERVATION II								
Course Code	24BRIT3102R	Total Credit = 5	L	T	P	S	R	O	C
			0	0	0	20	0	0	5
Pre- Requisite	Co- Requisite								
Anti -Requisite	Nil								
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall / V semester of third year of the Programme								
Course Objectives	1. To provide students hands-on training. 2. To provide students the understanding of contrast examination. 3. Differentiation and emphasis on sterilization techniques and radiological procedures.								
CO1	To comprehend knowledge on equipment used in contrast radiography.								
CO2	Perform case study on pediatric and geriatric x-ray examination.								
CO3	Perform case study on gastrointestinal tract x-ray examination.								
CO4	Perform case study on salivary glands and biliary system x-ray examination.								
CO5	Perform case study on urinary system and female reproductive system x-ray examination.								
Unit No.	Content	Contact Hour	Learning outcome				KL		
1	Introduction to equipment and it's accessories: • CR • DR • Fluoroscopy	7	Learn about the handling of CR, DR and fluoroscopic equipment				1,2,5		
2	Pediatric and Geriatric X-ray examination; case study: • Patient information/history • Informed consent • Patient preparation: -Laboratory investigation (Urea & Creatinine) - Fasting -Allergy protocol (Medication) • Contrast media and equipment used • Patient positioning • Procedure & techniques • Exposure factors • Evaluation criteria of radiographic images • Aftercare and radiation protection • Clinical findings	12	Description about pediatrics and geriatric radiography such as radiation safety, diagnostic challenges and patient care, responsibility, role of a radiographer during radiological procedure used or guided during Operation Theatre				1,2,5		
3	Gastrointestinal tract X-ray examination; case study: • Patient information/history • Informed consent • Patient preparation: -Laboratory investigation (Urea & Creatinine) - Fasting -Allergy	10	Understanding the concept of radiological anatomy and investigations of digestive system, fistula and sonogram. Describe and explain clinical indications , contra-indication,				2,3,5		

	<p>protocol (Medication)</p> <ul style="list-style-type: none"> • Contrast media and equipment used • Patient positioning • Procedure & techniques • Exposure factors • Evaluation criteria of radiographic images • Aftercare and radiation protection • Clinical findings 		<p>patient preparation , exposure factors, contrast media ,technique , filming, after care and radiation protection</p>	
4	<p>Salivary glands and Biliary system X-ray examination; case study:</p> <ul style="list-style-type: none"> • Patient information/history • Informed consent • Patient preparation: -Laboratory investigation (Urea & Creatinine) - Fasting -Allergy <p>protocol (Medication)</p> <ul style="list-style-type: none"> • Contrast media and equipment used • Patient positioning • Procedure & techniques • Exposure factors • Evaluation criteria of radiographic images • Aftercare and radiation protection • Clinical findings 	8	<p>Understanding the concept of radiological anatomy and investigations of salivary glands and hepato biliary system.</p> <p>Describe and explain clinical indications, contraindication, patient preparation , exposure factors, contrast media ,technique , filming, after care and radiation protection</p>	2,3,5
5	<p>Urinary system and Female reproductive system X-ray examination; case study:</p> <ul style="list-style-type: none"> • Patient information/history • Informed consent • Patient preparation: -Laboratory investigation (Urea & Creatinine) - Fasting -Allergy <p>protocol (Medication)</p> <ul style="list-style-type: none"> • Contrast media and equipment used • Patient positioning • Procedure & techniques • Exposure factors • Evaluation criteria of radiographic images • Aftercare and radiation protection <p>Clinical findings</p>	8	<p>Understanding the concept of radiological anatomy and investigations of both male and female urinary system and reproductive organs.</p> <p>Describe and explain clinical indications, contra-indication, patient preparation , exposure factors, contrast media ,technique , filming, after care and radiation protection</p>	2,3,5

TEXT BOOKS:

T1: Radiological Procedures – A Guideline by Bhushan N. Lakhar

T2: Guide to Radiological Procedures by Chapman & Nakielny'

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	To comprehend knowledge on equipment used in contrast radiography.	1,2,3,5,6,7
2	Perform case study on pediatric and geriatric x-ray examination.	1,2,3,6
3	Perform case study on gastrointestinal tract x-ray examination.	1,2,3,6
4	Perform case study on salivary glands and biliary system x-ray examination.	1,2,3
5	Perform case study on urinary system and female reproductive system x-ray examination.	1,2,3,5,6

SEMESTER – V									
Course Title	CLINICAL OBSERVATION III								
Course Code	24BRIT3103R	Total Credit : 6	L	T	P	S	R	O	C
			0	0	0	24	0	0	6
Pre- Requisite		Co- Requisite	Nil						
Anti-Requisite	Nil								
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall / V semester of third year of the Programme								
Course Objectives	1. Understanding and implementing advanced imaging modalities such as computed tomography (CT), magnetic resonance imaging (MRI), and interventional radiography. 2. Enhancing the ability to interpret and analyze advanced radiographic images for diagnostic purposes, including identifying any abnormalities. 3. Familiarize with advanced imaging technologies, such as digital imaging systems, contrast media administration, and image reconstruction software.								
CO1	Students will demonstrate proficiency in operating and understanding advanced imaging modalities.								
CO2	Comprehensive understanding of evolution history of mammography, construction and its safety considerations. Students will be able to effectively assess and manage patient care during advanced radiographic procedures, including patient positioning, immobilization,								
CO3	Students will develop the ability to interpret and analyze advanced radiographic images accurately, identifying anatomical structures, pathologies, and abnormalities to assist in diagnosis and treatment planning.								
CO4	Students will actively participate in clinical rotations and hands-on experiences								
CO5	Students will exhibit professionalism in their interactions with patients, and healthcare professionals.								
Unit No.	Content	Contact Hour	Learning outcome				KL		
1	Advanced Imaging Modalities: Computed Tomography (CT) Magnetic Resonance Imaging (MRI) Interventional Radiography- <ul style="list-style-type: none"> • Image Acquisition and Processing • Contrast Enhancement • Multi-planar Imaging • Reconstruction Algorithms • Patient Assessment and Positioning • Immobilization Techniques • Monitoring Vital Signs 	10	Knowledge of specialized radiographic procedures, including the purpose, techniques, and equipment used in areas such as CT, MRI, fluoroscopy, angiography, and interventional radiology.				1,2,3		
2	Introduction – <ul style="list-style-type: none"> • CT equipment and accessories, • MRI equipment and accessories, • Fluoroscopy equipment and accessories 	10	Familiarity with advanced radiographic equipment				1,2,3,4		
3	Computes Tomography (CT)- <ul style="list-style-type: none"> • Patient information, • History of patient, • Concent form to be filled, laboratory investigation to be checked, checking patient with matel detector, explain the procedure, • Protocols for various anatomical regions and 	10	The procedural steps and patient positioning requirements unique to advanced imaging modalities.				1,2,4,5		

	clinical indications • Multidetector CT (MDCT) and dual-energy CT (DECT), • CT angiography (CTA) and perfusion imaging,			
4	Magnetic Resonance Imaging (MRI)- • Patient information, history of patient, • Consent form to be filled, laboratory investigation to be checked, • checking patient with metal detector, • explain the procedure, • MRI pulse sequences (T1-weighted, T2-weighted, proton density, etc.), • Magnetism and superconducting magnets in MRI,	8	the ability to support patient care with an understanding of the unique needs of patients undergoing advanced or high-stress imaging procedures.	2,3,5
5	Interventional Radiology (Fluoroscopy)- • Patient information, history of patient, • Consent form to be filled, laboratory investigation to be checked, • checking patient with metal detector, explain the procedure, • Patient procedure and follow the protocols, • Angiography and vascular interventions, • Endovascular treatments for arterial and venous disorders, Embolization techniques for hemorrhage control and tumor management	9	Recognize the functions and applications of contrast media, image post-processing techniques, and image reconstruction methods	4,5,6

TEXT BOOKS:

T1: Catherine Westbrook, Carolyn Kaut Roth and John Talbot “MRI In Practice” 4th Edition (2011)

T2: Scott W. Atlas, Magnetic Resonance Imaging of the Brain and Spine 5th Edition (2016)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Students will demonstrate proficiency in operating and understanding advanced imaging modalities.	1,2,3,6
2	Comprehensive understanding of evolution history of mammography, construction and its safety considerations. Students will be able to effectively assess and manage patient care during advanced radiographic procedures, including patient positioning, immobilization,	1,2,3
3	Students will develop the ability to interpret and analyze advanced radiographic images accurately, identifying anatomical structures, pathologies, and abnormalities to assist in diagnosis and treatment planning.	1,2,3,6
4	Students will actively participate in clinical rotations and hands-on experiences	1,2,3
5	Students will exhibit professionalism in their interactions with patients, and healthcare professionals.	1,2,3,8

SEMESTER – V									
Course Title	CASE PRESENTATION								
Course code	24BRIT3104R	TOTAL CREDIT: 2	L	T	P	S	R	O	C
			0	0	0	0	12	0	2
Pre-requisite	Compulsory	Co- requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall / V semester of third year of the programme								
Course Objective	1. Develop Diagnostic Skills to interpret various radiologic images, identify abnormalities, and recognize signs of common conditions across key body systems. 2. Through case studies, learners will practice forming differential diagnoses and applying evidence-based decisions in a clinical context. 3. Students will gain proficiency in specialized imaging techniques, including contrast, paediatric, and oncologic imaging, for handling complex cases.								
CO1	Understanding of key radiology imaging modalities, their indications, basic image interpretation, and recognize normal anatomy across various orientations.								
CO2	Interpret system-specific imaging to identify key patterns and common pathologies in various cases.								
CO3	Apply advanced imaging techniques to enhance diagnostic accuracy in specialized and complex radiologic cases.								
CO4	Develop a systematic approach to differential diagnosis, collaborate across specialties, and enhance interpretive skills through case-based discussions and peer review.								
CO5	Demonstrate diagnostic proficiency in a hands-on assessment, review key radiologic concepts, and access resources for continued learning and specialization.								
Unit No.	Content	Contact Hour	Learning outcome	KL					
I	Introduction to Radiology Case Studies. Overview of Radiology Imaging Modalities <ul style="list-style-type: none"> ○ X-rays, CT, MRI, Ultrasound, PET, and other imaging types. ○ Indications for each modality. Basics of Image Interpretation <ul style="list-style-type: none"> ○ Reading image orientations (sagittal, coronal, axial). ○ Basic radiologic signs and terminology. ○ Understanding normal anatomy on various imaging modalities. 	6	To acquire basic knowledge about radiology case studies	1,2,3,4					
II	System-Specific Case Studies: Neurological Imaging <ul style="list-style-type: none"> ○ Common neurological conditions. ○ Recognizing patterns in MRI and CT images of the brain. ○ Ischemic stroke, glioblastoma, subdural hematoma, etc. Thoracic Imaging <ul style="list-style-type: none"> ○ Common thoracic cases including chest X-ray and CT interpretation. ○ Case studies: COVID-19 pneumonia, lung nodule assessment, etc. Cardiovascular Imaging <ul style="list-style-type: none"> ○ Heart and vascular imaging, echocardiograms, angiography. ○ Identifying heart conditions: coronary artery disease, cardiomyopathy, aneurysms. ○ Case studies. Abdominal Imaging	6	To acquire knowledge about System-Specific Case Studies	2,3,4					

	<ul style="list-style-type: none"> ○ Understanding abdominal CT and MRI, ultrasound. ○ Case studies. <p>Musculoskeletal Imaging</p> <ul style="list-style-type: none"> ○ X-ray, MRI of bones, joints, and soft tissues. ○ Common cases: fractures, arthritis, tumors, ligament tears. ○ Case studies. 			
III	<p>Advanced Imaging Techniques and Specialized Cases:</p> <p>Contrast Imaging Techniques</p> <ul style="list-style-type: none"> ○ Understanding contrast agents and when they're used. ○ Special considerations for contrast studies in CT and MRI. <p>Paediatric Imaging</p> <ul style="list-style-type: none"> ○ Differences in imaging paediatric cases. ○ Case studies. <p>Oncologic Imaging</p> <ul style="list-style-type: none"> ○ Staging and tracking tumours. ○ Specialized imaging for cancer Case studies. 	6	To understand the knowledge on advanced Imaging techniques and Specialized Cases	1,3,5
IV	<p>Problem-Solving and Diagnostic Challenges:</p> <p>Differential Diagnosis in Radiology</p> <ul style="list-style-type: none"> ○ Building a systematic approach to differential diagnosis. ○ Steps to narrow down diagnoses based on imaging and patient history. <p>Interdisciplinary Collaboration</p> <ul style="list-style-type: none"> ○ Working with other specialties: surgery, oncology, internal medicine. ○ Understanding the clinical context to improve radiologic interpretation. <p>Case Study Review and Group Discussions</p> <ul style="list-style-type: none"> ○ Case-based discussions to synthesize knowledge. ○ Peer review and comparison of interpretations. 	6	To understand problem solving on various diagnostic challenges.	3,4,5
V	<p>Practical Assessment and Review:</p> <p>Final Case Study Examination</p> <ul style="list-style-type: none"> ○ Hands-on assessment with a mix of new cases from various systems. <p>Review of Key Concepts</p> <ul style="list-style-type: none"> ○ Key takeaways and high-yield information across all systems. ○ Recap of major learning points and diagnostic frameworks. <p>Feedback and Further Resources</p> <ul style="list-style-type: none"> ○ Resources for further learning and specialization in radiology. ○ Tips for approaching complex cases and keeping up-to-date with advances. 	6	To understand the knowledge on Practical assessment and Review.	1,2,3,4

TEXT BOOK:

T1: Emergency Radiology: Case Studies by David T. Schwartz.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
S.N	Course Outcome (CO)	Mapped Programme Outcome
1	Understanding of key radiology imaging modalities, their indications, basic image interpretation, and recognize normal anatomy across various orientations.	1,3
2	Interpret system-specific imaging to identify key patterns and common pathologies in various cases.	2
3	Apply advanced imaging techniques to enhance diagnostic accuracy in specialized and complex radiologic cases.	1,2,3
4	Develop a systematic approach to differential diagnosis, collaborate across specialties, and enhance interpretive skills through case-based discussions and peer review.	2
5	Demonstrate diagnostic proficiency in a hands-on assessment, review key radiologic concepts, and access resources for continued learning and specialization.	1,2

SEMESTER – V									
Course Title	INTERNSHIP								
Course Code	24BRIT3105R	Total Credit : 4	L	T	P	S	R	O	C
			0	0	0	16	0	0	4
Pre- Requisite	Compulsory	Co- requisite	Nil						
Anti-Requisite	Nil								
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Fall / V semester of third year of the Programme								
Course Objective	1. Operate radiologic equipment safely and effectively. 2. Ensure Patient Safety & Care. 3. Gain Exposure to Specialized Imaging Modalities.								
CO1	Perform basic imaging techniques such as X-ray, CT, and MRI under supervision.								
CO2	Ensure proper patient positioning and technique optimization for quality imaging.								
CO3	Communicate effectively with patients to explain procedures and ensure comfort.								
CO4	Adhere to ethical and legal guidelines in radiology practice.								
CO5	Utilize protective equipment and shielding techniques effectively.								
Unit No.	Content	Contact Hour	Learning outcome				KL		
1	Hospital staffing and administration 1. Hospital records. 2. Professional ethics. 3. Co-operation with other staff and departments. 4. Departmental organizations.	6	To acquire knowledge about the functions of hospital and its ethics.				1,2,3,4		
2	Care of the patient 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	To acquire knowledge about patient care and management				2,3,4		
3	First aid 1. First aids wounds and bleeding dressing and bandages pressure and splints supports. 2. Shock, electrical shock, hemorrhage, burns, Asphyxia, fractures, loss of consciousness	6	To understand the knowledge on First aid.				1,3,5		
4	Patient care & implementation of radiographers in: <ul style="list-style-type: none"> • Pediatrics • Geriatrics • Patient care during Investigation: G.I. Tract, Biliary tract, Respiratory tract, Gynecology, Cardiovascular system, Lymphatic system, C.N.S. etc. 	6	To understand the knowledge on both pediatric and geriatric radiography and its patient care.				3,4,5		

5	Principles of asepsis <ul style="list-style-type: none"> • Sterilization methods. • Handling of infected patients in the department and ward. 	6	To understand the knowledge on both pediatric and geriatric radiography and its patient care.	1,2,3,4
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TEXT BOOKS:

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.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Perform basic imaging techniques such as X-ray, CT, and MRI under supervision.	1,2,3,5
2	Ensure proper patient positioning and technique optimization for quality imaging.	2,3
3	Communicate effectively with patients to explain procedures and ensure comfort.	2,6
4	Adhere to ethical and legal guidelines in radiology practice.	5
5	Utilize protective equipment and shielding techniques effectively.	2,3

SEMESTER – VI										
Course Title	INTERVENTIONAL RADIOLOGY AND NUCLEAR MEDICINE									
Course code	24BRIT3204R	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"> To gain the knowledge about basic and technological aspects of Special procedures in Radiology. 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. To introduce the students about nuclear physics and use of radioactive material in the body. 									
CO1	Comprehend the understanding on equipment used in interventional procedures.									
CO2	Discuss the various procedures, techniques and guided procedures of interventional radiology.									
CO3	Comprehend the understanding of basic nuclear physics and radiopharmaceuticals used in nuclear imaging.									
CO4	Explain the different types of production of radionuclides.									
CO5	Discuss the instrumentation used in nuclear medicine.									
Unit- No.	Content			Contact Hour	Learning Outcome			KL		
I	Basic principle and hardware Angiography equipment's history – 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.			10	To acquire knowledge about contrast media & its types, Procedures used in Angiography			1,2,3		
II	Interventional Radiology: Conventional / DSA studies Abdominal, visceral, peripheral, cerebral and cardiac angiography - arterial/venous anatomy, physiology- clinical indications and 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			12	To acquire knowledge about the different types of radiological examination used in interventional radiology.			2,3		

	the procedure - venography interventional angiography in hepatobiliary, GIT, urology and vascular system- coils/stents etc indications and contraindications - role of radiographer-radiation safety.			
III	Nuclear Medicine Equipment Nuclear Physics - basics in Nuclear Medicine- Nuclear medicine equipment's - Gamma Cameras rectilinear scanners- radioisotope generators- SPECT-CT & PET-CT introduction-basic physics and principle involved- equipment's basic structure— differences- fusion techniques- image formation storage devices— advantages limitations.	12	To acquire knowledge about the basic nuclear physics.	3,4
IV	Nuclear Scintiscan procedures: Basics of common clinical Nuclear Medicine procedures/techniques. structural imaging studies advantages and limitations.	6	To acquire knowledge about the scintiscan procedures used in PET and SPECT.	4,5
V	Hybrid imaging: PET-CT and PET MRI	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 Sabharwal.

T3: DebraA,Gervais,Tarun Sabharwal 'Interventional procedures in biopsy and drainage' 1st Edition (2011)

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Comprehend the understanding on equipment used in interventional procedures.	1,3
2	Discuss the various procedures, techniques and guided procedures of interventional radiology.	2
3	Comprehend the understanding of basic nuclear physics and radiopharmaceuticals used in nuclear imaging.	1,3,8
4	Explain the different types of production of radionuclides.	1,3,8
5	Discuss the instrumentation used in nuclear medicine.	1,3

SEMESTER – VI									
Course Title	PATIENT CARE IN DIAGNOSTIC RADIOLOGY								
Course code	24BRIT3205R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Hospital Training & Management	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
SEMESTER	Autumn/ VI semester of third year of the Programme								
Course Objectives	1. Students will understand record management, ethics, and teamwork in healthcare settings. 2. Students will learn specialized care techniques for diverse and critical patient needs. 3. Students will develop essential first aid skills and aseptic practices for safe patient handling.								
CO1	Discuss about the hospital ethics.								
CO2	Demonstrate the approach of reassuring and consoling the patient								
CO3	Apply first aid techniques and emergency care to the patient.								
CO4	Utilize the various radiographic techniques used for both paediatric and geriatric radiography.								
CO5	Explain about the sterilization techniques used during radiographic examination.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
1	Hospital staffing and administration <ul style="list-style-type: none"> .Hospital records. Professional ethics. Co-operation with other staff and departments. Departmental organizations. 	10	To acquire knowledge about the functions of hospital and its ethics.					1,2,3,4	
2	Care of the patient <ul style="list-style-type: none"> Management of chair and stretchers to patients. .Management for the unconscious patient. .Elementary hygiene& personal cleanliness hygiene. .Management for the visually impaired, speech and hearing impaired, mentally impaired, drug addicts and non-English speaking patients. .Management for the seriously ill and traumatized patients Informed consent 	12	To acquire knowledge about patient care and management					2,3,4	
3	First aid <ul style="list-style-type: none"> .First aids wounds and bleeding dressing and bandages pressure and splints supports. Shock, electrical shock, haemorrhage, burns, Asphyxia, fractures, loss of consciousness 	12	To understand the knowledge on First aid.					1,3,5	
4	Patient care & implementation of radiographers in:	6	To understand the knowledge on both pediatric and geriatric					3,4,5	

	<ul style="list-style-type: none"> • Paediatrics • Geriatrics • Patient care during Investigating. Tract , Biliary tract , Respiratory tract, Gynecology, • Cardiovascular system, Lymphatic system, C.N.S. etc. 		Radiography and its patient care.	
5	Principles of asepsis <ul style="list-style-type: none"> • Sterilization methods. • Handling of infected patients in the department and ward. 	5	To understand the knowledge on patient hygiene.	1,2,3,4

TEXT BOOKS:

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.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Discuss about the hospital ethics.	5
2	Use the approach of reassuring and consoling the patient	2
3	Apply first aid techniques and emergency care to the patient.	2
4	Utilize the various radiographic techniques used for both pediatric and geriatric radiography.	2
5	Explain about the sterilization techniques used during radiographic examination.	2

SEMESTER – VI									
Course Title	LAB BASED RESEARCH PROJECT								
Course code	24BRIT3206R	Total credits: 24	L	T	P	S	R	O/F	C
			0	0	0	0	24	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
Semester	Autumn/ VI semester of third year of the Programme								
Course Objectives	1. Equip students with the ability to design, conduct, and analyze scientific research relevant to radiography. 2. Provide practical experience in handling radiographic equipment, performing imaging procedures, and using advanced imaging software for data acquisition and analysis. 3. Instill knowledge of ethical considerations in research, including patient privacy, data security, and obtaining appropriate consent for studies involving human participants or clinical data.								
CO1	Explain the importance of research in advancing diagnostic imaging techniques, patient care, and radiographic technology.								
CO2	Perform radiographic imaging procedures with precision, adhering to standard protocols and patient safety guidelines.								
CO3	Explain the functions and importance of Health Information Systems in radiography.								
CO4	Recognize the significance of case presentations in improving diagnostic accuracy and treatment planning.								
CO5	Demonstrate a thorough understanding of ethical principles in research, including patient confidentiality, informed consent, and integrity in data reporting.								
Unit- No.	Content		Contact Hour	Learning Outcome			KL		
I	Introduction to Research in Radiography: Overview & Importance of research Formulating research questions and hypotheses. Study design: Experimental, observational, and mixed-methods approaches. Data collection methods: Quantitative and qualitative.		10	Students will be able to learn about research and its importance in clinical era.			1,2		
II	Radiographic Imaging Techniques: Principles of radiographic imaging and image acquisition. Optimization of imaging parameters for research purposes.		12	Students will be able to learn about the Imaging techniques used in various case study.			1,2,3		
III	Skills Development: Data entry and management on electronic health record system - HIS,RIS,DICOM,PACS.		12	Students will be able to learn about the use of teleradiography.			1,2,3		
IV	Introduction to Case Presentation: Importance and objectives of case presentations in clinical practice.		6	Students will be able to learn the importance of case presentations in clinical			2,3,4		

	Structuring a Case Presentation- Patient identification, Chief Complaints , History of Present Illness (HPI), Past Medical History, Family and Social History, Diagnostic Tests and Imaging , Diagnosis, Treatment Plan.		practice.	
V	Hybrid imaging: PET-CT and PET MRI	5	To acquire knowledge about the PET – CT scan and PET MRI scan	4,5

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Explain the importance of research in advancing diagnostic imaging techniques, patient care, and radiographic technology.	1, 2,3
2	Perform radiographic imaging procedures with precision, adhering to standard protocols and patient safety guidelines.	2,3
3	Explain the functions and importance of Health Information Systems in radiography.	2,3
4	Recognize the significance of case presentations in improving diagnostic accuracy and treatment planning.	2,3,8
5	Demonstrate a thorough understanding of ethical principles in research, including patient confidentiality, informed consent, and integrity in data reporting.	5,6,8

SEMESTER – VI									
Course Title	TECHNO-PROFESSIONAL SKILLS IV								
Course code	24BRIT3207R	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 RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY								
SEMESTER	Autumn/ VI semester of third year of the Programme								
Course Objectives	1. To improve the image quality thereby increasing the diagnostic value. 2. To reduce the radiation exposure and repeat examination. 3. To maintain the various diagnostic and imaging units at their optimal performance								
CO1	Describe the Quality Assurance & quality control of diagnostic Radiology Equipment.								
CO2	Describe about Care and Maintenance of Radiology Equipment.								
CO3	Knowledge of Different Imaging Modalities								
CO4	Understanding of Radiation Safety and Dose Management								
Unit- No.	Content			Contact Hour	Learning Outcome			KL	
1	Care and Maintenance of X- ray Equipment i. General care. ii. Functional tests. iii. Testing the performance of exposure timers. iv. Assessing the MA settings. v. Testing the available KV. vi. Measurement of focal spot of an x-ray tube, faults and remedies for X-ray tubes. vii. Testing the light beam diaphragm. • Practical precautions pertaining to Brakes and locks, H.T. cables, meters and controls. Assessing of tube stands and tracks as well as accessory equipment.			15	To acquire knowledge on Quality assurance and quality control and quality test on Xray unit both mechanical and radiological check.			1,2,3,4	
2	Quality Assurance and quality control of Modern Radiological Equipment. 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. • DEX			15	To demonstrate knowledge on Quality checking of fluoroscopy, CT, MRI, USG and DEXA.			2,3,4,5	

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 PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Describe the Quality Assurance & quality control of diagnostic Radiology Equipment.	1,3
2	Describe about Care and Maintenance of Radiology Equipment.	2
3	Knowledge of Different Imaging Modalities	1,3,8
4	Understanding of Radiation Safety and Dose Management	1,3,8

SEMESTER – VI										
Course Title	QUALITY ASSURANCE & QUALITY CONTROL IN DIAGNOSTIC RADIOLOGY									
Course Code	24BRIT3208R	Total Credit: 2 Total Hours= 30T		L	T	P	S	R	O	C
				2	0	0	0	0	0	2
Pre- Requisite		Co- Requisite		Nil						
Anti-Requisite	Nil									
Programme	BACHELOR OF RADIOGRAPHY & ADVANCED IMAGING TECHNOLOGY									
Semester	Autumn/ VI semester of third year of the Programme									
Course Objective	<ol style="list-style-type: none"> 1. Improve the quality of imaging thereby increasing the diagnostic value. 2. To reduce radiation exposure; Reduction of film wastage and repeat examination. 3. To maintain the various diagnostic and imaging units at their optimal performance. 									
CO1	Understand the principles of QA & QC in radiography.									
CO2	Implement and evaluate a QA Programme in a radiology department.									
CO3	Perform routine quality control tests on radiographic equipment.									
CO4	Understanding of Radiation Safety and Dose Management									
CO5	Apply QA principles to CT, MRI, Mammography, and Fluoroscopy.									
Unit No.	Content	Contact Hour	Learning outcome	KL						
1	Introduction: <ul style="list-style-type: none"> • QA & QC • Objectives 	4	Students will be able to explain the importance of QA/QC in ensuring high standards of medical imaging.	1,2						
2	Quality assurance programme in the radiological faculty level: <ul style="list-style-type: none"> • Responsibility • Purchase • Specifications; Acceptance; Routine testing's • Evaluation of results of routine tastings. 	10	Students will be able to interpret regulatory guidelines and standards related to QA in medical imaging.	1,2,3						
3	Quality assurance programme tests: <ul style="list-style-type: none"> • General principles and preventive maintenance for routine, daily, weekly, monthly, quarterly, annually – machine calibration. 	9	Students will be able to conduct daily, weekly, monthly, and annual QC tests on radiographic equipment.	1,3,4						
4	Radiographic Image Quality: <ul style="list-style-type: none"> • Factors affecting image quality (contrast, resolution, noise, artifacts) • Evaluation criteria for high-quality radiographs • Subject contrast and detector contrast 	9	Students will be able to understand the unique image quality parameters for different imaging modalities.	4,5						
5	Special Imaging Modalities & QA Considerations: <ul style="list-style-type: none"> • QA in CT, MRI, Mammography, and Fluoroscopy • Image quality parameters in different modalities • Dose management in advanced imaging systems 	9	Students will be able to implement QA/QC measures in CT, MRI, Mammography, and Fluoroscopy.	4,5,6						

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAMME OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Programme Outcome
1	Understand the principles of QA & QC in radiography.	1,3,8
2	Implement and evaluate a QA Programme in a radiology department.	1,3,8
3	Perform routine quality control tests on radiographic equipment.	1,3,8
4	Understanding of Radiation Safety and Dose Management	1,3,8
5	Apply QA principles to CT, MRI, Mammography, and Fluoroscopy.	1,3,8



Assam down town University

Curriculum and Syllabus

Bachelor of Critical and Intensive Care Unit Technology

**OUTCOME BASED EDUCATION FRAMEWORK
CHOICE BASED CREDIT SYSTEM**

Version: 2.2

FACULTY OF PARAMEDICAL SCIENCES

July, 2024

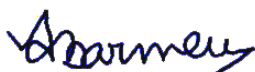
PREAMBLE

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 Board of Studies (BOS) meeting of the Faculty of Paramedical Sciences held on dated 20/06/2024 and approved by the 51st Academic Council (AC) meeting held on dated 26/07/2024.



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 Unit 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.

I. Specific Features of the Curriculum:

The curriculum provides skill enhancement and value-added courses which helps in understanding patient monitoring systems, different lifesaving skills and medical imaging.

Develops professional ethics and helps in developing personality

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):

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.

IV. 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: Techno-Professional Efficiency Professional Efficiency: Apply comprehensive knowledge to perform life-saving procedures in emergency and critical care settings.

PSO3: Global Competency: Demonstrate global competency to excel in the profession through international interdisciplinary certification courses.

V. Program Outcome (PO):

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.

VI. Total Credits to be Earned: 133

VII. Career Prospects:

Graduates of the Bachelor of Critical and Intensive Care Unit 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

SN	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

SN	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^{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, Student present and deliver lectures in presence of teacher and supervised by teacher	60%
Student visit fields or perform experiments or teacher perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

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

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.

Breakdown of Credits

S. N.	Category	Total number of Credits
1	DSC (Major)	70
2	DSC (Minor)	18
3	Multidisciplinary Course (MDC)	9
4	Ability Enhancement (AEC)	8
5	Skill Enhancement Course (SEC)	9
6	Value Added Course (VAC)	6
7	Internship	4
8	Research/Industry Internship	6
9	Field Training	1
10	Co & Extra-Curricular	2
Total:		133

Breakdown by categories of courses

S.N.	Category	Credits	%
1	Paramedical Sciences	119	89.47%
2	Science	2	1.50%
3	Engineering	1	0.75%
4	Commerce and Management	2	1.50%
5	CLPPD	6	4.51%
6	Humanities and Social Science	3	2.25%
Total:		133	100%

SEMESTER WISE COURSE DISTRIBUTION

SN	Course Code	Course Title	Course Category	Engagement							Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
Semester I	1.	24BCIC1101R	Human Anatomy & Physiology I	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200
	2.	24BCIC1102R	General Biochemistry	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3.	24BCIC1103R	Basic principles of Hospital practice and patient care	DSE (Minor)	2	0	0	0	0	0	2	40	60	00	100
	4.	24UBPD1101R	Basic Communicative English	AEC	0	0	2	0	0	0	1	0	0	100	100
	5.	24BCIC1101M	The Social Psychology	VAC	2	0	0	0	0	0	2	0	100	0	100
	6.	24BCIC1104R	Medical Psychology	MDC	3	0	0	0	0	0	3	40	60	0	100
	7.	24BCIC1105R	Basic Clinical Examination Skills (TPS)	SEC	0	0	2	0	0	0	1	0	0	100	100
	8.	24UBEC1101	Extra-curricular	VAC	0	0	0	4	0	0	1	0	0	100	100
	Total				14	0	10	4	0	0	20	160	340	500	1000
Semester II	1.	24BCIC1201R	Human Anatomy & Physiology II	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200
	2.	24BCIC1202R	Biochemistry: biomolecules and their metabolism	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3.	24BCIC1203R	Fundamentals of patient care and safety	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
	4.	24UBPD1201R	Functional English	AEC	0	0	2	0	0	0	1	0	0	100	100
	5.	24UPSD1201R	Fundamentals of Patient Safety in Dialysis	VAC	3	0	0	0	0	0	3	40	60	0	100
	6.	24UBES1201R	Environmental Studies	MDC	2	0	0	0	0	0	2	40	60	0	100
	7.	24BCIC1204R	Self-Study/ Seminar/ Presentation	SEC	0	0	2	0	0	0	1	0	0	100	100
	8.	24UBCC1201	Co-curricular	VAC	0	0	0	4	0	0	1	0	0	100	100
	Total				14	0	10	4	0	0	20	200	300	500	1000

SN	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
1.	24BCIC2101R	Airway management and respiratory emergencies	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200
2	24BCIC2102R	Patient assessment and drug administration	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200
3	24BCIC2103R	Nutrition	DSC (Minor)	3	0	0	0	0	0	3	40	60	0	100
4	24BCIC2104R	Pharmacology	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
5	24BCIC2105R	Biomedical Waste	DSC (Minor)	0	0	0	0	0	0	1	40	60	0	100
6		Fundamentals of Haemodialysis Machine	MDC	1	0	0	0	0	0	1	40	60	0	100
7		DISA	SEC	0	0	2	0	0	0	1	0	0	100	100
8	24UBPD2101R	Executive English	AEC	0	0	2	0	0	0	1	0	0	100	100
9	24BCIC2106R	First Aid (TPS)	SEC	0	0	2	0	0	0	1	0	0	100	100
10	24UDLS2101R	Digital Literacy	VAC	0	0	2	0	0	0	1	0	0	100	100
11	24UULS2101R	Basic Acclimatizing Skills	MDC	0	0	2	0	0	0	1	0	0	100	100
12	24BCIC2107R	Field Training	FT	0	0	0	0	0	8	1	0	0	0	100
Total				12	0	18	0	0	8	23	240	360	700	1400

SN.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
1	24BCIC2201R	Cardiovascular and neurological emergencies	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200
2	24BCIC2202R	Mechanical Ventilation	DSC (Major)	2	0	2	0	0	0	3	40	60	100	200
3	24BCIC2203R	Microbiology	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100
4	24BC IC2204R	Pathology	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100
5	24BCIC2205R	Palliative care	DSE (Major)	2	0	0	0	0	0	2	40	60	0	100
6	24BCIC2206R	Patient Safety And Quality Care	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100
7	24UBPD2201R	Enhanced Professional Skills	AEC	0	0	2	0	0	0	1	0	0	100	100
8	24UUF2202R	Financial Literacy	MDC	0	0	2	0	0	0	1	0	0	100	100
9	24BCIC2207R	Advanced Cardiac Life Support (TPS)	SEC	0	0	4	0	0	0	2	0	0	100	100
10	24UULS2202R	Basic Life Saving Skills	VAC	0	0	2	0	0	0	1	0	0	100	100
11	24BCIC2208R	Self-Study Seminar	AEC	0	0	2	0	0	0	1	0	0	100	100
Total				13	0	18	0	0	0	22	240	360	700	1300

	SN.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
Semester V	1	24BCIC3101R	Clinical Observation I (ICU procedure & Patient care)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100
	2	24BCIC3102R	Clinical Observation II (ICU monitoring Devices)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100
	3	24BCIC3103R	Clinical Observation III (ICU care medication)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100
	4	24BCIC3104R	Case Study Report	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100
	5	24BCIC3105R	Summer Internship	Internship	0	0	0	0	0	24	4	0	0	100	100
	6	24BCIC3106R	Research	Research	0	0	0	0	18	0	2	0	0	100	100
	Total					0	0	0	64	18	24	22	0	0	600
Semester VI	SN.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
	1	24BCIC3201R	Trauma Emergencies Management	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200
	2	24BCIC3202R	Medical And Surgical Emergencies Care	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200
	3	24BCIC3203R	Dialysis	DSC (Major)	4	0	0	0	0	0	4	40	60	0	100
	4	24BCIC3204R	Introduction To Research Methodology	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100
	5	24BCIC3205R	Research/ Industry Internship	Research	0	0	0	0	24	0	4	0	0	100	100
	6	24BCIC3206R	Techno Professional Skills	SEC	0	0	8	0	0	0	4	0	0	100	100
7		Finishing School	AEC	0	0	4	0	0	0	2	0	0	100	100	
Total:					12	0	20	0	24	0	26	160	240	500	900

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

SEMESTER – I									
Course Title	Human Anatomy & Physiology I								
Course code	24BCIC1101R	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	Bachelor of Critical and Intensive Care Unit Technology								
Semester	I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> 1. To familiarize with anatomical positions and understand the microscopic structure of organs and skeleton in the human body. 2. To facilitate a deeper comprehension of anatomical structure and basic physiological functions across different body regions. 3. To enable students to apply this knowledge practically in various healthcare and scientific contexts. 								
CO1	Discuss the anatomical terms and basic structure and function of cells								
CO2	Explore knowledge of Musculo skeletal system and bones along with their special features and functions.								
CO3	Describe the composition of the human digestive system and their specific functions.								
CO4	Explain respiratory system and classify various respiratory disorders.								
CO5	Describe the anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction To Anatomical Terms, Basic Structure and Function of Cell <ul style="list-style-type: none"> • Level of Organization – Body Parts and Areas, Planes and Sections. Common anatomical terminology • Structure and Function of Cell Membrane, Cellular Transport 		7	Describe, illustrate and explain the different anatomical terms, basic structure and function of cell.				1,2	
II	Muscle – Skeletal-System and Bones <ul style="list-style-type: none"> • Bones: Classification & types according to morphology. • Tissue and its types • Cartilage • Joints: definition, classification, and movements of joints. • Muscle and its types For Specific programs- <ul style="list-style-type: none"> • Radiology: Importance of different bones of human body. 		10	Describe, illustrate and classify the musculoskeletal system along with bones.				1,2	
III	Digestive System- <ul style="list-style-type: none"> • Anatomy of gastrointestinal tract and accessory organs of digestive system. • Composition and functions of gastric, pancreatic, intestinal, and biliary secretion. 		10	Describe, illustrate and explain the structure of organs of digestive system.				1,2	

IV	<p>Respiratory System-</p> <ul style="list-style-type: none"> • Anatomy of the respiratory tract • Mechanisms and Regulation of respiration. • Gaseous exchange in lung and tissues. • Lung volumes and capacities. • Respiratory abnormalities: Hypoxia, cyanosis, dyspnoea, Asphyxia, hyperventilation, hypoventilation, Tachypnea and Bradypnea <p>Specific Program</p> <p>ECC: Intrapleural and intrapulmonary pressures and their changes with respiration, Hypoxia.</p> <p>For Specific programs-</p> <p>ECC: Description of larynx, trachea, and respiratory centers</p>	8	Describe, illustrate and explain the anatomy of respiratory tract.	1,2
V	<p>Cardio-vascular System and Blood:</p> <ul style="list-style-type: none"> • Mediastinum – division • Structure of heart and blood vessels. • Systemic circulation, pulmonary circulation, and coronary circulation • Cardiac output, cardiac cycle, conducting system of heart. • Heart sounds, pulse, blood pressure and the irregularity. • Composition and functions of blood, Plasma, and body fluids. • Functions of RBC, WBC, and platelets. • Haemoglobin. • Blood haemostasis • Blood groups 	10	Describe, classify and explain the about cardio vascular system and composition and function of blood.	1,2
Practical	<ol style="list-style-type: none"> 1. Study of Skull Vertebrae, Ribs and bones of upper limb. 2. Study of compound microscope 3. Measurement of blood pressure, arterial pulse 4. Bleeding time 5. Clotting time 6. Haemoglobin time 	30	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:

T1: Fundamentals of Anatomy by Pamela K Levangie, Cynthia C Norkin: JP Bros Medical Publishers, New Delhi

T2: Fundamentals of Medical Anatomy by Duane nudson: 2nd ed. 2007 Publisher Springer.

T3: Ross and Wilson Anatomy and Physiology by Ross and Wilson: JP Bros Medical Publishers, New Delhi

REFERENCE BOOKS:

R1: Medical anatomy by JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997: JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997

R2: 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	Discuss the anatomical terms and basic structure and function of cells	1,3,8
2	Explore knowledge of Musculo skeletal system and bones along with their special features and functions.	1,3,8
3	Describe the composition of the human digestive system and their specific functions.	1,3,8
4	Explain respiratory system and classify various respiratory disorders.	1,3,8
5	Describe the anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body	1,3,8

SEMESTER – I									
Course Title	General Biochemistry								
Course code	24BCIC1102R	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	Bachelor of Critical and Intensive Care Unit Technology								
Semester	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	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: <ul style="list-style-type: none"> Definition and classification of carbohydrates Example of some common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch), their sources and structures. Biological significance of Carbohydrate 		10	Define, classify and describe the sources and types of carbohydrates along with their functions in the body.			1,2		
II	PROTEINS: <ul style="list-style-type: none"> Definition of Proteins along with the biological significance, Amino acids and its, classification: Essential and Non-essential amino acids 		9	Define, classify and explain the mechanism of proteins along with their functions in the body.			1,2		
III	LIPIDS: <ul style="list-style-type: none"> Definition and classification of lipids Classification of Fatty Acids Examples and functions of some common lipids (Phospholipids, Glycolipids, Steroids) 		8	Define and classify types of lipids along with their functions in the body.			1,2		
IV	NUCLEIC ACIDS: <ul style="list-style-type: none"> Basics on 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	ACID-BASE BUFFERS: <ul style="list-style-type: none"> Basics about acids, bases, pH, pOH, pKa and 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.	6	Define, illustrate, explain and apply different laboratory test like Fehling test, Benedict's test and molest text	1,2,3,4,5
	2. To identification and demonstration of biochemistry laboratory instruments (Principle and Applications)	6		
	3. To perform Fehling's test for determination of reducing and non-reducing sugar in an unknown sample.	6		
	4. To perform Benedict's test for determination of reducing and non-reducing sugar in an unknown sample.	6		
	5. To perform Molisch's for test determination of sugar in an unknown sample.	6		

TEXT BOOKS:

T1: Text Book of biochemistry by U Satyanaryana and U Chakrapani: Sixth Ed

T2: Text book of Biochemistry for medical students by DM Vasudevan (Author), Sreekumari S (Author), Kannan Vaidyanathan (Author): 7th Edition

REFERENCE BOOKS:

R1: Lehninger Principles of Biochemistry by David L Nelson and Michael M Cox: Eighth Edition| ©2021 David L.

R2: Text book of Biochemistry by Lubert Stryer, Jeremy M Berg, WH Freeman: 9th ed. 2019

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	1,2,3,8
2	Identify various classification of amino-acids and recognize the significance of Protein.	1,2,8
3	Describe the significance, classification and functions of lipids.	1,2,8
4	Comprehend the structure and functions of Nucleic Acids.	1,2,3,8
5	Explain the fundamentals and importance of acid, base and buffers	1,2,3,8

SEMESTER – I									
Course Title	Basic principles of Hospital practice and patient care								
Course code	24BCIC1103R	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 Critical and Intensive Care Unit Technology								
Semester	I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> To impart the knowledge in patient in a holistic approach for the overall wellbeing of the patient. To impart a comprehensive knowledge on medical ethics and the quality and functions of medical professionals. 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	Hospital & Records & Reports: <ul style="list-style-type: none"> 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 	5	Describe, illustrate and explain the different types of record and reports maintained in the hospital.					1,2	
II	FIRSTAID: <ul style="list-style-type: none"> First aid 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 Scorpion bite Dog bite foreign bodies in various organs Burns & scald Haemorrhage 	5	Explain the objectives of first aid and demonstrate the management of various medical emergencies.					1,2,3	

III	HYGIENE AND BASIC CARE NEEDS OF PATIENTS: <ul style="list-style-type: none"> • 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, Fowlers position 	5	Describe, illustrate and explain the significance of maintaining safety and hygiene in patient care.	2,3,4
IV	SAFETY IN THE LABORATORY: <ul style="list-style-type: none"> • Common laboratory accidents from physical injuries • Electrical shock • Chemical injury • Bleeding • Burn • Eye accidents • Biological hazards 	5	Describe, define and explain the different positions of the body along with the management of temperature for patients.	2,3,4
V	VITAL SIGNS OF PATIENTS: <ul style="list-style-type: none"> • 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 	10	Describe, explain and demonstrate the assessment of pulse and respiration along with the factors affecting them.	1,2,3,4,5

TEXT BOOKS:

T1: Principles of Hospital Practice and Patient Care by Srinivasulu Reddy: Paras, New Delhi, India, 13th Edition (2020).

T2: Hospital and Patient Care Management by Dr. Vidhya Srinivasan, Dr. Akshay Ch. Deka: Asian Humanities Press, New Delhi, India, 4th Edition (2019).

REFERENCE BOOKS:

R1: Principles and Practice of Hospital Medicine by Sylvia McKean: McGraw-Hill Education, USA, 4th Edition (2019).

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.	5,6,7,8
2	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	1,2,3,4
3	Apply fundamental knowledge of patient safety and care to ensure basic care needs of patients.	2,3,7
4	Assessment of common laboratory accidents and its effective management.	2,3,5
5	Describe vital signs and effectively manage the abnormalities	1,2,3

SEMESTER – I									
Course Title	MOOCS								
Course code	24BCICM1O01	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 Critical and Intensive Care Unit Technology								
Semester	I semester of first year of the programme								
Course Objectives	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

SEMESTER – I									
Course Title	Field Visit								
Course code	24BCIC1104R	Total credits: 1	L	T	P	S	R	O/F	C
			0	0	0	0	0	8	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	I semester of first year of the programme								
Course Objectives	1. To learn practical skills through early exposure to primary, secondary, and tertiary healthcare settings. 2. Understand the roles and responsibilities within different levels of the healthcare system. 3. Learn to develop innovative solutions and adapt to the dynamic nature of the medical field.								
CO1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.								
CO2	Comprehend the practical applications of theoretical concepts in real-world settings.								
CO3	Exposure to diverse situations to enhance skills in patient management and care.								
CO4	Evaluate the effectiveness of different approaches and methods seen during the field trip.								
CO5	Develop innovative strategies or solutions inspired by enhanced professional practice.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.	2,5,6,7,9
2	Comprehend the practical applications of theoretical concepts in real-world settings.	1,2,3,7,8
3	Exposure to diverse situations to enhance skills in patient management and care.	1,2,3,5,8
4	Evaluate the effectiveness of different approaches and methods seen during the field trip.	5,7,8
5	Develop innovative strategies or solutions inspired by enhanced professional practice.	5,6,7,8

SEMESTER – I									
Course Title	Basic communicative English								
Course code	24UBPD1101R	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 Critical and Intensive Care Unit Technology								
Semester	I semester of first year of the programme								
Course Objectives	1. To improve speaking and pronunciation skills. 2. To enhance vocabulary for everyday conversations and professional interactions. 3. To understand common grammatical structures and apply them accurately.								
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	Speaking Skills i. Introduction and greetings ii. Pronunciation iii. Asking and offering information	7	Describe, illustrate and explain about the speaking skills and pronunciation.					1,2	
II	Building Vocabulary i. Synonyms ii. Antonyms	5	Describe and explain about the vocabulary					1,2,3	
III	Grammar (Flipped Classroom) i. Parts of Speech ii. Articles iii. Affirmative and Negative Sentences iv. Sentence Construction from jumbled words	5	Describe, illustrate and explain about the grammar needed in every sentence					1,2,4	
IV	Communication Skills i. Introduction to Communication, ii. Purpose of Communication, iii. Types of Communication iv. Barriers of Communication	13	Describe, illustrate and explain the types of communication and communication skills.					1,2,3	
V	Presentation Skills i. Introduction to Presentation skills ii. Essential characteristics of a good presentation iii. Preparation of a good presentation (4P's of Presentation) iv. Tips for using visual aids during presentation	5	Describe, explain, demonstrate and applied the skills of good presentation.					1,2,3, 4,5	

TEXT BOOKS:

1. Barrett, Grant. 2016. *Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking*, Zephyros Press.
2. Professionalism Skills for Workplace Success, [Lydia E. Anderson](#), [Sandra B. Bolt](#), Publisher: [Pearson Education](#)
3. The Art of Public Speaking, [Dale Carnegie](#), Publisher: [Diamond Pocket Books Pvt Ltd](#)
4. English for Academic CVs, Resumes, and Online Profiles, [Adrian Wallwork](#), Publisher: [Springer International Publishing](#)
5. Employment & Volunteering: Job Interview Basics, [Lisa Renaud](#), Publisher: [Classroom Complete Press](#)

REFERENCE BOOKS:

- Zinsser, William. (2006) *On Writing Well: The Classic Guide to Writing Nonfiction*, Harper Perennial
- Taylor J. and Wright, J., *IELTS Advantage Reading Skills: A step-by-step guide to a high IELTS reading score*, Delta Publishing by Klett
- Murphy, Raymond., (2012) *English Grammar in Use Book with Answers: A Self- Study and Practice Book for Intermediate Learners of English*, Cambridge University Press
- Real-resumes for Teachers, [Anne McKinney](#), Publisher: [Prep Pub.](#)
- Public Speaking for Success, [Dale Carnegie](#), Publisher: [Penguin Publishing Group](#)
- Job Interview Skills, [Paige Labert](#), Publisher: [Di Dio Calderone Giuseppina](#)

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.	5,7,8
2	Expand their vocabulary and use synonyms and antonyms appropriately.	5,7,8
3	Apply grammatical rules to construct grammatically correct sentences and paragraphs.	5,7,8
4	Identify different types of communication and strategies to overcome communication barriers.	5,7,8
5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.	5,7,8

SEMESTER – I									
Course Title	Extra-curricular/Co-curricular								
Course code	24UBEC1101/ 24UBCC1101	Total credits: 1 Total hour: 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 Unit Technology								
Semester	I 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	ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.	60S	Develop skills and confidence to participate in different activities organized by the institution	1,2,3, 4,5					
	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.								

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	2,5,7,8
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.	2,5,7,8
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

SEMESTER – II									
Course Title	Human Anatomy & Physiology II								
Course code	24BCIC1201R	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 Critical and Intensive Care Unit Technology								
Semester	II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> To develop fundamental knowledge on the gross structure of the excretory system and its function. To classify the nervous system and understand the functions of all the special senses. To identify different types of immune cells, comprehend the lymphatic system, and understand the structure and function of the male and female reproductive systems, including their regulation by the endocrine system. 								
CO1	Explain the structure and function of excretory system.								
CO2	Describe the sensory organs and nervous system along with their functions								
CO3	Identify different types of immune cells and lymphatic system in the body.								
CO4	Explain the structure and functions of male and female reproductive system.								
CO5	Describe the endocrine system and their regulation								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Urinary System <ul style="list-style-type: none"> Structure of kidney, ureter, urinary bladder, male and female urethra. Functions of kidneys, nephron. Urine formation. 	10	Describe, define and explain the different structure of organs in the pelvis. Explain, define and classify the structure of organs involved in the urinary system.					1,2	
II	Nervous System <ul style="list-style-type: none"> Classification of Nervous system Central Nervous system – Brain and Spinal cord, blood supply of brain. Cranial nerves and spinal nerves Introduction of motor system, sensory system and Autonomic Nervous System. Functions of brain, and spinal cord Synapse, reflex arc Cerebrospinal fluid Sensory Organs: Skin, Ear, Nose, Tongue Eye 	9	Describe, classify and explain the nervous system of the human body.					1,2,3	
III	Lymphatic and Immunological System <ul style="list-style-type: none"> Structure of lymphatic system and functions. Immunity – Antigen, Antibody, and Immune response. Acquired immunity 	8	Classify the different structures and functions of the lymphs along with the immune system of the body.					1,2,3	

IV	Reproductive System <ul style="list-style-type: none"> • Structure of male and female reproductive organs. • Structure of breast • Changes during puberty • Ovulation, • Menstrual cycle • Pelvic cavity with its boundaries and contents 	8	Describe, illustrate and explain the different parts of the human reproductive system.	1,2,3,4
V	Endocrine System <ul style="list-style-type: none"> • Different endocrine glands • Hormones and functions of endocrine glands • Regulation of secretion hormones. 	10	Classify, differentiate and explain about endocrine glands with their hormones and function.	1,2,3,4,5
Practical	Study of pelvic bones and bones of lower limbs of human body. 1. Study of organs: Brain, heart, lung, liver, kidney 2. Blood group DLC Total count of RBC and WBC	30	Describe, illustrate and explain about bones and organs of human body. Analyzing the blood group and total count of RBC and WBC.	1,2,3,4,5

TEXT BOOKS:

T1: Fundamentals of Anatomy by Pamela K Levangie, Cynthia C Norkin: JP Bros Medical Publishers, New Delhi

T2: Fundamentals of Medical Anatomy By, Duane nudson: 2nd ed. 2007 Publisher Springer.

T3: Ross and Wilson Anatomy and Physiology by Ross and Wilson: **Churchill Livingstone 8th Ed.**

REFERENCE BOOKS:

R1: Medical anatomy : JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997

R2: 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	Explain the structure and function of excretory system.	1,8
2	Describe the sensory organs and nervous system along with their functions	1,8
3	Identify different types of immune cells and lymphatic system in the body.	1,8
4	Explain the structure and functions of male and female reproductive system.	1,8
5	Describe the endocrine system and their regulation	1,8

SEMESTER – II										
Course Title	Biochemistry: Biomolecules and Their Metabolism									
Course code	24BCIC1202R	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 Critical and Intensive Care Unit Technology									
Semester	II semester of first year of the programme									
Course Objectives	1.To teach the technical aspects of biochemical studies, focusing on clinical implications. 2.To elucidate the energy dynamics via ATP in human cells. 3.To provide comprehension of enzymes, including their functions, regulations, and biological significance.									
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 : <ul style="list-style-type: none"> • Definition and classification of enzyme. • Basic idea of co-enzyme, iso-enzyme. • Mechanism of enzyme • Action. • Factors affecting enzyme reaction 		7	Describe, classify and explain the types of enzymes along with the factors affecting their actions.					1,2	
II	CARBOHYDRATES METABOLISM <ul style="list-style-type: none"> • Glycolysis • Kreb's Cycle • Gluconeogenesis • Glycogenesis • Glycogenolysis 		10	Describe and explain the mechanism of carbohydrates in the body.					1,2,3	
III	PROTEINMETABOLISM <ul style="list-style-type: none"> • Transamination • Deamination • Urea Cycle and its Significance 		10	Describe, illustrate and explain the metabolism of protein and their significance.					1,2,3	
IV	LIPID METABOLISM, CLINICAL BIOCHEMISTRY <ul style="list-style-type: none"> • β oxidation of Fatty Acids. • Ketone bodies • Ketosis and ketoacidosis • Liver function test. • Renal function test 		8	Define and explain the metabolism of lipids along with the clinical diagnostic tests and their significance.					1,2,3,4	

V	VITAMINS AND MINERALS: <ul style="list-style-type: none"> • Definition and classification of vitamins according to solubility. • Sources and functions of individual vitamins Deficiency. • Individual minerals (calcium, phosphorus, iron, magnesium fluslide, copper, selenium, molybdenum etc) –their sources, function and properties. 	10	Describe, explain and classify the different types of vitamins and minerals along with their sources and functions.	1,2,3,4,5
Practical	To perform precipitation test to determine the presence of proteins in an unknown urine sample.	60	Describe, illustrate and explain about different test for proteins and lipids.	1,2,3,4,
	To perform heat and acetic acid test to determine the presence of proteins in an unknown urine sample			
	To perform Heller’s test to determine the presence of proteins in an unknown urine sample			
	To perform lipid solubility test			

TEXT BOOKS:

T1: Text Book of biochemistry by U Satyanarayana and U Chakrapani: Sixth Ed

T2: Text book of Biochemistry for medical students by DM Vasudevan (Author), Sreekumari S (Author), Kannan Vaidyanathan (Author): 7th Edition

REFERENCE BOOKS:

R1: Lehninger Principles of Biochemistry by David L Nelson and Michael M Cox: Eighth Edition|©2021 David L.

R2: Text book of Biochemistry, Lubert Stryer, Jeremy M Berg, WH Freeman: 9th ed. 2019

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.	1,2
2	Define the mechanism of carbohydrate metabolism in the body.	1,2
3	Explain the metabolism of protein and its significant effects on different organs of body.	1,2,3
4	Describe the process of Lipids metabolism and associated clinical conditions.	1,2,3
5	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body	1,2,3

SEMESTER – II											
Course Title	Fundamentals of patient care and safety										
Course code	24BCIC1203R	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 Critical and Intensive Care Unit Technology										
Semester	II 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	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	Poisoning: <ul style="list-style-type: none"> • Definition • Causes of poisoning • Sources of Poisoning • Symptoms of poisoning • First aid & Management • Antidotes • Common drugs poisoning • Carbon monoxide poisoning 				6	Define, describe and explain the different types of poisons along with their sources and management.				1,2	
II	MEDICAL PROFESSIONAL AND LEGAL HAZARDS OF MEDICAL PROFESSION <ul style="list-style-type: none"> • 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 				6	Describe, illustrate and explain various ethical and legal responsibilities of medical professionals.				1,2,3	
III	SHOCK <ul style="list-style-type: none"> • Definition • Types of shock • General Features of shock Investigations of shock • Initial management & first aid of shock 				6	Describe, classify and explain shock along with their clinical manifestations and management .				1,2,3	

IV	HYPERGLYCEMIA AND HYPOGLYCEMIA <ul style="list-style-type: none"> • 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 Hypoglycemia 	6	Describe, classify and explain the hyperglycemia and hypoglycemia along with laboratory tests of diabetes.	1,2,3,4
V	LABORATORY INVESTIGATION AND LABORATORY SETUP <ul style="list-style-type: none"> • 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 	6	Describe, illustrate and explain medical ethics along with the guidelines and management of different laboratories in the hospital.	1,2,3,4,5

TEXT BOOKS:

- T1: Principles of Hospital Practice and Patient Care by Srinivasulu Reddy: Paras, New Delhi, India, 13th Edition (2020).
T2: Hospital and Patient Care Management by Dr. Vidhya Srinivasan, Dr. Akshay Ch. Deka: Asian Humanities Press, New Delhi, India, 4th Edition (2019).

REFERENCE BOOKS:

- R1: Principles and Practice of Hospital Medicine by Sylvia McKean: McGraw-Hill Education, USA, 4th Edition (2019).

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	1,2,3,6,8
2	Explain the medical ethics and its importance on the healthcare system	6,7,8
3	Identify the different types of shock along with the management.	1,2,3,8
4	Classify the different types of emergency drugs along with the dosage and effects.	1,2,3,7,8
5	Proficient in performing quality laboratory investigation process and laboratory management	2,3,8

SEMESTER – II									
Course Title	Environmental science								
Course code	24UBES1101R	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 Critical and Intensive Care Unit Technology								
Semester	II semester of first year of the programme								
Course Objectives	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								
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		
I	Multidisciplinary nature of environmental studies: <ul style="list-style-type: none"> • Definition • Scope and importance • Need for public awareness 	7	Explain the definition, scope, and importance of environmental studies and discuss the need for public awareness.				1,2		
II	Natural Resources: Renewable and non-renewable resources: <ul style="list-style-type: none"> • Forest resources • Water resources • Mineral resources • Food resources • Energy resources • Land resources sources. 	5	Describe different types of natural resources (renewable and non-renewable) and explain their uses and environmental impacts.				1,2,3		
III	Ecosystems Concept of an ecosystem: <ul style="list-style-type: none"> • Structure and function- Producers, consumers, and decomposers. • Energy flow • 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 	5	Describe the components of an ecosystem, explain energy flow and ecological succession, and compare different types of ecosystems.				1,2,3		

IV	Biodiversity and its conservation <ul style="list-style-type: none"> • Introduction – • Definition • Value of biodiversity • Threats to biodiversity • Conservation of biodiversity 	8	Discuss , explain biodiversity's value and threats, and describe methods for its conservation.	1,2,3,4
V	Environmental Pollution <ul style="list-style-type: none"> • Definition Cause, effects, and control measures of: - Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards • Solid waste management • Disaster management 	5	Discuss , explain about the cause, effects of environmental pollution.	1,2,3,4,5

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 Chatwal G. R. & Sharma H. Environmental Studies, Himalaya Publishing House

REFERENCE BOOKS:

R1: Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, 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).

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Discuss the importance of Environment Studies and the need for public awareness.	1,2,8
2	Identify natural resource, its importance, and its impacts on the environment	1,2,8
3	Explore in-depth knowledge on concept of ecosystem	1,2,8
4	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.	1,2,8
5	Explain various environmental pollution and its impact on human and ecosystem	1,2,8

SEMESTER – II									
Course Title	MOOCS								
Course code	24BCICM1001	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 Critical and Intensive Care Unit Technology								
Semester	II semester of first year of the programme								
Course Objectives	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

SEMESTER – II									
Course Title	Field Visit								
Course code	24BCICFT102	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 1200	0	0	0	0	0	8	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	II semester of first year of the programme								
Course Objectives	1. To learn practical skills through early exposure to primary, secondary, and tertiary healthcare settings. 2. Understand the roles and responsibilities within different levels of the healthcare system. 3. Learn to develop innovative solutions and adapt to the dynamic nature of the medical field.								
CO1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.								
CO2	Comprehend the practical applications of theoretical concepts in real-world settings.								
CO3	Exposure to diverse situations to enhance skills in patient management and care.								
CO4	Evaluate the effectiveness of different approaches and methods seen during the field trip.								
CO5	Develop innovative strategies or solutions inspired by enhanced professional practice.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.	2,5,6,7,9
2	Comprehend the practical applications of theoretical concepts in real-world settings.	1,2,3,7,8
3	Exposure to diverse situations to enhance skills in patient management and care.	1,2,3,5,8
4	Evaluate the effectiveness of different approaches and methods seen during the field trip.	5,7,8
5	Develop innovative strategies or solutions inspired by enhanced professional practice.	5,6,7,8

SEMESTER – II									
Course Title	Functional English								
Course code	24UBPD1201R	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 Critical and Intensive Care Unit Technology								
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 strengthen the vocabulary of the students which will help in their writing and speaking. 3. To introduce them with the Time Management technique.								
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.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Module1-Grammar <ul style="list-style-type: none"> Interchange Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences Types of Tenses Common Errors 		7	Differentiate between interrogative, assertive, and exclamatory sentence types to enhance communication clarity.				1,2	
II	Module2-Vocabulary <ul style="list-style-type: none"> Homonyms Homophones 		5	Identify and classify homonyms in context to demonstrate understanding of word meanings.				1,2,3	
III	Module3-Reading Skills <ul style="list-style-type: none"> Techniques of Effective Reading Gathering ideas and information from a text 		5	Explain the importance of effective reading techniques in improving comprehension and information retention.				1,2,3	
IV	Module4–Conflict Management <ul style="list-style-type: none"> Definition Type of Conflict Management Effects of conflict Management 		8	Discuss the effects of different conflict management styles on relationships and team dynamics.				1,2,3,4	
V	Module5-Time-Management Skills <ul style="list-style-type: none"> Introduction To Time Management, Importance of Time Management, Basic Tips to Maintain Time. 		5	Demonstrate effective planning and scheduling techniques to optimize personal and professional productivity.				1,2,3,4,5	

TEXT BOOKS:

- T1: Wren, P. Cand 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.
- T3: Swan, Michael., (2014) Practical English Usage, Cambridge University Press Taylor J and Wright, J., IELTS Advantage Reading Skills: A step- by step guide to a high IELTS reading score, Delta Publishing by Klett

REFERENCE BOOKS:

R1.<https://clockify.me/time-management-techniques>

R2.<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	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

SEMESTER – II									
Course Title	Extra-curricular/Co-curricular								
Course code	24UBEC1201/ 24UBCC1201	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 Unit 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	ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.		60	The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2,3, 4,5	
	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.									

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

SEMESTER – III									
Course Title	Airway management and respiratory emergencies								
Course code	24BCIC2101R	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 Critical and Intensive Care Unit Technology								
Semester	III semester of 2 nd year of the programme								
Course Objectives	<ol style="list-style-type: none"> 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 practice various techniques and equipment. 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. 3. Recognition of airway compromise, including recognition and management of upper airway obstruction including foreign bodies and infections. 								
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	Airway Management: 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	Basic Airway Management: <ul style="list-style-type: none"> • Manual Airway maneuvers • Airway adjuncts • Suctioning • Assisted and artificial ventilation 	10	Describe, explain and demonstrate advance airway manoeuvres along with basic airway adjuncts and procedure of suctioning.					1,2,3	
III	Advanced Airway Management: <ul style="list-style-type: none"> • Endo tracheal intubations • Kings PtL Airway • Digital intubations • Laryngeal mask airways and Combitube intubations • Rapid sequence intubations • Surgical and non-surgical airways • Special patient consideration 	10	Classify and explain different airways along with their indications, contraindications and procedure.					1,2,3	
IV	Respiratory Emergencies I <ul style="list-style-type: none"> • Airway problems versus breathing problems 	8	Classify and differentiate between airway and breathing problems.					1,2,3,4	

V	Respiratory Emergencies II • Obstructive airway diseases Assessment and management of various respiratory problems.	10	Describe, identify and manage various respiratory disorders.	1,2,3,4,5
Practical	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	30		1,2,3,4

TEXT BOOKS:

T1: Nancy Caroline Emergency care in the street 7th edition

REFERENCE BOOKS:

R1: Textbook of critical care. 6th 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

SEMESTER – III									
Course Title	Patient assessment and drug administration								
Course code	24BCIC2102R	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 Critical and Intensive Care Unit Technology								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> 1. Introduce the patient assessment identification principles of history taking in the assessment process of individuals. 2. Demonstrate physical examination skills including focused physical, behavioral, psychological, socioeconomic, and environmental assessments of health and illness parameters in patients. 3. Introducing with the type of drug administration and the techniques of venous access. 								
CO1	Understand and apply the techniques of assessment for medical and trauma patients.								
CO2	Comprehend the technique of history taking and demonstrate how 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	Develop comprehensive knowledge on the routes of drug administration and utilize skills to perform correct techniques.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Patient assessment <ul style="list-style-type: none"> • Medical patient assessment • Trauma patient assessment 		7	Discuss briefly about patient assessment techniques including medical and trauma patients.				1,2	
II	History taking <ul style="list-style-type: none"> • Techniques of history taking • Special assessment challenges • Vital signs • Head to toe physical examination • Limits of physical exam 		10	Explain the techniques of history taking for better analysis of the patient's chief complaint.				1,2,3	
III	Interpretation & Special Situations <ul style="list-style-type: none"> • Concept formation • Data interpretation • Application of principle • Reflection in and on action. • Various communication matters. • Documentation techniques • Verbal and nonverbal skills • Special interview situations 		10	Enhance the skill of data interpretation and different vocabulary techniques to use in special situations.				1,2,3	
IV	Venous access <ul style="list-style-type: none"> • Fluid composition & distribution in the body • I.V. fluid composition • Techniques of I. V access. 		8	Illustrate about different techniques and methods of venous access in human body.				1,2,3,4	

V	Medication administration <ul style="list-style-type: none"> • Routes of medication administration • Calculating fluid infusion rates 	10	Explain the procedure of medication preparation for patient administration.	1,2,3,4,5
Practical	<ol style="list-style-type: none"> 1. Checking Vitals 2. Gaining Venous access 3. IV fluids administration 4. Full body Assessment 5. Rapid Assessment 	60		1,2,3,4

TEXT BOOKS:

T1: Nancy Caroline “Textbook of emergency care in the streets” 7th Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand and apply the techniques of assessment for medical and trauma patients.	1,2,3,4,5
2	Comprehend the technique of history taking and demonstrate how to perform head-to-toe examination.	1,2,3,8
3	Apply principles for critical thinking and implement skills on techniques of documentation and communication.	1,2,7
4	Identify the different composition of fluid in the body, different types of IV Fluids, gain IV sites and access.	1,2,3,4
5	Develop comprehensive knowledge on the routes of drug administration and utilize skills to perform correct techniques.	1,2,4

SEMESTER – III									
Course Title	Nutrition								
Course code	24BCIC2103R	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 Critical and Intensive Care Unit Technology								
Semester	III semester of second year of the programme								
Course Objectives	1. Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food. 2. Understanding nutrients in health and disease processes, provide nutrition counselling and education to individuals, groups. 3. 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.								
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	Introduction to Nutrition Science: <ul style="list-style-type: none"> Definitions, history, role of nutrition in maintaining health, classification of food. RDA – factors affecting RDA, determinants of RDA for different nutrients, requirements and allowances, balanced diet. 	7	Describe and explain nutrition; it's history and roles in maintaining health including the recommended dietary allowance.	1,2					
II	Macro Nutrients: 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	Micro Nutrients: <ul style="list-style-type: none"> Vitamins and minerals, their functions, source, digestion and absorption, effects of deficiency and excess. 	10	Describe, classify and explain micro nutrients along with their sources and functions.	1,2,3					
IV	Water and electrolyte balance: <ul style="list-style-type: none"> Distribution of body water – ECF/ICF, functions, different electrolytes – their functions, thirst mechanism, water/electrolyte balance, water imbalance. 	8	Describe, classify and explain the different types of electrolytes in the body along with their functions in the body.	1,2,3,4					
V	Diet Therapy: <ul style="list-style-type: none"> Principles of diet therapy Therapeutic diets, types of therapeutic diets Modification of consistency, feeding techniques, hospital routine diet, different types of diet for ICU patient Role of nutrition in critically ill patients with reference to ICU care 	10	Describe, classify and explain the diet therapy along with their significance and roles in critically ill patients.	1,2,3,4,5					

TEXT BOOKS:

Nutrition Science 7th 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

SEMESTER – III									
Course Title	Pharmacology								
Course code	24BCIC2104R	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 Critical and Intensive Care Unit Technology								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> To explain the fundamentals of pharmacology and comprehend the range of numerous disciplines, definitions, and drug nomenclature at the conclusion of each study unit. To understand the drug's mechanism of action, potential side effects, dosage recommendations, and therapeutic applications. To understand the adverse effects of different types of drugs. 								
CO1	Develop 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.								
Unit- No.	Content			Contact Hour	Learning Outcome			KL	
I	General Pharmacology <ul style="list-style-type: none"> • Introduction, definition and classification of drugs • Routes of drug administration • Pharmacokinetics • Pharmacodynamics • Factors modifying drug response • Adverse effects 			7	Define, explain and classify various drugs and the routes of drug administration.			1,2	
II	Autonomic Nervous System: <ul style="list-style-type: none"> • General Considerations • Cholinergic and Anti – Cholinergic drugs • Adrenergic and Adrenergic blocking drugs • Skeletal muscle relaxants 			10	Describe, classify and explain the drugs used to manage disorders in the nervous system.			1,2,3	
III	Neuropharmacology: <ul style="list-style-type: none"> • Sedative – Hypnotic Drugs: Barbiturates, Benzodiazepines • Antiepileptic drugs, narcotic analgesics. 			10	Describe, classify and explain the drugs used for sedation and pain management.			1,2,3	
IV	Cardiovascular and Respiratory Pharmacology: <ul style="list-style-type: none"> • Drugs used in heart failure – Digitalis, Diuretics, vasodilators. • Antihypertensive Drugs – ACE inhibitors. • Drugs for ischemic heart disease – Nitrates, Beta blockers, Calcium channel blockers. • Vasopressors, Inotropic agents • Anticoagulants and Thrombolytics • Bronchodilators and Mucokinetic agents. 			8	Describe, classify and explain the drugs used to treat cardiovascular and respiratory disorders.			1,2,3,4	

V	Others: <ul style="list-style-type: none"> • IV Fluids with different preparation. • Anti- Diabetic drugs – Insulin, Steroids 	10	Describe, classify and explain the different types of IV fluids including antidiabetic drugs.	1,2,3,4,5
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TEXT BOOKS:

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
1	Explain the concept of Pharmacology including Emergency Medicines and the routes of administration.	1,2
2	Recognize different drugs that affect the Autonomic Nervous System.	1,2,5
3	Classify sedative and antiepileptic drugs along with their mechanism of action.	2
4	Discuss different drugs used to treat cardiovascular and respiratory conditions	1,2
5	Identify different types of IV fluids and their preparations as well as antidiabetic drugs.	7,8

SEMESTER – III									
Course Title	Psychology								
Course code	24BCIC2105R	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 Critical and Intensive Care Unit Technology								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> 1. Aims to provide students with a comprehensive understanding of human behavior and mental processes. 2. Explore various psychological domains such as cognitive, developmental, social, and abnormal psychology, gaining insights into how individuals think, feel, and act. 3. To be equipped with critical thinking skills and an appreciation for the complexities of human behaviour, enabling them to apply psychological concepts to real-world situations. 								
CO1	Understand the significance, history, scope and branches of psychology.								
CO2	Discuss the biology of human behaviour and sensation.								
CO3	Identify the different stages of human growth and development and the factors influencing it.								
CO4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.								
CO5	Apply skills to assess mental health and identify the warning signs of poor mental health.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to Psychology <ul style="list-style-type: none"> • Definition of psychology • Evolution of modern psychology • Scope of psychology • Branch of psychology 	7	Introduces the knowledge of psychology its evolution in modern world and different branches of it.					1,2	
II	Biology of Behavior <ul style="list-style-type: none"> • Body mind relationship modulation process in health and illness • Brain and behavior: nervous system, neurons and synapse, Association cortex, Right and Left hemispheres. • Psychology of Sensation: Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation. 	10	Explains the biology of behaviour the mindset and all the complex function.					1,2,3	
III	Growth and Development <ul style="list-style-type: none"> • Life span: different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age) • Heredity and environment: role of heredity and environment in physical and psychological development. • Nature v/s Nurture controversy. 	10	Describes the growth and development of a person.					1,2,3	

IV	<p>Motivation and Emotional Processes</p> <ul style="list-style-type: none"> • Motivation: meaning, concepts, types, theories, motives and behavior. • Emotion: definition, components, changes in emotions, theories, emotional adjustments, emotions in health and illness. • Stress: stressors, cycle, effects, adaptation & coping and management. • Conflicts and frustration, conflict resolution. 	8	Explains the techniques of keeping one motivated and maintaining emotional processes.	1,2,3,4
V	<p>Mental Hygiene and Mental Health</p> <ul style="list-style-type: none"> • Concepts of mental hygiene and mental health. • Characteristics of mentally healthy person, • Warning signs of poor mental health, • Promotive and preventive mental health – strategies and services. • Psychology of vulnerable individuals. • Guidance counselling and Rehabilitation. 	10	Explain the warning sign of poor mental health ways of preventing it and characteristics of a healthy person.	1,2,3,4,5

TEXT BOOKS:

T1: Jane Ogden “Health Psychology” 3 rd Edition

T2: Amanpreet Kaur Jhand “Psychology” 1 st Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the significance, history, scope and branches of psychology.	1,8
2	Discuss the biology of human behaviour and sensation.	1,2,7
3	Identify the different stages of human growth and development and the factors influencing it.	1,8
4	Understand the concept and types of motivation, emotion, stress along with the management of stress and conflict.	7
5	Apply skills to assess mental health and identify the warning signs of poor mental health.	2,3,7

SEMESTER – III									
Course Title	MOOCS								
Course code	24BCICMO201	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 15T	1	0	0	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	III semester of second year of the programme								
Course Objectives	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

SEMESTER – III									
Course Title	Field Visit								
Course code	24BCIC2106R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 120	0	0	0	0	8	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	III semester of second 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	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.								
CO2	Comprehend the practical applications of theoretical concepts in real-world settings.								
CO3	Exposure to diverse situations to enhance skills in patient management and care.								
CO4	Evaluate the effectiveness of different approaches and methods seen during the field trip.								
CO5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.	1,6
2	Comprehend the practical applications of theoretical concepts in real-world settings.	2,3,5
3	Exposure to diverse situations to enhance skills in patient management and care.	2,3,5,8
4	Evaluate the effectiveness of different approaches and methods seen during the field trip.	3,4,5,8
5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.	2,3,5,8

SEMESTER – III									
Course Title	Basic acclimatizing skills								
Course code	24UULS2101R	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 Critical and Intensive Care Unit Technology								
Semester	III semester of second year of the programme								
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'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 household's amenities for day-to-day use.								
CO5	Students will develop an understanding of personal financial management and budgeting skills.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to Accommodation Management <ul style="list-style-type: none"> • Telephone handling technique • Organizing of Rooms. • Cleaning agents. • Cleaning equipment's and uses. • Bed making Process. 		7	Explains the techniques of accommodation management.				1,2	
II	Fundamentals of Cooking <ul style="list-style-type: none"> • Definition of cookery–Aim & Objectives of cooking. • Use of basic Cooking equipment's • Personal Hygiene and Safety • Use of Fire & Fuels 		5	Introduces the fundamentals of cooking including efficient and safety methods.				1,2,3	
III	Methods of Cooking <ul style="list-style-type: none"> • Different Cuts. • Use of Herbs and Spices. • Basic Food and Beverage Preparation. • Regional food Habits 		5	Illustrates different methods of cooking.				1,2,3	
IV	Forms & Format's <ul style="list-style-type: none"> • C –form • Reservation form • Registration form • Passport Application form Legal Rent Agreement 		8	Explains and illustrates various formats of writing forms like reservation, passport, etc.				1,2,3,4	

V	Introduction to Accommodation Management <ul style="list-style-type: none"> • Telephone handling technique • Organizing of Rooms. • Cleaning agents. • Cleaning equipment's and uses. • Bed making Process. 	5	Explains the techniques of accommodation management.	1,2,3, 4,5
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TEXT BOOKS:

T1: Arora K “Theory of cookery” 2011

T2: Bruce H. Axler, Carol A. Litrides “Food and Beverage Service” 2010, Vol-1

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.	7
2	Students will gain the knowledge of organizing & Cleaning of Rooms.	6,7
3	Students will be able to gain the travel management concept.	7
4	Students will be able to acquire the knowledge of basic household's amenities for day- to-day use.	7
5	Students will develop an understanding of personal financial management and budgeting skills.	7

SEMESTER – III									
Course Title	Executive English								
Course code	24UBPD2101R	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 Critical and Intensive Care Unit Technology								
Semester	III semester of second year of the programme								
Course Objectives	<p>1. Develop Writing Skills: To help students write clear paragraphs and applications. Enhance Grammar: To teach correct preposition use and active/passive voice.</p> <p>2. Understand Non-Verbal Cues: To provide knowledge on body language types and meanings. Improve Discussion Skills: To equip students to effectively engage in group discussions.</p> <p>3. Apply Communication Skills: To prepare students for real-world writing and communication.</p>								
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.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	Grammar Use of preposition, Tag Question, Idioms, Phrases and Clauses, Simple, Complex, Compound Sentences		7	Describe and explain about the preposition.					1,2
II	Grammar Active and Passive Voice, Direct and Indirect Speech		5	Describe, illustrate and explain about the active and passive voice and direct and indirect speech.					1,2,3
III	Writing Skills The Basics of writing, avoid ambiguity and vagueness, paragraph writing, Precise writing, Letter writing, resume, CV, Cover Letter		5	Describe, illustrate and apply the basic writing skills like paragraph writing, resume, CV.					1,2,3
IV	Self-Management Skills SWOT Analysis, Self-Regulation- Goal Setting, Personal hygiene		8	Describe and analyse about self-management skills.					1,2,3, 4
V	Non-Verbal Communication-Science of Body Language What is Non-Verbal Communication and 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, Introduction to Proxemics, Body Language Do's and Don'ts, Doubt Clearing Sessions		5	Describe, illustrate, explain about non-verbal communication, types of body language, importance and impact of body language and apply planning element and skills assessed.					1,2,3, 4,5

TEXT BOOKS:

T1: Barrett, Grant “Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking” 2016

T2: McDowell, Gayle Laakmann “Cracking the Coding Interview” Indian Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate proficiency in writing structured paragraphs and formal applications.	7
2	Learn the use of prepositions and convert sentences between active and passive voice.	7
3	Identify and interpret various types of body language and their meanings.	7
4	Initiate, participate in, and summarize group discussions effectively.	7
5	Apply writing, grammar, non-verbal communication, and group discussion skills in real-world contexts.	7

SEMESTER – III									
Course Title	Basic Digital Literacy								
Course code	24UCLD2001R	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 Critical and Intensive Care Unit Technology								
Semester	III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> Students will be able to identify and analyze computer hardware, software and their uses. Students will be able to use MS-Office suite for various purposes. Students will be able 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	Apply MS-Office to solve basic information Management issues.								
CO3	Operate the Internet, social media and e-commerce sites efficiently and ethically.								
CO4	Analyse the cybercrimes on digital payments application.								
CO5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	<p>Fundamentals of Computer Systems Components of a Computer and their functions. Different Types of Computers and their applications.</p> <p>Lab Experiment:</p> <ul style="list-style-type: none"> Identify the Components of a Computer and their Functions and different types of Computers and their Applications. Demonstrate the usage of various storage devices and identify various operating system file management commands 	7	Explain the fundamental of computer systems.	1,2					
II	<p>Introduction to MS-Office: Components of the MS-Office suite. Creating documents with MS-Word.</p> <p>Creating Presentations with MS-PowerPoint., Creating Spreadsheets with MS-Excel.</p> <p>Lab Experiment:</p> <ul style="list-style-type: none"> Demonstrate how a document to be prepared and formatted in MS Word. Create casual applications for 3 days leave because of family marriage ceremony using Word Processor. Create a curriculum vitae using MS-Word. 4. Creating a time table with MS – Word. Design PPT on Computer Components using different effects such as Insert, Design, Record etc., on slides. Design PPT on Computer Components using different effects such as Transitions, Animations etc., on slides. 	13	Describe the functions on different tools of Microsoft Office like MS-Excel, MS- Word, etc.	1,2,3					

	<ul style="list-style-type: none"> • Creating the time table with MS-Excel. • Creating the 10 student's Marksheet include total, grade, percentage and results using MS-Excel's formulas 			
III	<p>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.</p> <p>Lab Experiments:</p> <ul style="list-style-type: none"> • Creating a professional Google account and use various products of Google like drive, photos. Study of computer network and internet and demonstrate how to search information using keywords in different search engines. 	10	Explain the importance and use of internet along with its adverse side.	1,2,3
IV	<p>Introduction to social media: The Power of social media, Relevance of social media in present scenario. Creating accounts and using some popular social media portals and Apps like WhatsApp, Facebook, Twitter, Instagram, and LinkedIn. Social Media Etiquettes.</p> <p>Lab Experiments:</p> <ul style="list-style-type: none"> • Creating an account of some popular social media portals and Apps like LinkedIn, Facebook, Twitter, and Instagram. • Creating an accounts of digital payment systems like credit cards, debit cards, net banking 	15	Explain the power of social media their relevance and adverse effects to over using it.	1,2,3,4
V	<p>Introduction to Digital Payment Systems. Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, UPI.</p> <p>Lab Experiments:</p> <ul style="list-style-type: none"> • Create online Google form and learn how to • give online test. • Creating an account of Online Shopping sites like Amazon, flipkart, eBay etc. Understand the • journey of customer to buy and sell on online shopping sites. 	15	Illustrate the types of digital payment and their risks.	1,2,3,4,5

TEXT BOOKS:

T1: Sinha Pradeep K. and Priti Sinha “Computer Fundamentals: Concepts Systems & Applications” 3rd Edition

T2: Goel A “Computer Fundamentals” 2010

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding of Computer Hardware, Software and Computer handling.	2,7
2	Apply MS-Office to solve basic information Management issues.	2,7
3	Operate the Internet, social media and e-commerce sites efficiently and ethically.	2,7
4	Analyse the cybercrimes on digital payments application.	2,7
5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI.	2,7

SEMESTER – III									
Course Title	Generic elective								
Course code	24BCICGE201	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 Critical and Intensive Care Unit Technology								
Semester	III semester of second year of the programme								
Course Objectives	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 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.	7
3	Analyze and evaluate information, improving their problem-solving and decision-making abilities.	7
4	Develop their ideas clearly and effectively in both written and verbal forms.	7
5	Demonstrating strong collaboration and teamwork skills.	7

SEMESTER – III									
Course Title	Extra-Curricular/Co-Curricular								
Course code	24UBEC2101/ 24UBCC2101	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 Unit Technology								
Semester	III semester of 2nd year of the programme								
Course Objectives	<ol style="list-style-type: none"> To develop skills and interests through participation in diverse extracurricular and co-curricular activities. To learn about teamwork and leadership abilities by engaging students in club-led events and competitions. 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	ADTU encourages a range of activities outside the regular curriculum intended to meet learner's interest.		60	The students are encouraged to participate in regular club activities, workshops, competitions as per their interest and hobbies.				1,2,3,4,5	
	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.								

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
2	Develop confidence to participate in regular club activities, including workshops and competitions, according to individual interests.	7
3	Apply knowledge and skills to represent ADTU in inter-university, state, and national level competitions.	7
4	Explore new platform to learn from invited experts in their respective fields.	7
5	Evaluate overall growth alongside academic development.	7

SEMESTER – IV									
Course Title	Cardiovascular and neurological emergencies								
Course code	24BCIC2201R	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 Critical and Intensive Care Unit Technology								
Semester	IV semester of 2nd year of the programme								
Course Objectives	1. Develop skills to assess patients and identify cardiovascular and neurological emergencies. 2. To master the techniques used for managing strokes and seizures, including thrombolytic therapy and airway management. 3. To operate in emergency situations with resuscitative knowledge and save lives.								
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 anomalies.								
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 conditions.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Cardiovascular System Review of anatomy and physiology	7	Discuss about the anatomical structures and physiological function of cardiovascular system.					1,2	
II	Cardiovascular System Assessment and management of <ul style="list-style-type: none"> • Coronary artery disease and angina • Acute myocardial infarct • Congestive heart failure • Cardiac tamponade • Cardiogenic shock • Aortic aneurysm • Hypertensive emergencies 	10	Explain about different diseases related to cardiovascular system including its assessment and management.					1,2,3	
III	ECG <ul style="list-style-type: none"> • ECG and arrhythmias • 12 lead ECGs • Basic and advanced cardiac life support • Cardio pulmonary resuscitation (CPR) • Defibrillation • Cardio version • Transcutaneous cardiac pacing • Review of pharmacology 	10	Illustrate the ECG lead placement including techniques of delivering BLS and ACLS also using defibrillator.					1,2,3	
IV	Nervous system – Review of anatomy and physiology	8	Discuss about the anatomy and physiologic function of nervous system.					1,2,3,4	
V	Neurological emergencies Assessment and management of <ul style="list-style-type: none"> • Stroke • TIA • Altered Mental Status Coma, etc. 	10	Discuss about different neurological emergencies and their identification including immediate management.					1,2,3,4,5	

Practical	1. ECG lead placement 2. ECG rhythm determination 3. Performing CPR 4. Use of defibrillator 5. Identification and management of stroke.	60		1,2,3, 4
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TEXT BOOKS:

T1: Nancy Caroline “Textbook of emergency care in the Streets” 7th Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge of the human heart and the circulatory system.	1,8
2	Demonstrate skills and techniques to assess and manage any cardiac emergencies.	1,2,3,4,5
3	Apply acquired skills to perform ECG and identify anomalies.	2,3,4,5
4	Develop comprehensive knowledge on the nervous system.	1,8
5	Illustrate the ability to evaluate and treat a variety of neurologic emergencies, including seizures, strokes, and other conditions.	2,3,7

SEMESTER – IV									
Course Title	Mechanical Ventilation								
Course code	24BCIC2202R	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	Bachelor of Critical and Intensive Care Unit Technology								
Semester	IV semester of second year of the programme								
Course Objectives	1. To understand the principles and mechanics of mechanical of ventilation. 2. To learn effectively manage ventilator setting to optimise oxygenation. 3. To develop skills in assessing and responding to changes inpatient condition and ventilator parameters.								
CO1	Demonstrate knowledge on basic concept of ventilation.								
CO2	Apply Knowledge to initiate mechanical ventilation and assess for any respiratory failure.								
CO3	Apply skills on using various modes of ventilation and the timings to be initiated with.								
CO4	Demonstrate skills on monitoring of patient during ventilation and everyday checklist.								
CO5	Apply knowledge on various weaning criteria and management of complications during ventilation.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Basic concept: <ul style="list-style-type: none"> • Mechanics of ventilation • Work of breathing • Pressure – Peak, Plateau 	7	Explain the basic concepts of mechanical ventilation and physiology of breathing.	1,2					
II	Initiation of ventilation: <ul style="list-style-type: none"> • Clinical conditions leading to mechanical ventilation • Ventilatory failure, • oxygenation failure • Strategies to improve ventilation and oxygenation 	10	Discuss the condition where ventilator support is needed and check all essential criteria's of mechanical ventilation.	1,2,3					
III	Operating modes of ventilation: <ul style="list-style-type: none"> • Modes of ventilation • Invasive modes- controlled, assisted, SIMV, APRV, Pressure support • Non invasive modes- CPAP & BiPAP Ventilator settings Timings: inspiratory, expiratory, inspiratory hold PEEP, FiO2 • Alarm settings 	10	Illustrate different modes of ventilation including invasive and non-invasive modes.	1,2,3					
IV	Monitoring during ventilation: <ul style="list-style-type: none"> • Vital signs, chest inspection & auscultation • Arterial blood gases (ABG), Oxygen and end tidal • carbon dioxide monitoring • Fluid electrolyte balance Acid base balance 	8	Explain factors that are needed to be monitored during mechanical ventilation and also checking acid-base balance.	1,2,3,4					

V	Weaning: <ul style="list-style-type: none"> • Modes, weaning criteria's • Care of ventilator • Tubing and sterility complication during mechanical ventilation. 	10	Discuss about the weaning criteria's, maintaining sterility and care of ventilator.	1,2,3,4,5
Practical	Basic knowledge of ICU: ICU setup, sterilization of ICU, nursing and general care and nutritional support in ICU. Concept on ICU Procedures: Oxygen delivery system, monitoring system, ABG analysis, suctioning of ventilated patient, Central line cannula and infusion pump. Operating Procedures of Ventilators: Ventilator setting, different modes of ventilation, alarm during ventilation, care during mechanical ventilation, pre-use check up of ventilator, defibrillator.	60		1,2,3,4

TEXT BOOKS:

T1: Nancy Caroline's Emergency Care in the Streets, Andrew N.Pollak, MD, FAAOS, 7th Edition (1970)

T2: Essential of Mechanical Ventilation, DEAN R. HESS ROBERT M. KACMAREK 3rd Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate knowledge on basic concept of ventilation.	1,8
2	Apply Knowledge to initiate mechanical ventilation and assess for any respiratory failure.	1,2,3,4
3	Apply skills on using various modes of ventilation and the timings to be initiated with.	3,4
4	Demonstrate skills on monitoring of patient during ventilation and everyday checklist.	2,3
5	Apply knowledge on various weaning criteria and management of complications during ventilation.	1,2,3

SEMESTER – IV									
Course Title	Microbiology								
Course code	24BCIC2203R	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 Critical and Intensive Care Unit Technology								
Semester	IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • Agents causing infection – Bacteria, virus, fungus. • Sources • Transmission of infection • Bio-hazardous materials and handling. 		7	Describe, classify and explain infectious agents including their sources and transmission.				1,2	
II	Infection control: <ul style="list-style-type: none"> • Importance of infection in ICU • Spread of infection • Cleaning & methods of sterilization of instruments • Fumigation of ICU • Hygiene standards of ICU • Disposal of infections waste • Surveillance • Quality control and role of health care worker 		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	
III	Specific infections: <ul style="list-style-type: none"> • Nosocomial Infection – Types and prevention • HIV – AID • Tropical infections – Tetanus, • Malaria. 		10	Describe, illustrate and explain the different types of nosocomial infections.				1,2,3	
IV	Clinical Microbiology: <ul style="list-style-type: none"> • Growth of microbes • Collection and transport of clinical specimens • Methods in Diagnostic microbiology • Serological and Skin test 		8	Describe, illustrate and explain the growth and control measure of microbes along with the pathological tests.				1,2,3,4	

V	Fundamental of laboratory Technique: <ul style="list-style-type: none"> • Introduction to principle of different advance laboratory instruments and uses. • Inoculation of culture media and preparation and examination of slide. 	10	Describe, illustrate and explain the principles of laboratory instruments including their uses and procedure for preparation of examination slides.	1,2,3, 4,5
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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

SEMESTER – IV									
Course Title	Pathology								
Course code	24BCIC2204R	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 Critical and Intensive Care Unit Technology								
Semester	IV semester of second year of the programme								
Course Objectives	1. To understand the concept of cell injury, the change produces thereby, in the different tissues and organs. 2. The body capacity for healing, understand the etiopathogenesis, the pathological effects, 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.								
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	Introduction to Pathology: <ul style="list-style-type: none"> Cellular Adaptation, Cell injury and death Cellular adaptation – Atrophy, Hypertrophy, Hyperplasia, Metaplasia, aplasia Causes and mechanism of cell injury Classification of cell injury – Reversible and irreversible, Necrosis, Healing and factors affecting healing. 	7	Describe, classify and explain cell adaptation and mechanism of cell injury.				1,2		
II	Inflammation: <ul style="list-style-type: none"> General features of inflammation Classification-Acute and chronic inflammation Chemical mediators of inflammation 	10	Classify, identify and explain the types of inflammation.				1,2,3		
III	Haemodynamic Disorders: <ul style="list-style-type: none"> Hyperaemia, Ischemia and oedema, Haemorrhage, Thrombosis, embolism and infraction, shock. 	10	Describe, illustrate and explain various haemodynamic disorders along with their causes.				1,2,3		
IV	Neoplasia: Nomenclature, carcinogenic agents, Tumours and Tumours grading	8	Describe, classify and explain the pathophysiology of tumors including carcinogenic agents.				1,2,3,4		

V	Immunity Disorders: <ul style="list-style-type: none"> • General features of immune system • Disorders of Immune system • Clinical Pathology: • Routine examination of Urine, CSF and others body fluids. 	10	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
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TEXT BOOKS:

Based on Harsh Mohan Textbook of pathology 8th 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

SEMESTER – IV									
Course Title	Palliative care								
Course code	24BCIC2205R	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 Critical and Intensive Care Unit Technology								
Semester	IV semester of second year of the programme								
Course Objectives	1. To provide a descriptive knowledge on Palliative Care. 2. To prevent and relieve health related suffering of adults, children and their families' facing problems associated with life-threatening illness. 3. To become familiar with quality improvement tools that support excellence in palliative care.								
CO1	Discuss fundamental knowledge on Palliative care and its importance.								
CO2	Explain the importance of communication skills including the identification and management of the different barriers.								
CO3	Describe the evaluation and management of pain in patients and get acquainted with the different drug interventions.								
CO4	Demonstrate skills to assess different symptoms and management using pharmacological and non-pharmacological interventions.								
CO5	Explain high ethical standard and provide professional support while dealing with terminal and end of life phase.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to Palliative Care: <ul style="list-style-type: none"> History of Palliative Care Objective Purpose Importance 	7	Describe, classify and explain to palliative care.					1,2	
II	Communication Skills: <ul style="list-style-type: none"> Importance of Communication Skills Barriers to effective Communication Steps for effective Communication Management of Anger and Denial in Patient with terminal illnesses 	10	explain the importance and barriers to effective on communication skills and Management of Anger and Denial in Patient with terminal illnesses					1,2,3	
III	Assessment and Management if Pain: <ul style="list-style-type: none"> Definition of pain Evaluation of pain Assessment & Management Drugs from the WHO Analgesic Ladder Recommendations for safe prescription of NSAIDs Management of Neuropathic Pain Steps for calculating the dose of oral morphine Fentanyl Citrate Ways of improving effectiveness of the WHO Analgesic Ladder Management of opioid side effects 	10	Describe, illustrate and explain various assessment and management of pain.					1,2,3	

	<ul style="list-style-type: none"> • Signs of overdose with oral opioids • Interventional Techniques for management of pain 			
IV	Symptom Assessment & Management <ul style="list-style-type: none"> • Principles of symptom assessment & management • Pharmacological Management of: Dyspnoea, Constipation, Diarrhoea, Nausea and vomiting, Nutrition and Hydration, Anorexia, Anxiety and agitation, Malignant Wounds, Non-pharmacological management 	8	Describe, classify and explain the pathophysiology, Assessment and management of principle symptoms.	1,2,3,4
V	Optimization of Care: <ul style="list-style-type: none"> • Quality of Care • Essential Care • Anticipatory prescription • The terminal Phase • Dying Phase • Ethic Based Decision Making 	10	Describe, illustrate and explain the optimization of care.	1,2,3,4,5

TEXT BOOKS:

T1: “An Indian Primer of Palliative Care” by M.R. Rajagopal, Vallath Nandini, et al.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Discuss fundamental knowledge on Palliative care and its importance.	1
2	Explain the importance of communication skills including the identification and management of the different barriers.	1,2
3	Describe the evaluation and management of pain in patients and get acquainted with the different drug interventions.	1,7
4	Demonstrate skills to assess different symptoms and management using pharmacological and non- pharmacological interventions.	2,5,8
5	Explain high ethical standard and provide professional support while dealing with terminal and end of life phase.	1,7,8

SEMESTER – IV									
Course Title	Introduction to research methodology								
Course code	24BCIC2206R	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 Critical and Intensive Care Unit Technology								
Semester	IV semester of 2nd year of the programme								
Course Objectives	<ol style="list-style-type: none"> To gain a comprehensive understanding of foundational research concepts, including the research process, types of research, and ethical considerations. Acquire knowledge of various research designs, methodologies, and data collection techniques. Develop knowledge about research ethics. 								
CO1	Develop fundamental knowledge on the principles and types of research.								
CO2	Develop comprehensive understanding on research design.								
CO3	Acquire basic knowledge on the significance and conduction of literature review.								
CO4	Classify various types of data collection methods and techniques.								
CO5	Understand the different types of research ethics along with plagiarism.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to research <ul style="list-style-type: none"> • Definition of research • Importance and purpose of research • Types of research (basic, applied, quantitative, qualitative, etc.) • Research process overview 		7	Knowledge about importance and purposes of research.				1,2	
II	Research design <ul style="list-style-type: none"> • Formulating research questions and hypotheses • Variables and operationalization • Experimental, correlational, and descriptive research designs • Choosing an appropriate research design 		10	Learn about the method of designing a research and method of approach.				1,2,3	
III	Literature review <ul style="list-style-type: none"> • Conducting a literature search • Evaluating and synthesizing research literature • Identifying research gaps • Importance of literature review in research 		10	Knowledge about different steps of review literature.				1,2,3	
IV	Data collection methods <ul style="list-style-type: none"> • Surveys/questionnaires • Interviews • Observations • Experiments • Case studies • Secondary data analysis • Sampling techniques 		8	Understanding of different methods of data collection and continuing study.				1,2,3,4	

V	Research ethics <ul style="list-style-type: none"> • Ethical considerations in research • Informed consent • Confidentiality and anonymity • Institutional review boards (IRBs) • Avoiding plagiarism and other forms of academic misconduct 	10	Knowledge about different ethical considerations to be made during research.	1,2,3,4,5
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TEXT BOOKS:

T1: Research methodology by Vivek Singh

T2: Fundamental of research methodology by Kitab Mahal

REFERENCE BOOKS:

R1: Research methods the basic by Nichols walliman

R2: Research methodology methods and techniques by C.R. Kothari

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge on the principles and types of research.	3,6,7,8
2	Develop comprehensive understanding on research design.	3,6,7,8
3	Acquire basic knowledge on the significance and conduction of literature review.	6,7,8
4	Classify various types of data collection methods and techniques.	3,5,6,7,8
5	Understand the different types of research ethics along with plagiarism.	3,6,7,8

SEMESTER – IV									
Course Title	Basic lifesaving skills								
Course code	24UULS2201R	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 Critical and Intensive Care Unit Technology								
Semester	IV semester of 2nd year of the programme								
Course Objectives	<ol style="list-style-type: none"> To learn and demonstrate essential Basic Life Support (BLS) techniques for assisting in medical emergencies before professional help arrives. To enhance communication, teamwork, and conflict resolution skills to improve personal and professional interactions. 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) <ul style="list-style-type: none"> Introduction of BLS Chain of survival ABCs Assessment CPR and Ventilation Technique AED - Choking for adult and children 	7	Introduction about basic life support, about the chain of survival, different assessment techniques.				1,2		
II	Soft skills <ul style="list-style-type: none"> Introduction Communications Skills Situational Skills Team Work Other Soft Skills 	10	Illustrates different communication skills, situational awareness including teamwork.				1,2,3		
III	Trauma emergencies <ol style="list-style-type: none"> Introduction Priorities of Initial approach in pre-hospital care Scene safety Primary assessment Bleeding control Helmet removal Care of amputated body part Extrication of victims and safe transfer Cervical spine stabilization Cervical collar application - Splinting of broken Limbs 	10	Explains about different trauma emergencies and methods of managing trauma emergencies.				1,2,3		

IV	Triage system <ul style="list-style-type: none"> • Introduction • Flow chart approach of Triage • Triage of Multiple Casualties in Pre-Hospital setting - Triage of Single casualty 	8	Illustrates the triage system and explains about multiple causality operations.	1,2,3,4
V	Medical emergencies Introduction <ul style="list-style-type: none"> • Victim centred approach in medical emergency • Management of :- <ul style="list-style-type: none"> a) Seizures b) heart attack c) asthma d) diabetic emergencies e) emergency childbirth f) stroke recovery position 	10	Describes different types of medical emergencies and its management.	1,2,3,4,5

TEXT BOOKS:

T1: Nancy Caroline'S Emergency Care in the streets Seventh edition by Jones and Bartlett

T2: First Aid book by LC Gupta

T3: Advance Cardiovascular life support and Basic life support provider manual @ American Heart Association(AHA).

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate knowledge and skill to perform CPR use an AED, and respond to choking in adults and children.	2,3,4
2	Understand the significance of communication and teamwork in various situations.	2,5,7
3	Apply knowledge and skill about pre-hospital care and management of trauma emergencies.	2
4	Understand the principles and purpose of the Triage system in healthcare settings.	2,3,4,7
5	Identify and manage common medical emergency conditions.	2

SEMESTER – IV									
Course Title	Employability skills for personality development								
Course code	24UBPD2201R	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 of Critical and Intensive Care Unit Technology								
Semester	IV semester of 2nd year of the programme								
Course Objectives	<ol style="list-style-type: none"> To teach students the essential elements of public speaking and techniques to overcome the fear of speaking in public. To enhance students' ability to effectively use non-verbal cues when delivering a public speech. To guide students through the process of creating, finalizing, and screening a professional resume. To familiarize students with different types of interviews, including telephonic, virtual, and face-to-face formats. To prepare students to answer common interview questions confidently and understand appropriate dress code ethics. 								
CO1	Identify and effectively utilize key elements of public speaking while overcoming associated fears.								
CO2	Demonstrate the ability to use non-verbal cues to enhance their public speeches.								
CO3	Produce and submit a polished, professional resume suitable for job applications.								
CO4	Understand different interview types, including telephonic, virtual, and face-to-face.								
CO5	Learn to answer common interview questions and adhere to appropriate dress code ethics.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Presentation Skills <ul style="list-style-type: none"> Introduction Essential characteristics of a good presentation Preparation of a good presentation 		6	Knowledge about different skills needed to do presentation.				1,2	
II	Public Skills <ul style="list-style-type: none"> Fear of Public Speaking Understanding and Overcoming Fear of Public Speaking Confidence and Control Physiology and Stress- Control/Process Tips for Presentations and Public Speaking, Tips for Using Visual Aids in Presentations, Process for Preparing and Creating Presentations Delivering Presentations Successfully, Doubt Clearing and Summary of Main Points 		6	Gain confidence on public speaking, show leadership.				1,2,3	

III	Practical session on Resume, Curriculum Vitae, Writing cover letter & LinkedIn Profile Preparation, submission & screening of Resume <ul style="list-style-type: none"> • Practical session on cover letter screening session • Creating profile in LinkedIn • How to utilize it 	6	Knowledge on skills of writing professional letters.	1,2,3
IV	Leadership & Management Skills <ul style="list-style-type: none"> • Concepts of Leadership • Leadership Styles • Manager VS Leader • How to be an Effective Leader • Mock/Practice Session 	6	Learn about different management skills and show leadership qualities.	1,2,3,
V	Interview Skills & Dress code Ethics <ul style="list-style-type: none"> • Types of interviews- telephonic, virtual & face to face • Online interview, personal interview • Panel interview, • Group interview, • JAM session, • Types of interview questions traditional/ common 	6	Gain ethical understanding of dress code and different interview skills.	1,2,3,

TEXT BOOKS:

T1: Barrett, Grant “Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speak” 2016

T2: McDowell, Gayle Laakmann “Cracking the Coding Interview” Indian Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify and effectively utilize key elements of public speaking while overcoming associated fears.	6
2	Demonstrate the ability to use non-verbal cues to enhance their public speeches.	6
3	Produce and submit a polished, professional resume suitable for job applications.	6
4	Understand different interview types, including telephonic, virtual, and face-to-face.	6
5	Learn to answer common interview questions and adhere to appropriate dress code ethics.	6

SEMESTER – IV									
Course Title	Personal Financial Planning								
Course code	24UUFL2201R	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 Critical and Intensive Care Unit Technology								
Semester	IV semester of 2nd year of the programme								
Course Objectives	<ol style="list-style-type: none"> To create awareness among students about the need for possessing financial literacy education. Identification of money as a working asset. 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								
CO5	Students will learn how to assess and compare different investment options to make informed financial decisions.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction: <ul style="list-style-type: none"> 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. 	10	Define financial literacy and its importance in personal finance management and Identify components such as savings, investments, financial institutions, and investment avenues.					1,2	
II	Financial Planning <ul style="list-style-type: none"> Meaning, need and importance for financial planning, Budgeting and its importance in financial planning; Steps to involved in Financial Planning Process; Preparation of personal budgets, budget surplus and budget deficit, avenues for savings from surplus, sources for meeting deficit. Informal Society funds and crowd funding 	10	Explain the significance of financial planning in achieving financial goals and understand budgeting as a tool for managing income and expenses					1,2,3	

III	<p>Banks & Post Office- As financial service provider:</p> <ul style="list-style-type: none"> • Meaning and evolution of money, • Banks– meaning, types & functions; types of accounts; • Formalities to open various accounts. • Different types of Post Office saving schemes: Recurring deposit, savings, term deposit; NSC; Kisan Vikas Patra; Monthly Income scheme (MIS) Account, • Public Provident Funds (PPF), Senior citizen savings scheme (SCSS), Sukanya Samridhi Accounts, • Indian Postal Order; International Money transfer service; Forex Services; • Money remittance services; Jansuraksha Scheme 	10	Define different types of banks, their functions, and account opening formalities and Understand services like international money transfer, forex, and insurance offered by banks and post offices	1,2,3
IV	<p>Insurance-As financial service provider:</p> <ul style="list-style-type: none"> • Different types of Risks and their Management, Diversification of risk; • Meaning, need and importance of Insurance • Pension and retirement policies; • Post office life insurance schemes, Postal life insurance and rural postal life insurance. 	15	Identify types of insurance policies such as life insurance and retirement plans and learn about post office insurance schemes like Postal Life Insurance and Rural Postal Life Insurance.	1,2,3, 4
V	<p>Transformations in Digital Money market:</p> <ul style="list-style-type: none"> • Various functions & innovative services of Banks; Mobile Banking, NEFT, IMPS, RTGS, • Money transfer, Different types of cards-Debits & Credit, E-Banking, Unified payment interface (UPI), • Credit Scoring- CIBIL, Digital Banking, crypto currency and related transactions, 	15	Explore innovative banking services like mobile banking, NEFT, IMPS, RTGS, and digital wallets and understand digital transactions, security measures, and credit scoring systems like CIBIL.	1,2,3, 4,5

TEXT BOOKS:

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

T2: Financial Freedom with Financial Control by Jagmohan Singh Pen down Press

REFERENCE BOOKS:

R1: 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.

R2: Financial literacy to financial planning by Dr.Purvi Kothari and Mr. Keyur Mehta Nexus Publications Surat Gujarat

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	The students would be able to understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.	5,7,8
2	The students would be able to understand the need and various kind of banking institutions' instrument and their utilities	5,7,8
3	The student would be able to describe the importance of insurance services as social security measures.	5,7,8
4	The student would be able to manage the money and debt more effectively	5,7,8
5	Students will learn how to assess and compare different investment options to make informed financial decisions.	5,7,8

SEMESTER –VI									
Course Title	Generic Elective								
Course code	24BCICGE201	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 Critical and Intensive Care Unit Technology								
Semester	VI semester of third year of the programme								
Course Objectives	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 team work 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 team work 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 team work skills.	7,8

SEMESTER – IV									
Course Title	Indian heritage (Swayam/ NPTEL)								
Course code	24BCICIH201	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 15T	1	0	0	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	IV semester of 2nd year of the programme								
Course Objectives	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 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

SEMESTER – IV									
Course Title	Extra-curricular/Co-curricular								
Course code	24UBEC2201/ 24UBCC2201	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 Unit Technology								
Semester	IV semester of second year of the programme								
Course Objectives	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.								
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.								

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

SEMESTER – V									
Course Title	Clinical Observation I (ICU procedure & Patient care)								
Course code	24BCIC3101R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 120P	0	0	8	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	V semester of third year of the programme								
Course Objectives	1. Understand ICU setup, equipment, monitor vital signs and interpret their significance. 2. Assist in common ICU procedures and learn patient care protocols including hygiene and nutrition. 3. Develop emergency response skills, understand ethical and legal considerations and learn teamwork and communication in the ICU setting.								
CO1	Understand the roles of ICU staffs and basic settings of ICU.								
CO2	Develop fundamental skills to monitor vital parameters and practice safe hygiene techniques.								
CO3	Ability to perform full body examination and interpret differential diagnosis.								
CO4	Apply knowledge to assess pain levels and skills to manage pain as well as monitor the side effects.								
CO5	Ability to empathize and communicate effectively with patient's family.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Introduction to the ICU Environment <ul style="list-style-type: none"> • Overview of the ICU setting • Roles and responsibilities of ICU staff • Importance of teamwork in the ICU 	24	Describe about ICU environment, explain different roles and responsibilities of ICU staff and importance of teamwork in the ICU.				1,2		
II	Basic ICU Procedures <ul style="list-style-type: none"> • Hand hygiene and infection control practices • Patient identification and safety protocols • Monitoring vital signs (heart rate, blood pressure, respiratory rate, temperature) 	24	Explain about infection control practice, safety protocols and monitoring vital signs equipment's.				1,2,3		
III	Initial Patient Assessment <ul style="list-style-type: none"> • Conducting a thorough physical examination • Obtaining and interpreting patient history • Developing differential diagnoses 	24	Describe the assessment of physical examination.				1,2,3		
IV	Pain and Sedation Management <ul style="list-style-type: none"> • Assessment of pain and agitation • Use of analgesics and sedatives • Monitoring for side effects and complications 	24	Describe and assessment of pain and sedation management.				1,2,3, 4		

V	Patient and Family Communication <ul style="list-style-type: none"> • Communicating effectively with patients and families • Providing emotional support and education • Navigating difficult conversations and delivering bad news 	24	Explain about communicating effectively with patients and families.	1,2,3,4,5
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RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the roles of ICU staffs and basic settings of ICU.	1
2	Develop fundamental skills to monitor vital parameters and practice safe hygiene techniques.	1,2
3	Ability to perform full body examination and interpret differential diagnosis.	2,3,4
4	Apply knowledge to assess pain levels and skills to manage pain as well as monitor the side effects.	4,5
5	Ability to empathize and communicate effectively with patient's family.	7,8

SEMESTER – V									
Course Title	Clinical Observation II (ICU monitoring Devices)								
Course code	24BCIC3102R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 120P	0	0	8	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	V semester of 3 rd year of the programme								
Course Objectives	<ol style="list-style-type: none"> 1. Master the usage of ICU monitoring devices. 2. Interpret patient data accurately. 3. Ensure patient safety through vigilant monitoring. 								
CO1	Understand the purpose and importance of monitoring devices in the ICU.								
CO2	Apply knowledge and skills to monitor cardiac activity using ECG and Hemodynamic status.								
CO3	Demonstrate the mechanism, significance and types of different devices used to monitor respiration.								
CO4	Demonstrate devices used to monitor Intracranial Pressure, interpret the results and management of increased ICP.								
CO5	Explain the procedures used to monitor hemodynamic status such as arterial line catheter, central venous catheter and pulmonary artery catheter.								
Unit- No.	Content		Contact Hour	Learning Outcome					KL
I	Introduction to ICU Monitoring Devices <ul style="list-style-type: none"> • Definition and importance. • Goals of monitoring critically ill patients 		24	Define and explain the importance of monitoring devices.					1,2
II	Cardiac Monitoring Devices <ul style="list-style-type: none"> • Electrocardiogram (ECG) Monitoring: Principles of ECG, lead placement, waveform interpretation, recognizing arrhythmias. • Hemodynamic Monitoring: Non-invasive and invasive techniques, interpreting arterial pressure waveforms, central venous pressure monitoring. 		24	Describe the Principles of ECG, lead placement, waveform interpretation, recognizing arrhythmias.					1,2,3
III	Respiratory Monitoring Devices <ul style="list-style-type: none"> • Pulse Oximetry: Principles of pulse oximetry, proper sensor placement, interpreting oxygen saturation levels. • Capnography: Understanding end-tidal CO₂ monitoring, capnograph waveform interpretation, clinical significance. • Ventilator Monitors: Types of ventilators, modes of ventilation, setting and adjusting ventilator parameters, monitoring ventilator performance. 		24	Explain the different types of respiratory monitoring devices.					1,2,3

IV	<p>Neurological Monitoring Devices</p> <ul style="list-style-type: none"> • Intracranial Pressure (ICP) Monitoring: Indications for ICP monitoring, types of ICP monitors, interpreting ICP readings, management of increased ICP. • Cerebral Oximetry: Understanding near-infrared spectroscopy (NIRS), applications in monitoring cerebral oxygenation. 	24	Describe the Neurological Monitoring Devices	1,2,3,4
V	<p>Hemodynamic Monitoring Devices</p> <p>Arterial Lines: Insertion techniques and indications for use, Complications and management.</p> <ul style="list-style-type: none"> • Central Venous Catheters (CVC): Uses of CVC in monitoring central venous pressure (CVP), Insertion techniques and care. • Pulmonary Artery Catheters (Swan- Ganz): Indications for use and insertion techniques, Monitoring pulmonary artery pressure and cardiac output, Clinical applications and complications. 	24	Describe and explain Hemodynamic Monitoring Devices	1,2,3,4,5

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the purpose and importance of monitoring devices in the ICU.	1
2	Apply knowledge and skills to monitor cardiac activity using ECG and Hemodynamic status.	1,2
3	Demonstrate the mechanism, significance and types of different devices used to monitor respiration.	2,3,4
4	Demonstrate devices used to monitor Intracranial Pressure, interpret the results and management of increased ICP.	4,5
5	Explain the procedures used to monitor hemodynamic status such as arterial line catheter, central venous catheter and pulmonary artery catheter.	7,8

SEMESTER – V									
Course Title	Clinical Observation III (ICU care medication)								
Course code	24BCIC3103R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 120P	0	0	8	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	V semester of 3 rd year of the programme								
Course Objectives	1. Understand the pharmacology of ICU medications. 2. Administer medications safely and accurately. 3. Monitor patients for drug efficacy and adverse effects.								
CO1	Understand the different types of sedative and analgesics used for pain management in ICU.								
CO2	Classify the different drugs used to manage hemodynamic abnormalities.								
CO3	Identify the common antibiotics used in ICU including the possible side effects.								
CO4	Classify anticoagulants and thrombolytics along with their indication and dosing.								
CO5	Identify the signs and symptoms of electrolyte imbalance in the body along with their management.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Sedation and Pain Management <ul style="list-style-type: none"> Sedative Medications: indications, dosing, side effects, withdrawal management, potential complications and monitoring for hypotension and bradycardia. Analgesic Medications: indications, pain management protocols, side effects, tolerance, and dependence. 	24	Apply to assist Sedation and Pain Management medication.	1,2					
II	Hemodynamic Support Medications <ul style="list-style-type: none"> Vasopressors: indications, mechanism, dosing, titration, and monitoring for effectiveness and adverse effects. Inotropes: indications for use, dosing, monitoring for effectiveness, and side effects. 	24	Explain and describe Hemodynamic Support Medications	1,2,3					
III	Common ICU Antibiotics: <ul style="list-style-type: none"> Broad-spectrum antibiotics (e.g., piperacillin-tazobactam, meropenem): indications and dosing. Monitoring for antibiotic resistance and side effects. 	24	Explain and discuss about common ICU antibiotics	1,2,3					
IV	Anticoagulants and Thrombolytics <ul style="list-style-type: none"> Anticoagulants: Heparin and low molecular weight heparin: indications, dosing, and monitoring (aPTT, anti-Xa levels), Direct oral anticoagulants: uses in ICU settings, monitoring, Warfarin: role in ICU, monitoring INR, and managing interactions. Thrombolytics: Indications for thrombolytic therapy, Agents used: dosing and administration. 	24	Explain about Anticoagulants and Thrombolytics Anticoagulants: Heparin and low molecular weight heparin: indications, dosing, and monitoring (aPTT, anti-Xa levels), Direct oral anticoagulants: uses in ICU	1,2,3,4					

V	Electrolyte & Glucose Management: <ul style="list-style-type: none"> • Common electrolyte imbalances in ICU patients (sodium, potassium, calcium, magnesium, phosphate). • Clinical implications and correction strategies. • Monitoring and managing complications of electrolyte imbalances. • Insulin protocols for hyperglycemia in ICU patients. • Continuous glucose monitoring systems. • Preventing and managing hypoglycemia 	24	Apply skills of Electrolyte & Glucose Management: Common electrolyte imbalances in ICU patients (sodium, potassium, calcium, magnesium, phosphate).	1,2,3,4,5
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RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the different types of sedative and analgesics used for pain management in ICU.	1
2	Classify the different drugs used to manage hemodynamic abnormalities.	1,2
3	Identify the common antibiotics used in ICU including the possible side effects.	2,3,4
4	Classify anticoagulants and thrombolytics along with their indication and dosing.	4,5
5	Identify the signs and symptoms of electrolyte imbalance in the body along with their management.	7,8

SEMESTER – V									
Course Title	MOOCS								
Course code	24BCICMO301	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 15T	1	0	0	0	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	V semester of 3rd year of the programme								
Course Objectives	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 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

SEMESTER – V									
Course Title	Summer Internship								
Course code	24BCIC3105R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours:	0	0	0	0	0	24	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	V semester of 3rd year of the programme								
Course Objectives	1. To develop and enhance specific professional skills relevant to the intern's career path. 2. To gain a comprehensive understanding of the industry and build a professional network. 3. To identify and pursue personal and career goals through guided reflection and mentorship.								
CO1	Understand and become familiar with the work environment.								
CO2	Understanding and practicing workplace professionalism.								
CO3	Develop specific skills like communication, teamwork, or technical abilities								
CO4	Develop a clear scope of career aspect.								
CO5	Develop practical knowledge and skills for application in real time.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand and become familiar with the work environment.	2,5,6,7,8
2	Understanding and practicing workplace professionalism.	2,3,5,6,7,8
3	Develop specific skills like communication, teamwork, or technical abilities	5,6,7,8
4	Develop a clear scope of career aspect.	2,5,6,7,8
5	Develop practical knowledge and skills for application in real time.	1,2,3,5,6,7,8

SEMESTER – V									
Course Title	Digital Tech								
Course code	24BCIC3106R	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 Critical and Intensive Care Unit Technology								
Semester	V semester of 3rd year of the programme								
Course Objectives	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 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

SEMESTER – V									
Course Title	Generic Elective								
Course code	24BCICGE301	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 Critical and Intensive Care Unit Technology								
Semester	V semester of 3rd year of the programme								
Course Objectives	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 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

SEMESTER – VI									
Course Title	Trauma Emergencies Management								
Course code	24BCIC3201R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 30T+ 30P	2	0	2	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	VI semester of 3 rd year of the programme								
Course Objectives	<ol style="list-style-type: none"> 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	Trauma systems and mechanism of injury: <ul style="list-style-type: none"> • Energy • Biomechanics and • Kinematics • Trauma centers • Types of trauma 		6	Describe, illustrate and explain the mechanism of injury along with the types of trauma and trauma centers.				1,2	
II	Soft Tissue Injury and Bleeding and Shock: <ul style="list-style-type: none"> • Anatomy and physiology of skin • Pathophysiology of shock • Assessment and management of shock in ICU • Wound healing • Closed versus open wounds • Crush injuries • Blast injuries • Management of crush syndrome 		6	Describe, illustrate and explain the mechanism of soft tissue injuries and its management including bleeding and shock.				1,2,3	

III	Burns, Abdominal Injuries & Thoracic Injuries: <ul style="list-style-type: none"> • Review of anatomy and physiology and abdomen and thorax • Pathophysiology of burns Assessment and management of burns • Pathophysiology, assessment and management of abdominal injuries • Pathophysiology Assessment & Management of Thoracic • Injuries 	6	Explain, identify and assess injuries related to the abdominal and thoracic cavity including burns.	1,2,3
IV	Musculoskeletal injuries, Head and face and Spinal Injuries: <ul style="list-style-type: none"> • Review of anatomy and physiology • Assessment and management of head and facial injuries • Assessment and management of spinal injuries • Spinal immobilization techniques 	6	Describe, identify and demonstrate assessment of various musculoskeletal injuries along with techniques of spinal immobilization.	1,2,3,4
V	Environmental Emergencies : <ul style="list-style-type: none"> • Heat Illness • Cold Injuries • Drowning • Diving Injuries • Altitude Illness • Lightning Strike • Bites & Stings. 	6	Explain, assess and manage environmental emergencies such as heat cramps, cold injuries, altitude sickness, etc.	1,2,3,4,5
Practical	1. different types of haemorrhage management 2. dressing, bandaging 3. burn management 4. spinal immobilization techniques	30	Explain and demonstrate of haemorrhage management, different types of dressing, bandages and burn management.	1,2,3,4

TEXT BOOKS:

T1: Nancy Caroline's emergency care in the streets 9th edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOME

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Determine the mechanism of injury and identify different trauma centers.	1
2	Describe the anatomy and physiology of the skin with the ability to recognize and treat shock and soft tissue injuries.	1,2
3	Discuss various skills to assess and manage injuries related to the abdominal and thoracic cavities including burns.	3,4
4	Develop knowledge and skills to assess and manage injuries related to musculoskeletal system.	3,4
5	Apply skills to assess and manage different types of injuries such as lightning strike, heat injury, etc.	4,7&8

SEMESTER – VI									
Course Title	Medical and Surgical Emergencies Care								
Course code	24BCIC3202R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 30T+30P	2	0	2	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Critical and Intensive Care Unit Technology								
Semester	VI semester of 3 rd year of the programme								
Course Objectives	1. This course is designed to assist students in developing expertise and in depth understanding in the field of medical and surgical emergency. 2. It will help the students to develop advanced skills for surgical intervention in various conditions. 3. helps the student to develop a comprehensive knowledge in dealing with psychiatric emergencies.								
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	Nervous System: <ul style="list-style-type: none"> • Cerebrovascular disease – <ul style="list-style-type: none"> ▪ CVA ▪ Haemorrhage, Embolism, Thrombosis • Head Injury • Delirium, Persistent vegetative state • Brain death • Coma. 	6	Explain, identify and assess various neurologic disorders including their etiology and pathophysiology.				1,2		
II	Neuromuscular disease: <ul style="list-style-type: none"> • Myasthenia Gravis • Guillain Barre Syndrome 	6	Explain, identify and assess neuromuscular disorders such as myasthenia gravis and gullain barre syndrome.				1,2,3		
III	Poisoning : <ul style="list-style-type: none"> • Common poisons • General supportive care • Snake bite • Insect and animal bite – scorpion sting 	6	Explain, identify and manage various types of poisoning including snake bite, animal bite, insect bite, etc.				1,2,3		
IV	Obstetric Emergency: <ul style="list-style-type: none"> • Complications of labour - Fetal distress, obstructed labour, reputed uterus • Antepartum Hemorrhage • Post partum Hemorrhage • Preeclampsia, Eclampsia • Ectopic pregnancy • Puerperal sepsis 	6	Explain, identify and assess various obstetric complications and emergencies.				1,2,3, 4		

V	Behavioural Emergencies: <ul style="list-style-type: none"> • Psychiatric signs and symptoms • Management of behavioural emergencies • Management and handling of violent patients • Management of post ventilation psychosis. 	6	Explain, identify and manage psychiatric and behavioural emergencies.	1,2,3, 4,5
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TEXT BOOKS:

T1: Textbook of critical care. 6th edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge on the nervous system along with the assessment of neurologic examinations.	1,2
2	Understand the pathophysiology and management of neuromuscular disorders.	1,2
3	Describe signs and symptoms of common poisonings and its immediate management.	2,3
4	Explain the assessment and management of various obstetric emergencies.	3,7
5	Identify the signs of behavioral emergencies and manage accordingly.	7,8

SEMESTER – VI									
Course Title	Patient safety and Quality Care								
Course code	24BCIC3203R	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 Critical and Intensive Care Unit Technology								
Semester	VI semester of 3 rd year of the programme								
Course Objectives	1. To understand basic pharmacological concepts, including emergency medicines and their properties. 2. To identify various drugs used in medicine and discuss their mechanisms of action. 3. To report on clinical applications, side effects, and toxicities of drugs, and translate pharmacological principles into clinical decision-making.								
CO1	Explain and Implement the concepts of quality management pertaining to patient safety and healthcare quality.								
CO2	Utilize appropriate tools and approaches required for systematic evaluation, measurement and quality system improvements.								
CO3	Identify gaps in quality and safety in healthcare organizations and develop strategies that will solve them.								
CO4	Recognize causes of medical errors and harm; then incorporate preventative measures into practice.								
CO5	Describe the healthcare data and analytics to measure healthcare quality and patient safety								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to Patient Safety <ul style="list-style-type: none"> • Definition and Importance of patient safety • Principles and concepts of Patient Safety • History context and development of Patient Safety • Importance and role of organization on Patient Safety Culture • Tools and techniques for identifying potential patient safety hazards. 	10	Describe and understand the definition and importance of patient safety, be familiar with its historical context and development, grasp the principles and concepts of patient safety, recognize the role of organizational culture in promoting safety, and utilize tools and techniques for identifying potential patient safety hazards.					1,2	
II	Medical Errors and Prevention <ul style="list-style-type: none"> • Types and classification of medical errors • Factors contributing to medical errors • Risk assessment in healthcare settings • Impact of medical errors on patients and healthcare organizations • Responding to adverse events • Management of patients affected by medical harm • Prevention strategies for medical errors 	9	Describe and classify different types of medical errors, identify factors contributing to these errors, conduct risk assessments in healthcare settings, comprehend the impact of medical errors on patients and organizations, respond appropriately to adverse events, manage patients affected by medical harm, and implement effective prevention strategies.					1,2,3	

<p style="text-align: center;">III</p>	<p>Healthcare Quality Management</p> <ul style="list-style-type: none"> • Definition and significance of healthcare quality management • History and evolution of quality management in healthcare • Key concepts and principles of quality management • Metrics and indicators used to measure healthcare quality <p>Relationship Between quality management and patient outcomes</p>	<p style="text-align: center;">9</p>	<p>Describe, illustrate and understand the definition, significance, and evolution of healthcare quality management, apply key concepts and principles of quality management, utilize metrics and indicators to measure healthcare quality, and analyze the relationship between quality management and patient outcomes.</p>	<p style="text-align: center;">1,2,3</p>
<p style="text-align: center;">IV</p>	<p>Quality Improvement in Healthcare</p> <ul style="list-style-type: none"> • Plan-Do-Study-Act (PDSA) cycle • Continuous quality improvement (CQI) processes • Root cause analysis (RCA) techniques for identifying quality issues • Utilization of quality improvement tools • Implementation of evidence- based practices • Clinical guidelines to enhance quality of patient care 	<p style="text-align: center;">9</p>	<p>Describe, illustrate and explain about the Plan-Do- Study-Act (PDSA) cycle, engage in continuous quality improvement (CQI) processes, apply root cause analysis (RCA) techniques to identify quality issues, use quality improvement tools effectively, implement evidence-based practices, and follow clinical guidelines to enhance the quality of patient care.</p>	<p style="text-align: center;">1,2,3,4</p>
<p style="text-align: center;">V</p>	<p>Incident Reporting and Documentation</p> <ul style="list-style-type: none"> • Principles and purpose of Incident reporting in healthcare setting • Documentation requirements for adverse events • Utilization of incident reporting tools and systems • Role of incident reporting in promoting transparency and accountability • Training and education on incident reporting for healthcare professionals 	<p style="text-align: center;">8</p>	<p>Describe and apply knowledge about the principles and purpose of incident reporting in healthcare, meet documentation requirements for adverse events, utilize incident reporting tools and systems, appreciate the role of incident reporting in promoting transparency and accountability, and participate in training and education on incident reporting for healthcare professionals.</p>	<p style="text-align: center;">1,2,3,4,5</p>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain and implement the concepts of quality management pertaining to patient safety and healthcare quality.	1,2,3,5,7
2	Utilize appropriate tools and approaches required for systematic evaluation, measurement and quality system improvements.	2,3,5,7
3	Identify gaps in quality and safety in healthcare organizations and develop strategies that will solve them.	2,5,7
4	Recognize causes of medical errors and harm; then incorporate preventative measures into practice.	2,3,5,7
5	Describe the healthcare data and analytics to measure healthcare quality and patient safety	2,5,7

SEMESTER – VI									
Course Title	Dialysis								
Course code	24BCIC3204R	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 Critical and Intensive Care Unit Technology								
Semester	VI semester of 3 rd year of the programme								
Course Objectives	1. Understand the principles and techniques of dialysis. 2. Operate and maintain dialysis equipment. 3. Monitor and manage patient responses to dialysis treatment								
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: • Anatomy of Kidney • Physiology of Kidney	7	Describe, illustrate and explain cell organization and functions, microscopy and structural differences.	1,2					
II	Basics of Dialysis: • Indications of dialysis – Acute and chronic renal disease • Principles of dialysis, definitions • Types of dialysis	10	Describe, illustrate and explain membrane structure, function; cell organization and the proteins involved in transportation.	1,2,3					
III	Haemodialysis • Haemodialysis apparatus – types of dialyzer & membrane • Types of vascular access for haemodialysis • Introduction, functioning and management machine • Priming of dialysis apparatus • Assessment during dialysis • Common complications of haemodialysis • Monitoring of patient during dialysis.	10	Describe, illustrate and explain chromosomal structure and types.	1,2,3					
IV	Peritoneal Dialysis: • Peritoneal dialysis machine • Peritoneal access devices: types of catheter insertion • Complications of dialysis (P.D.) • Anticoagulation • Withdrawal of dialysis criteria	8	Describe, illustrate and explain the mechanism of cell-to-cell communication	1,2,3,4					
V	Drugs and Fluid: • I.V. fluid therapy in renal disease • Diuretics • Antihypertensive and their use during dialysis	10	Describe, illustrate and explain the cell cycle and division in general and in some specific cell types	1,2,3,4,5					

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain the renal anatomy and physiology.	1
2	Discuss the principles of acute and chronic renal diseases followed by the purpose and types of dialysis.	2
3	Discuss the use of hemodialysis machine its Performance and maintenance	2,3
4	Discuss about the Peritoneal Dialysis machine and its applicability.	4
5	Discuss various drugs used during treatment of renal diseases.	4,8

SEMESTER – VI									
Course Title	MOOCS								
Course code	24BCICMO302	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 Critical and Intensive Care Unit Technology								
Semester	VI semester of 3 rd year of the programme								
Course Objective	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 team work 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 team work skills.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
S N	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 team work skills.	7,8

SEMESTER –VI									
Course Title	Generic Elective								
Course code	24BCICGE302	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 Critical and Intensive Care Unit Technology								
Semester	VI semester of third year of the programme								
Course Objectives	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 team work 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 team work 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 team work skills.	7,8

SEMESTER – VI									
Course Title	Digital Tech								
Course code	24BCIC3106R	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 Critical and Intensive Care Unit Technology								
Semester	VI semester of third year of the programme								
Course Objectives	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 team work 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



Assam down town UNIVERSITY

Curriculum and Syllabus

Bachelor of Operation Theatre Technology

**OUTCOME BASED EDUCATION FRAMEWORK
CHOICE BASED CREDIT SYSTEM**

Version: 2.2

**FACULTY OF PARAMEDICAL
SCIENCES**

July, 2024

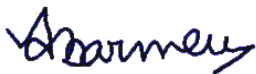
PREAMBLE

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 Board of Studies (BOS) meeting of the Faculty of Paramedical Sciences held on dated 20/06/2024 and approved by the 51st Academic Council (AC) meeting held on dated 26/07/2024.



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 multi-disciplinary 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 conflict-free global society.
6. To be renowned for creating new knowledge through high quality inter disciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stake holders 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. We all give credit to Doctors and nurses for saving patients' lives by performing operations. Yes, they do deserve the credit. But OT technicians, who are part of the team, also deserve credit.

The curriculum provides skill enhancement and value-added courses along with the core papers.

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 (POs):

- 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: 123

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 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.

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-Voice etc.:

- i) Practical examination shall be conducted in the presence of one external expert and one or more internal examiners.
- ii) Viva-Voice, 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^{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 class room teaching through series of lectures delivering concepts using ITC facilities, white or black board. Notes may also be circulated to the students however; the students are to be involved in preparation of the notes. The teacher will be responsible in selecting the best note for circulation. The teacher- centric methodology has recently fallen out of favour 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 student for studying by themselves, prepare presentations, notes etc., and present at respective class time after consultation and discussion with the course teachers. The teacher facilitate 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 visit to the laboratory for experiments or field and survey. 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 a 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 with problems. During the library hours the student along with the teacher visits library search probable solution for the assigned problem. The same has to be done in group 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, Student present and deliver lectures in presence of teacher and supervised by teacher	60%
Student visit fields or perform experiments or teacher perform demonstration	05%
Flipped Classroom approach	10%
Cooperative learning approach	05%

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

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

Breakdown of Credits

Sl. No	Category		Total number of Credits
1	University Core (UC)	Skill Enhancement Course (SEC)	16
		Ability Enhancement Course(AEC)	
		Field Training	
		Discipline Specific Elective (DSE)	
		Value Added Course (VAC)	
2	University Elective (UE)	Multidisciplinary Course (MDC)	16
		Value Added Course (VAC)	
3	Program Core (PC)	Discipline Specific Core(DSC)	71
		Field Training	
		Research /Industry Internship	
		Summer Internship	
4	Program Elective (PE)	Discipline Specific Elective (DSE)	20
		Value Added Course (VAC)	
5	Faculty Core(FC)	Skill Enhancement Course (SEC)	-
		Ability Enhancement Course(AEC)	
Total			123

SEMESTER WISE COURSE DISTRIBUTION

	S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
Semester I	1.	24BOTT1101R	Human Anatomy & Physiology I	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200
	2	24BOTT1102R	General Biochemistry	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3	24BOTT1103R	Basic principles of Hospital practice and patient care	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
	4	24UBPD1101R	English for Enhancing career opportunities	AEC	0	0	2	0	0	0	1	0	0	100	100
	5	24BOTT1101M	Network analysis in systems biology	VAC	2	0	0	0	0	0	2	0	100	0	100
	6	24BOTT1104R	Medical Psychology	MDC	3	0	0	0	0	0	3	40	60	0	100
	7	24UBEC1101	Extra-curricular activities	Extra-Curricular	0	0	0	4	0	0	1	0	100	0	100
	Total					14	0	10	4	0	0	20	160	440	300
Semester II	1.	24BOTT1201R	Human anatomy and physiology 1	DSC (Major)	4	0	4	0	0	0	6	40	60	100	200
	2	24BOTT1202R	Biochemistry: Biomolecules and its Metabolism	DSC (Minor)	3	0	2	0	0	0	4	40	60	100	200
	3	24BOTT1203R	Fundamentals of Patient Care and Safety	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
	4	24UBPD1201R	Functional English	AEC	0	0	2	0	0	0	1	0	0	100	100
	5	24ODI1201R	Ocular Disease I	MDC	3	0	0	0	0	0	3	40	60	0	100
	6	24UBES1201R	Environmental Science	VAC	2	0	0	0	0	0	2	40	60	0	100
	7	24BOTT1204R	Self-Study Seminar	AEC	0	0	2	0	0	0	1	0	0	100	100
	8	24UBCC1201	Co-curricular activities	Co-Curricular	0	0	0	4	0	0	1	0	0	100	100
	Total					14	0	10	4	0	0	20	200	300	500

S. N.	Course Code	Course Title	Course Category	Engagement							Maximum Marks for			
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
1.	24BOTT2101R	Introduction of post Operative care unit	DSC (Major)	3	0	2	0	0	0	4	40	60	100	200
2	24BOTT2102R	Introduction to Anesthesia and Basic Life Support	DSC (Major)	3	0	2	0	0	0	4	40	60	100	200
3	24BOTT2103R	Basic Microbiology	DSC (Minor)	3	0	0	0	0	0	3	40	60	0	100
4	24BOTT2104R	Pharmacology I	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100
5	24BOTT2105R	Infection control and Sterile technique procedure	DSC (Minor)	2	0	2	0	0	0	3	40	60	100	200
6		DISA	MDC	1	0	0	0	0	0	1	0	0	100	100
7		Ocular Disease II	MDC	1	0	0	0	0	0	1	40	60	0	100
8	24UBPD2101R	CLPPD	AEC	0	0	2	0	0	0	1	0	0	100	100
9	24UDLS2101 R	Digital literacy	SEC	0	0	2	0	0	0	1	0	0	100	100
10	24UULS2101 R	BAS	SEC	0	0	2	0	0	0	1	0	0	100	100
11	24BOTT2106R	Techno Professional Skills	FT	0	0	0	0	0	8	1	0	0	100	100
12	24BOTT2107R	Field training	FT	0	0	0	0	0	0	1	0	0	100	100
Total				15	0	12	0	0	8	23	240	360	900	1500

Semester III

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total		
Semester IV	1.	24BOTT2201R	Management of Medical & Surgical Emergencies	DSC (Major)	3	0	4	0	0	0	5	40	60	100	200	
	2	24BOTT2202R	Medical Law and Ethics	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100	
	3	24BOTT2203R	Patient safety and quality care	DSC (Major)	3	0	0	0	0	0	3	40	60	0	100	
	4	24BOTT2204R	Clinical pathology, hematology and blood bank	DSC (Major)	3	0	0	0	0	0	3	40	60	0	100	
	5	24BOTT2205R	Pharmacology-II	DSC (Minor)	2	0	0	0	0	0	2	40	60	0	100	
	6	24BOTT2206R	Bio medical waste management	DSC (Minor)	1	0	0	0	0	0	1	40	60	0	100	
	7	24UBPD2201 R	CLPPD	AEC	0	0	2	0	0	0	1	0	0	100	100	
	8	24UUFL2202R	Financial Literacy	MDC	0	0	2	0	0	0	1	0	0	100	100	
	9	24BOTT2207R	Techno Professional Skills	AEC	0	0	4	0	0	0	2	0	0	100	100	
	10	24BOTT2208R	Advance Cardiac Life Support (ACLS)	VAC	0	0	2	0	0	0	1	0	0	100	100	
	11	24BOTT2209R	Self-Study Seminar	AEC	0	0	2	0	0	0	1	0	0	100	100	
Total				14	0	18	0	0	0	22	240	360	600	1200		
Semester V	S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for			
					L	T	P	S	R	O	C	IA*	SEE*	PE*	Total	
	1.	24BOTT3101R	Clinical Observation I (OT Procedure & Patient care)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100	
	2	24BOTT3102R	Clinical Observation II (Sterilization & aseptic techniques)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100	
	3	24BOTT3103R	Clinical Observation III (Anesthesia & Surgical Procedure)	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100	
	4	24BOTT3104R	Case Study Report	DSC (Major)	0	0	0	16	0	0	4	0	0	100	100	
	5	24BOTT3106R	Summer Internship	Internship	0	0	0	0	0	24	4	0	0	100	100	
6	24BOTT3107R	Research	Research	0	0	0	0	18	0	2	0	0	100	100		
Total				0	0	0	64	18	24	22	0	0	600	600		

S. N.	Course Code	Course Title	Course Category	Engagement						Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SEE*	PE*	Total
1.	24BOTT3201R	Clinical application	DSC (Major)	3	0	4	0	0	0	5	40	60	100	100
2	24BOTT3202R	Advanced Anaesthesia Technique	DSC (Major)	3	0	4	0	0	0	5	40	60	100	100
3.	24BOTT3203R	Surgical procedure and equipment use in the OT	DSC (Major)	2	0	4	0	0	0	4	40	60	100	100
4	24BOTT3204R	Introduction to Research methodology	DSC (Major)	2	0	0	0	0	0	2	40	60	0	100
5	24BOTT3205R	Research/ Industry Internship	Research	0	0	0	0	24	0	4	0	0	100	100
6	24BOTT3206R	Techno Professional Skills	SEC	0	0	4	0	0	0	4	0	0	100	100
7		Finishing School	AEC	0	0	4	0	0	0	2	0	0	100	100
Total				10	0	20	0	24	0	26	160	240	600	1000

Semester VI

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

SEMESTER – I									
Course Title	Human Anatomy and Physiology I								
Course code	24BOTT1101R	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	Bachelor of Operation Theatre Technology								
Semester	Fall/ I semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> To familiarize with anatomical positions and understand the microscopic structure of organs and skeleton in the human body. To facilitate a deeper comprehension of anatomical structure and basic physiological functions across different body regions. To enable students to apply this knowledge practically in various healthcare and scientific contexts. 								
CO1	Discuss the anatomical terms and basic structure and function of cells								
CO2	Explore knowledge of Musculo skeletal system and bones along with their special features and functions.								
CO3	Describe the composition of the human digestive system and their specific functions.								
CO4	Explain respiratory system and classify various respiratory disorders.								
CO5	Describe the anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Introduction To Anatomical Terms, Basic Structure and Function of Cell <ul style="list-style-type: none"> Level of Organization – Body Parts and Areas, Planes and Sections. Common anatomical terminology Structure and Function of Cell Membrane, Cellular Transport 	7	Describe, illustrate and explain the different anatomical terms, basic structure and function of cell.	1,2					
II	Musculo – Skeletal System and Bones <ul style="list-style-type: none"> Bones: Classification & types according to morphology. Tissue and its types Cartilage Joints: definition, classification, and movements of joints. <ul style="list-style-type: none"> Muscle and its types For Specific programs- Radiology: Importance of different bones of human body.	10	Describe, illustrate and classify the musculoskeletal system along with bones.	1,2					
III	Digestive System- <ul style="list-style-type: none"> Anatomy of gastrointestinal tract and accessory organs of digestive system. Composition and functions of gastric, pancreatic, intestinal, and biliary secretion. 	8	Describe, illustrate and explain the structure of organs of digestive system.	1,2					

IV	Respiratory System- <ul style="list-style-type: none"> • Anatomy of the respiratory tract • Mechanisms and Regulation of respiration. • Gaseous exchange in lung and tissues. • Lung volumes and capacities. • Respiratory abnormalities: Hypoxia, cyanosis, dyspnoea, Asphyxia, hyperventilation, hypoventilation, tachypnoea and bradypnea Specific Program ECC: Intrapleural and intrapulmonary pressures and their changes with respiration, Hypoxia. For Specific programs- ECC: Description of larynx, trachea, and respiratory centers.	10	Describe, illustrate and explain the anatomy of respiratory tract.	1,2
V	Cardio-vascular System and Blood: <ul style="list-style-type: none"> • Mediastinum – division • Structure of heart and blood vessels. • Systemic circulation, pulmonary circulation, and coronary circulation • Cardiac output, cardiac cycle, conducting system of heart. • Heart sounds, pulse, blood pressure and the irregularity. • Composition and functions of blood, Plasma, and body fluids. • Functions of RBC, WBC, and platelets. • Hemoglobin. • Blood hemostasis • Blood groups 	10	Describe, classify and explain the about cardio vascular system and composition and function of blood.	1,2
Practical	1. Study of Skull Vertebrae, Ribs and bones of upper limb.	10	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
	2. Study of compound Microscope.	4		
	3. Measurement of blood pressure, Arterial pulse	6		
	4. Bleeding time (BT)	6		
	5. Clotting time (CT)	6		
	6. Hemoglobin estimation	4		

TEXT BOOKS:

T1. Fundamentals of Anatomy, Pamela K Levangie, Cynthia C Norkin, JP Bros Medical Publishers, New Delhi

T2. Fundamentals of Medical Anatomy By, Duane nudson, 2nd ed. 2007 Publisher Springer.

T3. Ross and Wilson Anatomy and Physiology, Ross and Wilson, JP Bros Medical Publishers, New Delhi

REFERENCE BOOKS:

R1. Medical anatomy, JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997, JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997

R2. 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	Discuss the anatomical terms and basic structure and function of cells	1,3,8
2	Explore knowledge of Musculo skeletal system and bones along with their special features and functions.	1,3,8
3	Describe the composition of the human digestive system and their specific functions.	1,3,8
4	Explain respiratory system and classify various respiratory disorders.	1,3,8
5	Describe the anatomy and physiology of the cardiovascular system, fluid composition and distribution in the body	1,3,8

SEMESTER – I									
Course Title	GENERAL BIOCHEMISTRY								
Course Code	24BOTT1102R	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 Operation Theatre Technology								
Semester	Fall/ I semester of first year of the Programme								
Course Objectives	<ol style="list-style-type: none"> To impart the knowledge in the technical aspects of biochemical studies specially focusing on the clinical findings in various body metabolites. To explain the energy flow in the form on ATP in the human body and cells. To demonstrate 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	CARBOHYDRATES: <ul style="list-style-type: none"> Definition and classification of carbohydrates Example of some common carbohydrates (Glucose, Fructose, Starch, Glycogen, Starch), their sources and structures. Biological significance of Carbohydrate 	8	Define, classify and describe the sources and types of carbohydrates along with their functions in the body.				1,2		
II	PROTEINS: <ul style="list-style-type: none"> Definition of Proteins along with the biological significance, Amino acids and its, classification: Essential and Non-essential amino acids 	7	Define, classify and explain the mechanism of proteins along with their functions in the body.				1,2		
III	LIPIDS: <ul style="list-style-type: none"> Definition and classification of lipids Classification of Fatty Acids Examples and functions of some common lipids (Phospholipids, Glycolipids, Steroids) 	7	Define and classify types of lipids along with their functions in the body.				1,2		
IV	NUCLEIC ACIDS: <ul style="list-style-type: none"> Basics on 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	ACID-BASE BUFFERS:	8	Define, explain and				1,2		

	<ul style="list-style-type: none"> Basics about acids, bases, pH, pOH, pKa and Buffer Acid base balance 		describe acid-base buffers.	
Practical	1. To identification and demonstration of biochemistry laboratory glassware's and apparatus.	6	Define, illustrate, explain and apply different laboratory test like Fehling test, Benedict's test and molest text	1,2,3,4,5
	2. To identification and demonstration of biochemistry laboratory instruments (Principle and Applications)	4		
	3. To perform Fehling's test for determination of reducing and non-reducing sugar in an unknown sample.	4		
	4. To perform Benedict's test for determination of reducing and non-reducing sugar in an unknown sample.	4		
	5. To perform Molisch's test for determination of sugar in an unknown sample.	4		

TEXT BOOKS:

T1. Text Book of biochemistry, U Satyanaryana and U Chakrapani, Sixth Ed

T2. Text book of Biochemistry for medical students, DM Vasudevan (Author), Sreekumari S (Author), Kannan Vaidyanathan (Author), 7th Edition

REFERENCE BOOKS:

R1. Lehninger Principles of Biochemistry, David L Nelson and Michael M Cox, Eighth Edition|©2021 David L.

R2. Text book of Biochemistry, Lubert Stryer, Jeremy M Berg, WH Freeman, 9th ed. 2019

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	1,2,3,8
2	Identify various classification of amino-acids and recognize the significance of Protein.	1,2,8
3	Describe the significance, classification and functions of lipids.	1,2,8
4	Comprehend the structure and functions of Nucleic Acids.	1,2,3,8
5	Explain the fundamentals and importance of acid, base and buffers	1,2,3,8

SEMESTER – I									
Course Title	Basic Principle of Hospital Practice and Patient Care								
Course code	24BOTT1103R	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 Operation Theatre Technology								
Semester	Fall/ 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	Hospital & Records & Reports: <ul style="list-style-type: none"> 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 the different types of record and reports maintained in the hospital.					1,2	
II	FIRSTAID: <ul style="list-style-type: none"> First aid 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 Scorpion bite Dog bite foreign bodies in various organs Burns & scald Haemorrhage 	10	Explain the objectives of first aid and demonstrate the management of various medical emergencies.					1,2	

III	HYGIENE AND BASIC CARE NEEDS OF PATIENTS: <ul style="list-style-type: none"> • 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, Fowlers position 	10	Describe, illustrate and explain the significance of maintaining safety and hygiene in patient care.	1,2
IV	SAFETY IN THE LABORATORY: <ul style="list-style-type: none"> • Common laboratory accidents from physical injuries • Electrical shock • Chemical injury • Bleeding • Burn • Eye accidents • Biological hazards 	9	Describe, define and explain the different positions of the body along with the management of temperature for patients.	1,2
V	VITAL SIGNS OF PATIENTS: <ul style="list-style-type: none"> • 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 	9	Describe, explain and demonstrate the assessment of pulse and respiration along with the factors affecting them.	1,2

TEXT BOOKS:

T1. Principles of Hospital Practice and Patient Care, Srinivasulu Reddy, Paras, New Delhi, India, 13thEdition (2020).

T2. Hospital and Patient Care Management, Dr. Vidhya Srinivasan, Dr. Akshay Ch. Deka, Asian Humanities Press, New Delhi, India, 4th Edition (2019).

REFERENCE BOOKS:

R1. Principles and Practice of Hospital Medicine, Sylvia McKean, McGraw-Hill Education, USA, 4thEdition (2019).

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.	5,6,7,8
2	Explain the basic principles, golden rules of First Aid and effectively implement the skills in certain medical emergencies.	1,2,3,4
3	Apply fundamental knowledge of patient safety and care to ensure basic care needs of patients.	2,3,7
4	Assessment of common laboratory accidents and its effective management.	2,3,5
5	Describe vital signs and effectively manage the abnormalities	1,2,3

SEMESTER – I									
Course Title	FIELD VISIT								
Course code	24BOTT1104R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 120T	0	0	0	0	0	8	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ I semester of first year of the Programme								
Course Objectives	<ol style="list-style-type: none"> To learn practical skills through early exposure to primary, secondary, and tertiary healthcare settings. Understand the roles and responsibilities within different levels of the healthcare system. Learn to develop innovative solutions and adapt to the dynamic nature of the medical field. 								
CO1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.								
CO2	Comprehend the practical applications of theoretical concepts in real-world settings.								
CO3	Exposure to diverse situations to enhance skills in patient management and care.								
CO4	Evaluate the effectiveness of different approaches and methods seen during the field trip.								
CO5	Develop innovative strategies or solutions inspired by enhanced professional practice.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.	2,5,6,7,9
2	Comprehend the practical applications of theoretical concepts in real-world settings.	1,2,3,7,8
3	Exposure to diverse situations to enhance skills in patient management and care.	1,2,3,5,8
4	Evaluate the effectiveness of different approaches and methods seen during the field trip.	5,7,8
5	Develop innovative strategies or solutions inspired by enhanced professional practice.	5,6,7,8

SEMESTER – I									
Course Title	BASIC COMMUNICATIVE ENGLISH								
Course code	24UBPD1101 R	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 Operation Theatre Technology								
Semester	Fall/ I semester of first year of the Programme								
Course Objectives	1. To improve speaking and pronunciation skills. 2. To enhance vocabulary for everyday conversations and professional interactions. 3. To understand common grammatical structures and apply them accurately.								
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	Speaking Skills i. Introduction and greetings ii. Pronunciation iii. Asking and offering information		6	Describe, illustrate and explain about the speaking skills and pronunciation.				1,2	
II	Building Vocabulary i. Synonyms ii. Antonyms		6	Describe and explain about the vocabulary				1,2	
III	Grammar (Flipped Classroom) i. Parts of Speech ii. Articles iii. Affirmative and Negative Sentences iv. Sentence Construction from jumbled words		6	Describe , illustrate and explain about the grammar needed in every sentences				1,2	
IV	Communication Skills i. Introduction to Communication, ii. Purpose of Communication, iii. Types of Communication iv. Barriers of Communication		6	Describe, illustrate and explain the types of communication and communication skills.				1,2	
V	Presentation Skills i. Introduction to Presentation skills ii. Essential characteristics of a good presentation iii. Preparation of a good presentation (4P's of Presentation) iv. Tips for using visual aids during presentation		6	Describe, explain, demonstrate and applied the skills of good presentation.				1,2	

TEXT BOOKS:

- T1. Barrett, Grant. 2016. *Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking*, Zephyros Press.
- T2. Professionalism Skills for Workplace Success, [Lydia E. Anderson](#), [Sandra B. Bolt](#), Publisher: [Pearson Education](#)
- T3. The Art of Public Speaking, [Dale Carnegie](#), Publisher: [Diamond Pocket Books Pvt Ltd](#)
- T4. English for Academic CVs, Resumes, and Online Profiles, [Adrian Wallwork](#), Publisher: [Springer International Publishing](#)
- T5. Employment & Volunteering: Job Interview Basics, [Lisa Renaud](#), Publisher: [Classroom Complete Press](#)

REFERENCE BOOKS:

- R1. Zinsser, William. (2006) *On Writing Well: The Classic Guide to Writing Nonfiction*, Harper Perennial
- 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
- R3. Murphy, Raymond,.(2012) *English Grammar in Use Book with Answers: A Self- Study and Practice Book for Intermediate Learners of English*, Cambridge University Press
- R4. Real-resumes for Teachers, [Anne McKinney](#), Publisher: [Prep Pub.](#)
- R5. Public Speaking for Success, [Dale Carnegie](#), Publisher: [Penguin Publishing Group](#)
- R6. Job Interview Skills, [Paige Labret](#), Publisher: [Di Dior Calderone Giuseppina](#)

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.	5,7,8
2	Expand their vocabulary and use synonyms and antonyms appropriately.	5,7,8
3	Apply grammatical rules to construct grammatically correct sentences and paragraphs.	5,7,8
4	Identify different types of communication and strategies to overcome communication barriers.	5,7,8
5	Prepare and deliver presentations effectively using visual aids and non-verbal communication techniques.	5,7,8

SEMESTER – I									
Course Title	Co0Curricular/ Extra-Curricular								
Course code	24UBEC1101/ 24UBCC1101	Total credits: 1 Total hours:60T	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ I 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"> 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. 		10	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

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	2,5,7,8
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.	2,5,7,8
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

SEMESTER – II									
Course Title	HUMAN ANATOMY & PHYSIOLOGY II								
Course code	24BOTT1201R	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						
Programmed	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	1. To develop fundamental knowledge on the gross structure of the excretory system and its function. 2. To classify the nervous system and understand the functions of all the special senses. 3. To identify different types of immune cells, comprehend the lymphatic system, and understand the structure and function of the male and female reproductive systems, including their regulation by the endocrine system.								
CO1	Explain the structure and function of excretory system.								
CO2	Describe the sensory organs and nervous system along with their functions								
CO3	Identify different types of immune cells and lymphatic system in the body.								
CO4	Explain the structure and functions of male and female reproductive system.								
CO5	Describe the endocrine system and their regulation								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Urinary System <ul style="list-style-type: none"> Structure of kidney, ureter, urinary bladder, male and female urethra. Functions of kidneys, nephron. Urine formation. 	7	Describe, define and explain the different structure of organs in the pelvis. Explain, define and classify the structure of organs involved in the urinary system.	1,2					
II	Nervous System <ul style="list-style-type: none"> Classification of Nervous system. Central Nervous system – Brain and Spinal cord, blood supply of brain. Cranial nerves and spinal nerves Introduction of motor system, sensory system and Autonomic Nervous System. Functions of brain, and spinal cord Synapse, reflex arc Cerebrospinal fluid Sensory Organs: Skin, Ear, Nose, Tongue Eye 	12	Describe, classify and explain the nervous system of the human body.	1,2					
III	Lymphatic and Immunological System	8	Classify the different structures and functions of the lymphs along with	1,2					

	<ul style="list-style-type: none"> • Structure of lymphatic system and functions. • Immunity – Antigen, Antibody, and Immune response. • Acquired immunity 		the immune system of the body.	
IV	Reproductive System <ul style="list-style-type: none"> • Structure of male and female reproductive organs. • Structure of breast • Changes during puberty • Ovulation, • Menstrual cycle • Pelvic cavity with its boundaries and contents 	10	Describe, illustrate and explain the different parts of the human reproductive system.	1,2
V	Endocrine System <ul style="list-style-type: none"> • Different endocrine glands • Hormones and functions of endocrine glands • Regulation of secretion hormones. 	10	Classify, differentiate and explain about endocrine glands with their hormones and function.	1,2
Practical	1. Study of pelvic bones and bones of lower limbs of human body.	8	Describe, illustrate and explain about bones and organs of human body. Analyzing the blood group and total count of RBC and WBC.	1,2,3,4,5
	2. Study of organs: Brain, heart, lung, liver, kidney	8		
	3. Blood group	4		
	4. DLC	4		
	5. Total count of RBC and WBC	6		

TEXT BOOKS:

- T1. Fundamentals of Anatomy, Fundamentals of Anatomy, JP Bros Medical Publishers, New Delhi
T2. Fundamentals of Medical Anatomy By, Duane nudson, 2nd ed. 2007 Publisher Springer.
T3. Ross and Wilson Anatomy and Physiology, Ross and Wilson, Churchill Livingstone 8th Ed.

REFERENCE BOOKS:

- R1. Medical anatomy, JP Bros Medical Publishers, Bangalore, 1st Indian Ed1997
R2. 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	Explain the structure and function of excretory system.	1,8
2	Describe the sensory organs and nervous system along with their functions	1,8
3	Identify different types of immune cells and lymphatic system in the body.	1,8
4	Explain the structure and functions of male and female reproductive system.	1,8
5	Describe the endocrine system and their regulation	1,8

SEMESTER – II									
Course Title	BIOCHEMISTRY: BIOMOLECULES AND ITS METABOLISM								
Course code	24BOTT1202R	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	1. To teach the technical aspects of biochemical studies, focusing on clinical implications. 2. To elucidate the energy dynamics via ATP in human cells. 3. To provide comprehension of enzymes, including their functions, regulations, and biological significance.								
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 : <ul style="list-style-type: none"> Definition and classification of enzyme. Basic idea of co-enzyme, iso-enzyme. Mechanism of enzyme Action. Factors affecting enzymeaction 		8	Describe, classify and explain the types of enzymes along with the factors affecting their actions.				1,2	
II	CARBOHYDRATESMETABOLISM <ul style="list-style-type: none"> Glycolysis Kreb's Cycle Glyconeogenesis Glcogenesis Glcogenolysis 		7	Describe and explain the mechanism of carbohydrates in the body.				1,2	
III	PROTEINMETABOLISM <ul style="list-style-type: none"> Transamination Deamination Urea Cycleandits Significance 		7	Describe, illustrate and explain the metabolism of protein and their significance.				1,2	
IV	LIPID METABOLISM, CLINICALBIOCHEMISTRY <ul style="list-style-type: none"> Boxidation of Fatty Acids. Ketone bodies Ketosis and ketoacidosis Liver function test. Renal function test 		9	Define and explain the metabolism of lipids along with the clinical diagnostic tests and their significance.				1,2	
V	VITAMINSANDMINERALS : <ul style="list-style-type: none"> Definition and classification of vitamins according to solubility. Sources and functions of 		12	Describe, explain and classify the different types of vitamins and minerals along with their sources and				1,2	

	individual vitamins. <ul style="list-style-type: none"> • Deficiency. • Individual minerals (calcium, phosphorus, iron, magnesium, fluoride, copper, selenium, molybdenum etc) –their sources, function and properties. 		functions.	
Practical	<ol style="list-style-type: none"> 1. To perform precipitation test to determine the presence of proteins in an unknown urine sample. 2. To perform heat and acetic acid test to determine the presence of proteins in an unknown urine sample 3. To perform Heller’s test to determine the presence of proteins in an unknown urine sample 4. To perform lipid solubility test 	30	Describe, illustrate and explain about different test for proteins and lipids.	1,2,3,4,5

TEXT BOOKS:

T1. Text Book of biochemistry, U Satyanaryana and U Chakrapani, Sixth Ed

T2. Text book of Biochemistry for medical students, DM

Vasudevan (Author), SreekumariS (Author), KannanVaidyanathan (Author), 7th Edition

REFERENCE BOOKS:

R1. Lehninger Principles of Biochemistry, David L Nelson and Michael M Cox, Eighth Edition| ©2021 David L.

R2. Text book of Biochemistry, LubertStryer, Jeremy M Berg, WH Freeman, 9th ed. 2019

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.	1,2
2	Define the mechanism of carbohydrate metabolism in the body.	1,2
3	Explain the metabolism of protein and its significant effects on different organs of body.	1,2,3
4	Describe the process of Lipids metabolism and associated clinical conditions.	1,2,3
5	Determine the different types of vitamins and minerals, their classification, sources and signs of deficiencies in the body	1,2,3

SEMESTER – II									
Course Title	FUNDAMENTAL PATIENT OF CARE AND SAFETY								
Course code	24BOTT1203R	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 Operation Theatre Technology								
Semester	Fall/ II 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	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	Poisoning: <ul style="list-style-type: none"> • Definition • Causes of poisoning • Sources of Poisoning • Symptoms of poisoning • First aid & Management • Antidotes • Common drugs poisoning • Carbon monoxide poisoning 	8	Define, describe and explain the different types of poisons along with their sources and management.				1,2		
II	MEDICAL PROFESSIONAL AND LEGAL HAZARDS OF MEDICAL PROFESSION <ul style="list-style-type: none"> • 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 	5	Describe, illustrate and explain various ethical and legal responsibilities of medical professionals.				1,2		
III	SHOCK <ul style="list-style-type: none"> • Definition • Types of shock • General Features of shock • Investigations of shock 	6	Describe, classify and explain shock along with their clinical manifestations and management.				1,2		

	<ul style="list-style-type: none"> Initial management & first aid of shock 			
IV	HYPERGLYCEMIA AND HYPOGLYCEMIA <ul style="list-style-type: none"> 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 Hypoglycemia 	4	Describe, classify and explain the hyperglycemia and hypoglycaemia along with laboratory tests of diabetes.	1,2
V	LABORATORY INVESTIGATION AND LABORATORY SETUP <ul style="list-style-type: none"> 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 	9	Describe, illustrate and explain medical ethics along with the guidelines and management of different laboratories in the hospital.	1,2

TEXT BOOKS:

T1. Principles of Hospital Practice and Patient Care, Srinivasulu Reddy, Paras, New Delhi, India, 13th Edition (2020).

T2. Hospital and Patient Care Management, Dr. Vidhya Srinivasan, Dr. Akshay Ch. Deka, Asian Humanities Press, New Delhi, India, 4th Edition (2019).

REFERENCE BOOKS:

R1. Principles and Practice of Hospital Medicine, Sylvia McKean, McGraw-Hill Education, USA, 4th Edition (2019).

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	1,2,3,6,8
2	Explain the medical ethics and its importance on the healthcare system	6,7,8
3	Identify the different types of shock along with the management.	1,2,3,8
4	Classify the different types of emergency drugs along with the dosage and effects.	1,2,3,7,8
5	Proficient in performing quality laboratory investigation process and laboratory management	2,3,8

SEMESTER – II									
Course Title	ENVIRONMENTAL SCIENCE								
Course code	24UBES1101R	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 Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	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								
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					
I	Multidisciplinary nature of environmental studies: <ul style="list-style-type: none"> Definition Scope and importance Need for public awareness 	6	Explain the definition, scope, and importance of environmental studies and discuss the need for public awareness.	1,2					
II	Natural Resources: Renewable and non-renewable resources: <ul style="list-style-type: none"> Forest resources Water resources Mineral resources Food resources Energy resources Land resources sources. 	5	Describe different types of natural resources (renewable and non-renewable) and explain their uses and environmental impacts.	1,2					
III	Ecosystems Concept of an ecosystem: <ul style="list-style-type: none"> Structure and function- Producers, consumers, and decomposers. Energy flow 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 	7	Describe the components of an ecosystem, explain energy flow and ecological succession, and compare different types of ecosystems.	1,2					

IV	Biodiversity and its conservation <ul style="list-style-type: none"> • Introduction – • Definition • Value of biodiversity • Threats to biodiversity • Conservation of biodiversity 	5	Discuss, explain biodiversity's value and threats, and describe methods for its conservation.	1,2
V	Environmental Pollution <ul style="list-style-type: none"> • Definition Cause, effects, and control measures of: - Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards • Solid waste management • Disaster management 	5	Discuss, explain about the cause, effects of environmental pollution.	1,2

TEXT BOOKS:

- T1. Harucha E.B, Text book of Environmental Studies, Orient Blackswan Publishing
T2. Tiwari V. K A Textbook of Environmental Studies, Himalaya Publishing House
3. Chatwal G. R. & Sharma H. Environmental Studies, Himalaya Publishing House

REFERENCE BOOKS:

- R1. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, 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](mailto:mapin@icenet.net)(R).

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Discuss the importance of Environment Studies and the need for public awareness.	1,2,8
2	Identify natural resource, its importance, and its impacts on the environment	1,2,8
3	Explore in-depth knowledge on concept of ecosystem	1,2,8
4	Discuss the value of biodiversity and the various methods of conservation of Biodiversity.	1,2,8
5	Explain various environmental pollution and its impact on human and ecosystem	1,2,8

SEMESTER – II									
Course Title	FIELD TRAINING								
Course code	24BOTTFT102	Total credits: 1 Total hours: 120T	L	T	P	S	R	O/F	C
			0	0	0	0	0	8	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> To learn practical skills through early exposure to primary, secondary, and tertiary healthcare settings. Understand the roles and responsibilities within different levels of the healthcare system. Learn to develop innovative solutions and adapt to the dynamic nature of the medical field. 								
CO1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.								
CO2	Comprehend the practical applications of theoretical concepts in real-world settings.								
CO3	Exposure to diverse situations to enhance skills in patient management and care.								
CO4	Evaluate the effectiveness of different approaches and methods seen during the field trip.								
CO5	Develop innovative strategies or solutions inspired by enhanced professional practice.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.	2,5,6,7,9
2	Comprehend the practical applications of theoretical concepts in real-world settings.	1,2,3,7,8
3	Exposure to diverse situations to enhance skills in patient management and care.	1,2,3,5,8
4	Evaluate the effectiveness of different approaches and methods seen during the field trip.	5,7,8
5	Develop innovative strategies or solutions inspired by enhanced professional practice.	5,6,7,8

SEMESTER – II									
Course Title	FUNCTIONAL ENGLISH								
Course code	24UBPD1201R	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 Operation Theatre Technology								
Semester	Fall/ II semester of first year of the programme								
Course Objectives	<ol style="list-style-type: none"> To enable students to learn and understand the different types of sentences. To strengthen the vocabulary of the students which will help in their writing and speaking. To introduce them with the Time Management technique. 								
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.								
Unit- No.	Content		Contact Hour	Learning Outcome					K L
I	Module1-Grammar <ul style="list-style-type: none"> Interchange Interrogative and Assertive Sentences, Exclamatory and Assertive Sentences Types of Tenses Common Errors 		10	Differentiate between interrogative, assertive, and exclamatory sentence types to enhance communication clarity.					1,2
II	Module2-Vocabulary <ul style="list-style-type: none"> Homonyms Homophones 		10	Identify and classify homonyms in context to demonstrate understanding of word meanings.					1,2
III	Module3-ReadingSkills <ul style="list-style-type: none"> Techniques of Effective Reading Gathering ideas and information from a text 		10	Explain the importance of effective reading techniques in improving comprehension and information retention.					1,2
IV	Module4–ConflictManagement <ul style="list-style-type: none"> Definition Type of Conflict Management Effects of conflict Management 		8	Discuss the effects of different conflict management styles on relationships and team dynamics.					1,2
V	Module5-Time-ManagementSkills <ul style="list-style-type: none"> Introduction To Time Management, Importance of Time Management, Basic Tips to Maintain Time. 		7	Demonstrate effective planning and scheduling techniques to optimize personal and professional productivity.					1,2

TEXT BOOKS:

- T1. Wren, P.C and Martin, H.1995. High School English Grammar and Composition, S Chand Publishing. Barrett, Grant.2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.
- T2. Swan, Michael.,(2014)Practical English Usage, Cambridge University Press Taylor J. and Wright, J. , IELTS Advantage Reading Skills: A step-by step guide to a high IELT Sreading score, Delta Publishing by Klett

REFERENCES:

- R1.<https://clockify.me/time-management-techniques>
- R2.<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	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

SEMESTER – II									
Course Title	CO CURRICULAR/ EXTRA CURRICULAR ACTIVITIES								
Course code	24UBEC1101/ 24UBCC1101	Total credits: 1 Total hours: 60T	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ 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"> 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 ho. 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. 			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	

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

SEMESTER – III									
Course Title	INTRODUCTION TO OT & POST OPERATIVE CARE UNIT								
Course code	24BOTT2101R	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 Operation Theatre Technology								
Semester	Fall/ III semester of second year of the programme								
Course Objectives	1. To understand the role and function of the operating theatre in healthcare. 2. Introduce the postoperative care unit environment, including equipment and personnel. 3. To understand the workflow and processes within the operating theatre and postoperative care unit.								
CO1	Describe the physical structure and zones of OT Complex								
CO2	Explain about the requirement of OT environment.								
CO3	Describe fundamental knowledge of OT settings and equipment including the techniques of fumigation								
CO4	Apply skill and knowledge about post operative care.								
CO5	Demonstrate knowledge on the functioning and monitoring devices in ICU setting.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	Introduction to OT Complex <ul style="list-style-type: none"> • Definition • Zones of OT Complex • Importance of each Complex • Aims of Planning 	5	Explain the importance of OT zone and classify the zones and maintain safety and hygiene.	1,2					
II	Physical facilities of OT Complex <ul style="list-style-type: none"> • Location • Size of the OT room • OT Flooring • Space requirement • Ventilation of OT • HEPA Filter • Pressure, Humidity and Temperature 	10	Identify and explain the requirements for OT flooring materials and designs that ensure hygiene and safety and apply standards for proper ventilation to minimize infection risks.	1,2,3,4					
III	Basic Knowledge of OT setting <ul style="list-style-type: none"> • Modular OT • Staffing of OT • Basic Equipment in OT • Monitoring of OT Asepsis • Fumigation of OT 	10	Explain its benefits and functionalities of modular OT and OT equipment.	1,2,3,4					
IV	Introduction to post operative care unit <ul style="list-style-type: none"> • Definition • Functions • Location, Bed Strength, Patient space, Nursing station, Temperature and Humidity • Staffing • Equipment 	10	Describe what a post-operative care unit is and its significance in patient recovery and maintain and monitor optimal temperature and humidity conditions for patient recovery.	1,2,3,4					
V	Introduction to ICU	10	Define what an ICU is and	1,2,					

	<ul style="list-style-type: none"> • Definition • Functions of ICU • Criteria for selection of patients • Types of ICU • Location, Bed Strength, Patient space, Nursing station, Temperature and Humidity • Staffing • Equipment in ICU 		its critical importance in healthcare and apply criteria for selecting patients for ICU admission.	3,4
Practical	<ul style="list-style-type: none"> • Understanding the role of each zone in maintaining hygiene, safety, and efficiency. • Requirements for OT flooring material and design for hygiene and safety. • Standards for proper ventilation to minimize infection risk • Steps and importance of fumigating the OT to maintain sterility. • Primary roles and tasks performed in the post-operative care unit. • Maintaining optimal conditions for patient recovery. • Roles and responsibilities of ICU personnel. • Critical equipment and machinery used for patient monitoring and treatment. • OT equipment checklist. 	60	Describe, illustrate, explain different practical procedure and apply their knowledge and skilled to perform all practical procedure.	1,2,3,4,5

TEXT BOOKS:

- T1. Text book of operation theater technology by Dr. B.C .Bhagavan, Prof .P.V . Ramachandran and Prof .Nisha Clement
- T2. Text Book of Operation theatre Technology, Manjushree Ray & MM Ray, CBS Publisher & Distributors Pvt. Ltd. New Delhi, First ebook Edition 2020

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe the physical structure and zones of OT Complex	2,3,5
2	Explain about the requirement of OT environment.	2,3,5
3	Describe fundamental knowledge of OT settings and equipment including the techniques of fumigation	2,3,5
4	Apply skill and knowledge about post operative care.	2,3,5
5	Demonstrate knowledge on the functioning and monitoring devices in ICU setting.	2,3,5

SEMESTER – III									
Course Title	INTRODUCTION TO ANAESTHESIA AND BASIC LIFE SUPPORT								
Course code	24BOTT2102R	Total credits: 5	L	T	P	S	R	O/F	C
		Total hours: 45P,60P	3	0	4	0	0	0	5
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ III semester of 2 nd year of the Programme								
Course Objectives	1. To understand the principles and techniques of anaesthesia administration. 2. To learn essential life support skills including CPR and airway management. 3. To develop effective communication and teamwork abilities for emergency situations								
CO1	Describe the principle, history and types of anaesthesia.								
CO2	Classify different drugs used in general anaesthesia procedures including post surgery and recovery.								
CO3	Identify the regional anaesthesia and inhalation agents.								
CO4	Demonstrate knowledge on the types of gases used in general anaesthesia and monitoring anaesthesia machine.								
CO5	Demonstrate knowledge and techniques of basic life saving skills.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Introduction of Anaesthesia <ul style="list-style-type: none"> - Definition and goal of Anaesthesia - History of anaesthesia (nitrous oxide, ether, chloroform, Intravenous Anaesthesia, Local Anaesthesia, Muscle Relaxant. - Types of anaesthesia 	5	Describe and understand basic knowledge of anaesthesia and its history , classify different type of anaesthesia	1,2,3					
II	Introduction to General Anaesthesia <ul style="list-style-type: none"> - component of general anaesthesia - stages of Anaesthesia - Complication of General Anaesthesia - Drug use in GA - Pre-medication: indication, type of drugs used for pre-medication, doses and side effects. - Pre and post Aesthetic assessment - Recovery from Anaesthesia - Arrangement of anaesthesia trolley for general anaesthesia - Pain management 	10	Define general anaesthesia; identify its components, stages, and complications. They will also be able to describe the process of drug use in general anaesthesia, including pre-medication (indications, types of drugs, doses, and side effects), and will understand the procedures for pre- and post-anaesthetic assessment, recovery, and pain management.	1,2,3,4					
III	Introduction to Regional Anaesthesia & Inhalation agents <ul style="list-style-type: none"> - Local anaesthetic agents used in regional anaesthesia: indications, contraindications, dosage, complications, route of administrations. -Regional anaesthesia: spinal anaesthesia in all age group of patients: indications, 	15	Understand and apply the principles of regional anaesthesia, including spinal and epidural anaesthesia. They will also be proficient in identifying and using local anaesthetic agents, including their	1,2,3,4					

	<p>contraindications, commonly used local anaesthetics.</p> <p>-Epidural anesthesia</p> <p>Inhalation agents</p> <ul style="list-style-type: none"> - Classification and Mechanism of action of inhalation agents. - Indication and contraindication, Advantage and disadvantages of each agents. <ul style="list-style-type: none"> • Colour code and aesthetic properties of inhalation agents 		<p>indications, contraindications, dosages, and potential complications. Classify different inhalation agents, understand their mechanisms of action, and evaluate their indications, contraindications, advantages, and disadvantages. They will also be able to identify the colour codes and aesthetic properties of these inhalation agents.</p>	
IV	<p>Gases OF Anaesthesia & anaesthesia delivery machine</p> <ul style="list-style-type: none"> - Components, Indication and contraindication of each Gas - Oxygen deficiency, excessive O₂ , hyperbaric O₂, - Pin index, color code, Size and pressure of All Gases Cylinder. - Part and component of cylinder - Recommendation of piping system - Aerosol therapy Nebulization - His story of boyles's machine - Part of the anaesthesia workstation. (function and importance of each part) - Maintenance, filling and draining 	10	<p>Describe the different gases used in anaesthesia, including their indications and contraindications and identify the parts of an anaesthesia workstation, describe the function and importance of each part, and understand the maintenance, filling, and draining processes for anaesthesia equipment.</p>	1,2,3,4
V	<p>Basic Life Support</p> <ul style="list-style-type: none"> - Introduction to CPR/resuscitation- BLS - Chain of survival - ABCs Assessment - CPR and Ventilation Technique - Choking for adult and children 	5	<p>Understand how to perform basic life support (BLS) and CPR, including the assessment of airway, breathing, and circulation (ABCs). They will also be able to manage choking in both adults and children, following the chain of survival principles.</p>	1,2
Practical	<ul style="list-style-type: none"> • Identify and describe different types of anaesthesia (general, regional, local). • Perform pre- and post-anaesthetic assessments. • Arrange and organize an anaesthesia trolley. • Administer common anaesthetic 	60	<p>Describe, illustrate , explain different practical procedure and apply their knowledge and skilled to perform all practical procedure</p>	1,2,3,4,5

	<p>age</p> <ul style="list-style-type: none"> Identify and understand the use of anaesthesia gases.nts and understand their use and Manage gas cylinders (pin index, color code, size, pressure). Identify parts and functions of the anaesthesia workstation. Perform CPR and resuscitation techniques and manage choking in adults and children. Conduct ABC (Airway, Breathing and Circulation) assessments. 			
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TEXT BOOKS:

T1: Short textbook of anesthesia by Ajay Yadav MD (Anesthesiology) [Ajay Yadv Short Textbook of Anesthesia 1st Edition' with you.pdf](#)

T2: 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

CO PO Mapping0		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe the principle, history and types of anaesthesia.	1,2,3
2	Classify different drugs used in general anaesthesia procedures including post surgery and recovery.	1,2,3,4
3	Identify the regional anesthesia and inhalation agents.	1,2,3,4
4	Demonstrate knowledge on the types of gases used in general anesthesia and monitoring anaesthesia machine.	2,3,4
5	Demonstrate knowledge and techniques of basic life savings kills .	1,2,3,4

SEMESTER – III									
Course Title	BASIC MICROBIOLOGY								
Course code	24BOTT2103R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ III semester of 2 nd year of the programme								
Course Objectives	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.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to Microbiology <ul style="list-style-type: none"> General concept of Bacteria, Virus, Fungi and Parasite 		5	Describe and explain about the history and classification of microbiology.				1,2	
II	Stains in microbiology: <ul style="list-style-type: none"> Classification of stains and staining Preparation of smear, Gram staining Acid fast staining 		10	Describe , illustrate and classify about the stains in microbiology.				1,2	
III	Some important disease-causing microorganisms: <ul style="list-style-type: none"> Staphylococcus, Streptococcus, Mycobacterium tuberculosis , E.coli, Clostridium tetani, HIV, Influenza, Hepatitis , <i>Madurellamycetomatis</i>, Candida sp, Plasmodiumsp , Entamoebahistolytica 		10	Describe, understand and identify the disease-causing microorganisms.				1,2	
IV	Immunology <ul style="list-style-type: none"> Introduction to immunology, immunity and its types and classification. Antigen and Antibodies, Ag-Ab reactions hypersensitivity 		7	Describe the basic knowledge about immunology and classify different type of immunity.				1,2	
V	Serological tests <ul style="list-style-type: none"> (WIDAL, VDRL, ASO, CRP, RIA, RF & ELISA) Rapid test for HIV and Hbs Ag Vaccine and its types. 		13	Identify different type of serological test and understand its importance.				1,2	

TEXT BOOKS:

- T1. Apurba Sankar Sastry, Sandhya Bhat K, 'Essentials of Medical Microbiology', Jaypee Brothers Medical Publishers, 1st Edition, 2016.
- T2. Satish Gupta. "[The Short Textbook of Medical Microbiology \(Including Parasitology\)](#)". Jaypee Brothers Medical Publishers, 10th Edition, 2010

REFERENCE BOOKS:

- R1. Ananthanarayan, CK Jayaram Paniker. 'Ananthanarayan and Paniker's Textbook of Microbiology, Universities Press (India) Pvt. Ltd. 11th edition, 2020.
- R2. Jawetz, Melnick & Adelberg's Medical Microbiology. Norwalk, Conn.: Appleton & Lange, 1991.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Ability to gain the knowledge about the concept of microbiology.	1,2,3
2	Demonstrate about various staining process and its interpretation.	1,2,3
3	Get the knowledge about the general introduction of disease-causing agent.	1,3
4	Get the knowledge about serological test.	1,2,3
5	Ability to gain the knowledge about the structure and function of the immune system.	1,2,3

SEMESTER – III									
Course Title	PHARMACOLOGY I								
Course code	24BOTT2104R	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 Operation Theatre Technology								
Semester	Fall/ III semester of 2 nd year of the programme								
Course Objectives	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 anti diabetic drugs.								
Unit- No.	Content		Contact Hour	Learning Outcome		KL			
I	General Pharmacology <ul style="list-style-type: none"> • Introduction, definition and classification of drugs • Routes of drug administration • Pharmacokinetics • Pharmacodynamics • Factors modifying drug response • Adverse effects 		6	Define, explain and classify various drugs and the routes of drug administration.		1,2			
II	Autonomic Nervous System: <ul style="list-style-type: none"> • General Considerations • Cholinergic and Anti – Cholinergic drugs • Adrenergic and Adrenergic blocking drugs • Skeletal musculere laxants 		5	Describe, classify and explain the drugs used to manage disorders in the nervous system		1,2			
III	Neuropharmacology: <ul style="list-style-type: none"> • Sedative–Hypnotic Drugs: Barbiturates, Benzodiazepines • Anti epileptic drugs, narcotic analgesics. 		4	Describe, classify and explain the drugs used for sedation and pain management.		1,2			
IV	Cardiovascular and Respiratory Pharmacology: <ul style="list-style-type: none"> • Drugs used in heart failure –Digitalis, Diuretics, vasodilators. • Antihypertensive Drugs – ACE inhibitors. • Drugs for ischemic Heart Disease – Nitrates, Beta blockers, Calcium channel blockers. • Vasopressors, Inotropicagents • Anticoagulants and Thrombolytics • Bronchodilators and Mucokinetic agents. 		10	Describe, classify and explain the drugs used to treat cardiovascular and respiratory disorders.		1,2			
V	Others: <ul style="list-style-type: none"> • IV Fluids with different preparation. • Anti Diabetic drugs–Insulin, Steroids 		5	Describe, classify and explain the different types of IV fluids including antidiabetic drugs.		1,2			

TEXT BOOKS:

T1. *Essentials of Medical Pharmacology - Dr KD Tripathi*

T2. *Comprehensive medical Pharmacology*

REFERENCE BOOKS:

R1. [Clinical Pharmacology: A Comprehensive Drug Reference - PubMed \(nih.gov\)](#)

R2. [medical Pharmacology references - Bing images](#)

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.	2,3,4
2	Recognize different drugs that affect the Autonomic Nervous System.	1,2,3
3	Classify sedative and antiepileptic drugs along with their mechanism of action.	2,3
4	Discuss different drugs used to treat cardiovascular and respiratory conditions	1,2,3
5	Identify different types of IV fluids and their preparations as well as antidiabetic drugs.	1,2,4

SEMESTER – III									
Course Title	INFECTION CONTROL AND STERILIZATION TECHNIQUES PROCEDURE								
Course code	24BOTT2105R	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	Bachelor of Operation Theatre Technology								
Semester	Fall/ III semester of 2 nd year of the Programme								
Course Objectives	1. Understand infection control principles and prevention strategies. 2. Learn various sterilization methods and their applications. 3. Develop practical skills in implementing infection control measures for maintaining a safe healthcare environment.								
CO1	Describe fundamental knowledge of Hospital acquired infection (HAI).								
CO2	Explain principal and knowledge about PPE.								
CO3	Classify different types of disinfection and sterilization techniques.								
CO4	Demonstrate the knowledge and techniques of CSSD.								
CO5	Apply skills and techniques of sterilization of different equipment.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Hospital acquired infection (HAI) <ul style="list-style-type: none"> Definition, types and prevention Definition and prevention of nosocomial infection, surgical site infection (SSI), ventilation associated events (VAE), central line associated blood stream infection (CLABSI), CAUTI, UTI. 	5	Describe and understand hospital-acquired infections (HAIs) and understand their types. The learner will also be able to identify and implement effective prevention strategies for each type of infection.	1,2,3					
II	Isolation precaution and used of PPE <ul style="list-style-type: none"> Types and significant of isolation Definition and equipment of PPE Definition 2 steps of donning and doffing. standard precaution and transmission-based precaution (Direct contact, droplet, indirect) Steps of hand hygiene techniques Gowning and gloving, distributing of sterile goods 	10	Identify and apply appropriate isolation precautions, understand the significance of PPE, and demonstrate the correct procedures for donning and doffing PPE.	1,2					
III	Disinfection and sterilization <ul style="list-style-type: none"> Principles and method of disinfection Disinfection by boiling method and chemical method Principles and types of 	10	Understand the principles and methods of disinfection and sterilization and	1,2					

	<p>sterilization (dry, wet, hot)'</p> <ul style="list-style-type: none"> • Autoclaving Techniques (air gases, radiation & chemical) • Special sterilization for rubber articles 			
IV	<p>CSSD</p> <ul style="list-style-type: none"> • Introduction and objective of the guideline • Layout of CSSD (size, receiving area, disinfection area, washing area, dry area, folding area, ironing area, issue area) • Pressure and humidity , temperature • activities at CSSD in each area • Maintenance hygiene and handling dirty and clean linen as well as equipment. 	10	Describe the objectives and layout of the CSSD, including the functions of different areas (receiving, disinfection, washing, drying, folding, ironing, and issue areas). They will also understand the importance of CSSD.	1,2
V	<p>Sterilization of OT Equipment</p> <ul style="list-style-type: none"> • Classification of instrument • General care testing and cleaning of instrument • Fabrication of metal instruments • Use and handling of instrument • sterilization of each equipment in OT • sterilization of OT room • Sterilization of Ventilation, arthroscope, gastroscope, endoscope. • precaution in sterilization • Demonstrate procedures for preventing and managing HAIs, including proper hand hygiene and environmental cleaning. • Practice proper gowning and gloving techniques and distribute sterile goods appropriately. • Demonstrate and practice disinfection and sterilization methods. • Demonstrate proper maintenance and hygiene practices for handling dirty and clean linen and equipment. • Demonstration of sterilization techniques for OT equipment and rooms. 	10	Classify OT instruments, perform general care, testing, and cleaning of instruments, and understand the specific handling and sterilization procedures for various types of OT equipment Describe, illustrate , explain different practical procedure and apply their knowledge and skilled to perform all practical procedure	1,2

	<ul style="list-style-type: none"> Identify and apply precautions to ensure effective sterilization. 			
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TEXT BOOKS:

T1. Equipment, Drugs and Waveforms in Anesthesia, Pramod kumar

T2. Handbook for CSSD Technicians, Joan M.Losper

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe fundamental knowledge of Hospital acquired infection (HAI).	1,2,3
2	Explain principal and knowledge about PPE.	2,3,4
3	Classify different types of disinfection and sterilization techniques.	1,2,3
4	Demonstrate the knowledge and techniques of CSSD.	2,3,5,7
5	Apply skills and techniques of sterilization of different equipment.	1,2,3

SEMESTER – III									
Course Title	FIELD VISIT								
Course code	24BOTT2106R	Total credits: 1	L	T	P	S	R	O/F	C
		Total hours: 120T	0	0	0	0	0	8	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> To learn practical skills through early exposure to primary, secondary, and tertiary healthcare settings. Understand the roles and responsibilities within different levels of the healthcare system. Learn to develop innovative solutions and adapt to the dynamic nature of the medical field. 								
CO1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.								
CO2	Comprehend the practical applications of theoretical concepts in real-world settings.								
CO3	Exposure to diverse situations to enhance skills in patient management and care.								
CO4	Evaluate the effectiveness of different approaches and methods seen during the field trip.								
CO5	Develop innovative strategies or solutions inspired by enhanced professional practice.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the theoretical concepts and foundational knowledge relevant to the field during the visit.	2,5,6,7,9
2	Comprehend the practical applications of theoretical concepts in real-world settings.	1,2,3,7,8
3	Exposure to diverse situations to enhance skills in patient management and care.	1,2,3,5,8
4	Evaluate the effectiveness of different approaches and methods seen during the field trip.	5,7,8
5	Develop innovative strategies or solutions inspired by enhanced professional practice.	5,6,7,8

SEMESTER – III									
Course Title	BASIC ACCLIMATIZING SKILLS								
Course code	24UULS2101R	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 Operation Theatre Technology								
Semester	Fall/ III semester of second year of the programme								
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'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 develop an understanding of personal financial management and budgeting skills.								
Unit- No.	Content		Contact Hour	Learning Outcome					K L
I	Introduction to Accommodation Management <ul style="list-style-type: none"> Telephone handling technique Organizing of Rooms. Cleaning agents. Cleaning equipment's and uses. Bedmaking Process 		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
II	Fundamentals of Cooking <ul style="list-style-type: none"> -Definition of cookery–Aim & Objectives of cooking. -Use of basic Cooking equipment's -Personal Hygiene and Safety -Use of Fire & Fuels 		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
III	Methods of Cooking <ul style="list-style-type: none"> Different Cuts. Use of Herbs and Spices. Basic Food and Beverage Preparation. Regional food Habits 		10	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
IV	Forms & Format's <ul style="list-style-type: none"> C –form Reservation form Registration form Passport Application form Legal Rent Agreement 			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

TEXT BOOKS:

T1. AroraK (2011). Theory of cookery, Frank brothers & company (pub) pvtltd-NewDelhi.

T2. BruceH.Axler, CarolA. Litrides (2010) Food and Beverage Service Volume 1 of Wiley Professional Restaurateur, Guides.

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.	7,8
2	Students will gain the knowledge of organizing & Cleaning of Rooms.	7,8
3	Students will be able to gain the travel management concept.	7,8
4	Students will be able to acquire the knowledge of basic households amenities for day- to-day use.	7,8
5	Students will develop an understanding of personal financial management and budgeting skills.	7,8

SEMESTER – III									
Course Title	EXECUTIVE ENGLISH								
Course code	24UBPD2101R	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 Operation Theatre Technology								
Semester	Fall/ III semester of second 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	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.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Grammar		5	Describe and explain about the preposition.				1,2	
<ul style="list-style-type: none"> Use of Prepositions Tag questions 									
II	Grammar		5	Describe, illustrate and explain about the active and passive voice and direct and indirect speech.				1,2	
<ul style="list-style-type: none"> .Active and Passive Voice Direct and Indirect Speech 									
III	Writing Skills		5	Describe , illustrate and apply the basic writing skills like paragraph writing , resume, CV.				1,2	
<ul style="list-style-type: none"> The Basics of Writing; avoid ambiguity and vagueness Paragraph Writing Resume, CV and Cover Letter 									
IV	Self-Management Skills		5	Describe and analyse about self management skills.				1,2	
<ul style="list-style-type: none"> SWOT Analysis Goal Setting Personal Hygiene 									
V	Non-Verbal Communication-Sciences of Body Language		10	Describe, illustrate, explain about non-verbal communication, types of body language, importance and impact of body language and apply planning element and skills assessed.				1,2	
<ul style="list-style-type: none"> What is Non-Verbal Communication & Body Language, Types of Body Language, Importance and Impact of Body Language, Types of Communication through Body Language, Body Language Do's and Don'ts, 									

	Doubt Clearing Session. Group Discussion (Theory) <ul style="list-style-type: none"> • Importance, • Planning, Elements, and Skills assessed; • Effectively disagreeing, 			
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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. McDowell, Gayle Laakmann. 2008. Cracking the Coding Interview (Indian Edition).

REFERENCE BOOKS:

- R1. Zinsser, William. (2006) On Writing Well: The Classic Guide to Writing Nonfiction, Harper Perennial
 R2. Lacinai, Antonio. (2016) Understanding Body Language: 51 gestures and what they signal,

OTHER LEARNING RESOURCES:

1. <https://learning.shine.com/talenteconomy/career-help/top-group-discussion-skills/>
2. <https://www.thoughtco.com/what-is-nonverbal-communication-1691351>

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate proficiency in writing structured paragraphs and formal applications.	7,8
2	Learn the use of prepositions and convert sentences between active and passive voice.	7,8
3	Identify and interpret various types of body language and their meanings.	5,7,8
4	Initiate, participate in, and summarize group discussions effectively.	5,6,7,8
5	Apply writing, grammar, non-verbal communication, and group discussion skills in real-world contexts.	5,6,7,8

SEMESTER – III									
Course Title	BASIC DIGITAL PROFICIENCY								
Course code	24UCDL2101R	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 Operation Theatre Technology								
Semester	Fall/ III semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> Students will be able to identify and analyse computer hardware, software and their uses. Students will be able to use MS-Office suite for various purposes. Students will be able 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	Apply MS-Office to solve basic information Management issues.								
CO3	Operate the Internet, social media and e-commerce sites efficiently and ethically.								
CO4	Analyze the cyber crimes on digital payments application								
CO5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	<p>Fundamentals of Computer Systems Components of a Computer and their functions. Different Types of Computers and their applications.</p> <p>Lab Experiment:</p> <ol style="list-style-type: none"> Identify the Components of a Computer and their Functions and different types of Computers and their Applications. Demonstrate the usage of various storage devices and identify various operating system file management commands. 	4	Explain the fundamental of computer systems.					1,2	
II	<p>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.</p> <p>Lab Experiment:</p> <ol style="list-style-type: none"> Demonstrate how a document to be prepared and formatted in MS Word. Create casual applications for 3 days leave because of family marriage ceremony using Word Processor. Create a curriculum vitae using MS-Word. Creating a time table with MS-Word. Design PPT on Computer Components using different effects such as Insert, Design, Record etc., on slides. 		Describe the functions on different tools of Microsoft Office like MS-Excel, MS-Word, etc.					1,2	

	<p>6. Design PPT on Computer Components using different effects such as Transitions, Animations etc., on slides.</p> <p>7. Creating the time table with MS-Excel.</p> <p>8. Creating the 10 student's Marksheet include total, grade, percentage and results using MS-Excel's formulas.</p>	14		
III	<p>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.</p> <p>Lab Experiments:</p> <ol style="list-style-type: none"> 1. Creating a professional google account and use various products of google like drive, photos. 2. Study of computer network and internet and demonstrate how to search information using keywords in different search engines. 	6	Explain the importance and use of internet along with its adverse side.	1,2
IV	<p>Introduction to social media: The Power of social media, Relevance 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.</p> <p>Lab Experiments:</p> <ol style="list-style-type: none"> 1. Creating an account of some popular social media portals and Apps like LinkedIn, Facebook, Twitter, and Instagram. 2. Creating an accounts of digital payment systems like credit cards, debit cards, net banking, UPI. 	4	Explain the power of social media their relevance and adverse effects to over using it.	1,2
V	<p>Introduction to Digital Payment Systems. Creating accounts and using Digital Payment Systems like Credit Cards, Debit Cards, Net banking, UPI.</p> <p>Lab Experiments:</p> <ol style="list-style-type: none"> 1. Create online google form and learn how to give online test. 2. Creating an account of Online Shopping sites like Amazon, flip kart, eBay etc. Understand the journey of customer to buy and sell on online shopping sites. 	4	Illustrate the types of digital payment and their risks.	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 Mc Grew-Hill Education.
- R2. Balaguruswamy, 2014.E. Fundamentals of Computers & Programming (Updated EdSem.I, Au) Tata
Mc Graw-Hill Education.
- R3. Lawson,C.2022. Introduction to Social Media, Oklahoma State University.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understanding of Computer Hardware, Software and Computer handling.	3,8
2	Apply MS-Office to solve basic information Management issues.	3,8
3	Operate the Internet, social media and e-commerce sites efficiently and ethically.	3,7,8
4	Analyse the cyber crimes on digital payments application	3,7,8
5	Explore the functionality and use of credit cards, debit cards, net banking, and UPI	3,7,8

SEMESTER – III									
Course Title	CO-CURRICULAR /EXTRA CURRICULAR ACTIVITIES								
Course code	24UBCC2101/ 24UBEC2101	Total credits: 1 Total hours: 60T	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ III semester of second 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"> 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 ho. 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. 	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		

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

SEMESTER – IV									
Course Title	MANAGEMENT OF MEDICAL & SURGICAL EMERGENCIES								
Course code	24BOTT2201R	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/IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> Understand the principles of initial assessment and stabilization of patients presenting with medical and surgical emergencies To incorporate knowledge, skills and techniques in the management of certain emergencies including IV fluid administration. To gain insight into gynaecological and paediatric emergency scenarios. 								
CO1	Understand the fundamental of medical and surgical emergencies.								
CO2	Acquire knowledge on gynaecological and paediatric emergencies.								
CO3	Develop skills and knowledge on management of common surgical emergencies.								
CO4	Understand the different types of IV fluids along with their route of administration.								
CO5	Develops skills to perform advance airway techniques and read imaging diagnostic results.								
Unit-No.	Content	Contact Hour	Learning Outcome	KL					
I	INTRODUCTION TO MEDICAL AND SURGICAL EMERGENCIES - Definition and classification of emergencies Respiratory emergencies - Review of respiratory system -Asthma and Pneumothorax Cardiovascular & neurological emergencies -Review of cardiovascular & neurological system -Heart failure -AMI -Cardiac arrest -Stroke (ischemic and hemorrhagic) - Seizure & Coma -shock Endocrine and gastrointestinal disorders -Basic anatomy and physiology of Endocrine and gastrointestinal system - hypoglycaemia and hyperglycaemia -Electrolyte imbalances -GI bleeding	10	Demonstrate an understanding of the initial assessment and management of respiratory, cardiovascular & neurological emergencies, endocrine & gastrointestinal emergencies	1,2,3,4					

II	Obstetric and Gynecological Emergencies -Physiological changes in pregnancy -Normal delivery, LSCS -Ectopic pregnancy and post-partum hemorrhage -Pre-eclampsia/eclampsia and obstetric emergencies during labor Pediatric Emergencies -Common pediatric medical and surgical emergencies -Pediatric trauma and injury prevention. -Resuscitation of the new born , APGAR score	10	Apply skills in managing life-threatening obstetric emergencies, pediatric emergencies including ectopic pregnancies and postpartum hemorrhage, and understanding the implications of physiological changes during pregnancy and common pediatric medical & surgical emergency condition.	1,2,3,4
III	COMMON SURGICAL EMERGENCIES -Trauma emergencies (e.g., fractures, lacerations, burns) -Abdominal emergencies (e.g., appendicitis, perforation, bowel obstruction, Acute cholecystitis) -Vascular emergencies (e.g., arterial injuries, hemorrhage) -Soft tissue emergencies (e.g., abscess drainage, wound debridement) -Head and Neck Emergencies (e.g., Traumatic brain injury, Airway compromise)	10	Classify common surgical emergencies and describe management skill.	1,2,3,4
IV	Blood Products and IV Fluids Administration -Fluid distribution in the body -Types of IV fluid and composition -Medication dosage & calculation -Iv access and fluid administration - Blood Transfusion types, purpose and its adverse effects.	5	Understand the distribution of body fluids and its clinical significance in fluid therapy and identify and choose the appropriate type of intravenous fluid based on its composition and patient needs.	1,2,

V	Advanced Techniques <ul style="list-style-type: none"> • Techniques for difficult airway management • Use of advanced airway adjuncts: supraglottic airways, video laryngoscope • Airway management, wound management, splinting, bandage. • Defibrillation, pacing • ECG, X-ray, CT scan, ultrasound • invasive blood pressure monitoring, central venous catheterization • Use of emergency medications and resuscitation fluid 	10	Demonstrate proficiency in assessing and managing difficult airways using a structured approach such as the difficult airway algorithm.	1,2,3,4
Practical	<ol style="list-style-type: none"> 1. Perform rapid assessment and manage to Medical and Surgical Emergencies 2. Conduct a comprehensive respiratory examination and administer inhalers, nebulizers, and measure peak expiratory flow. 3. Perform needle decompression and chest tube insertion and conduct a thorough cardiovascular examination. 4. Perform high-quality CPR and defibrillation and identify signs of stroke and initiate appropriate management. 5. Apply skill and knowledge to manage gynaecological emergencies. 6. Perform pediatric assessments and Perform newborn resuscitation and calculate APGAR scores. 7. Gaining venous access (Intravenous cannulation) drugs administration techniques intravenous (IV) , Intramuscular (IM), Intraosseous (IO). 8. Calculate medication dosages and administer IV fluids and Perform blood transfusions and manage adverse effects. 9. Manage difficult airways using advanced techniques. 10. Perform airway management, wound care, and splinting. 11. Perform invasive blood pressure monitoring and central venous catheterization. 	60	Describe, illustrate and explain and apply skill & techniques to perform all practical techniques.	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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the fundamental of medical and surgical emergencies.	1,2,3
2	Acquire knowledge on gynaecological and padiatric emergencies.	1,2,3,4
3	Develop skills and knowledge on management of common surgical emergencies.	1,2,3,4
4	Understand the different types of IV fluids along with their route of administration.	2,3,4
5	Develops skills to perform advance airway techniques and read imaging diagnostic results.	1,2,3,4

SEMESTER – IV									
Course Title	MEDICAL LAW AND ETHICS								
Course code	24BOTT2202R	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 Operation Theatre Technology								
Semester	Fall/IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> To comprehend legal principles and ethical dilemmas in healthcare. To advance awareness of patient rights and professional responsibilities. To analyze the impact of laws on medical practice. 								
CO1	Explain medical laws and ethics along with its differences.								
CO2	Discuss the Indian Legal system binding healthcare workers								
CO3	Explain the principles of personal and professional ethics.								
CO4	Describe the medical code of conduct and malpractices.								
CO5	Identify the patient's rights, including their autonomy, their ability to make end-of-life decisions and other advance directives.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	INTRODUCTION <ul style="list-style-type: none"> Introduction to Medical law and Ethics. Similarities and differences between law & ethics Moral Issues 		8	Explain and understand the difference between the laws and ethics and the implication of medical ethics for paramedic.				1,2,3	
II	Medical legal issues and Ethical issues <ul style="list-style-type: none"> Introduction of MCI Legal system in India. Legal accountability of the paramedic. common medical law Introduction of MLC cases 		12	Understand the student about Medico legal law and the importance of MLC.				1,2,3,	
III	ETHICS <ul style="list-style-type: none"> Types of Ethics Personal vs. Professional Ethics Medical Ethics Ethics for Healthcare Professionals Role and Responsibility of healthcare. 		10	Develop and understand Medical ethics and its important.				1,2,3,	
IV	CODE IN LAW <ul style="list-style-type: none"> Code of Conduct Misconduct Negligence Malpractices 		6	Understand the student about Code of conduct and the malpractices.				1,2,3,	

V	RIGHT & AUTONOMY <ul style="list-style-type: none"> • Crime scene and emergency scene responsibilities. • Basic Ethical Principles in Critical Care • Patient's rights. • autonomy • End of Life in the ICU • Withholding or withdrawing resuscitation 	8	understand the patient's rights including autonomy, end life decisions and the moral and	1,2,3
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TEXT BOOKS:

T1: Nancy Caroline's Emergency care in the streets, Andrew N. Pollak, MD, FAAOS, 7th Edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain medical laws and ethics along with its differences.	6,7,8
2	Discuss the Indian Legal system binding healthcare workers	5,6,7,8
3	Explain the principles of personal and professional ethics.	6,7,8
4	Describe the medical code of conduct and malpractices.	6,7,8
5	Identify the patient's rights, including their autonomy, their ability to make end-of-life decisions and other advance directives.	6,7,8

SEMESTER – IV									
Course Title	Pharmacology II								
Course code	24BOTT2203R	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 Operation Theatre Technology								
Semester	Fall/IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> 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. To develop a treatment plan for heart failure using digitalis, diuretics, vasodilators, and ACE inhibitors, considering their mechanisms and possible interactions. 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	Neuro pharmacology: - 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	Other Anxiolytics - Antiepileptic drugs, Narcotic analgesics		5	Assess the effectiveness of antiepileptic drugs in treating anxiety disorders compared to benzodiazepines.				2,3,4	
III	Cardiovascular pharmacology: - 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,	
IV	Antihypertensive drugs - 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 co morbidities and central acting alpha agonists.				2,3,4,	

V	Drugs used in the treatment of vascular disease and tissue Ischemia <ul style="list-style-type: none"> - Vascular Disease - Lipid lowering agents - Antithrombotic - Anticoagulants and Thrombolytics - Ischemic Heart Disease - Nitrates, Beta Blockers, Calcium channel Blockers 	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,
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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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Differentiate between the mechanisms of action of barbiturates and benzodiazepines.	1,2,8
2	Evaluate the appropriate use of antiepileptic drugs in managing anxiety disorders.	1,2,8
3	Apply pharmacological principles in the use of drugs for heart failure (digitalis, diuretics, vasodilators) and ACE inhibitors.	1,2,8
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.	1,2,8
5	Integrate pharmacological treatments for vascular disease and ischemic heart disease.	1,2,8

SEMESTER – IV									
Course Title	PATIENT SAFETY AND QUALITY CARE								
Course code	24BOTT2204 R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> To understand basic pharmacological concepts, including emergency medicines and their properties. To identify various drugs used in medicine and discuss their mechanisms of action. To report on clinical applications, side effects, and toxicities of drugs, and translate pharmacological principles into clinical decision-making. 								
CO1	Explain and Implement the concepts of quality management pertaining to patient safety and healthcare quality.								
CO2	Utilize appropriate tools and approaches required for systematic evaluation, measurement and quality system improvements.								
CO3	Identify gaps in quality and safety in healthcare organizations and develop strategies that will solve them.								
CO4	Recognize causes of medical errors and harm; then incorporate preventative measures into practice.								
CO5	Describe the healthcare data and analytics to measure healthcare quality and patient safety								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	Introduction to Patient Safety		10	Describe and understand the definition and importance of patient safety, be familiar with its historical context and development, grasp the principles and concepts of patient safety, recognize the role of organizational culture in promoting safety, and utilize tools and techniques for identifying potential patient safety hazards.				1,2,	
	<ul style="list-style-type: none"> Definition and Importance of patient safety Principles and concepts of Patient Safety History context and development of Patient Safety Importance and role of organization on Patient Safety Culture Tools and techniques for identifying potential patient safety hazards. 								

II	Medical Errors and Prevention <ul style="list-style-type: none"> - Types and classification of medical errors - Factors contributing to medical errors - Risk assessment in healthcare settings - Impact of medical errors on patients and healthcare organizations - Responding to adverse events - Management of patients affected by medical harm - Prevention strategies for medical errors 	8	Describe and classify different types of medical errors, identify factors contributing to these errors, conduct risk assessments in healthcare settings, comprehend the impact of medical errors on patients and organizations, respond appropriately to adverse events, manage patients affected by medical harm, and implement effective prevention strategies.	1,2,3
III	Healthcare Quality Management <ul style="list-style-type: none"> - Definition and significance of healthcare quality management - History and evolution of quality management in healthcare - Key concepts and principles of quality management - Metrics and indicators used to measure healthcare quality - Relationship between quality management and patient outcomes 	10	Describe, illustrate and understand the definition, significance, and evolution of healthcare quality management, apply key concepts and principles of quality management, utilize metrics and indicators to measure healthcare quality, and analyze the relationship between quality management and patient outcomes.	1,2
IV	Quality Improvement in Healthcare <ul style="list-style-type: none"> - Plan-Do-Study-Act (PDSA) cycle - Continuous quality improvement (CQI) processes - Root cause analysis (RCA) techniques for identifying quality issues - Utilization of quality improvement tools - Implementation of evidence-based practices - Clinical guidelines to enhance quality of patient care 	10	Describe, illustrate and explain about the Plan-Do-Study-Act (PDSA) cycle, engage in continuous quality improvement (CQI) processes, apply root cause analysis (RCA) techniques to identify quality issues, use quality improvement tools effectively, implement evidence-based practices, and follow clinical guidelines to enhance the quality of patient care.	1,2

V	Incident Reporting and Documentation <ul style="list-style-type: none"> - Principles and purpose of Incident reporting in healthcare setting - Documentation requirements for adverse events - Utilization of incident reporting tools and systems - Role of incident reporting in promoting transparency and accountability - Training and education on incident reporting for healthcare professionals 	7	Describe and apply knowledge about the principles and purpose of incident reporting in healthcare, meet documentation requirements for adverse events, utilize incident reporting tools and systems, appreciate the role of incident reporting in promoting transparency and accountability, and participate in training and education on incident reporting for healthcare professionals.	1,2,3
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TEXT BOOK :

T1. Rahul k. Shah, “patient safety and quality improvement in health care system”

T2. Barbaraj. Youngberk “patient safety Hand Book”

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Explain and Implement the concepts of quality management pertaining to patient safety and healthcare quality.	1,2,3,5,7
2	Utilize appropriate tools and approaches required for systematic evaluation, measurement and quality system improvements.	2,3,5,7
3	Identify gaps in quality and safety in healthcare organizations and develop strategies that will solve them.	2,5,7
4	Recognize causes of medical errors and harm; then incorporate preventative measures into practice.	2,3,5,7
5	Describe the healthcare data and analytics to measure healthcare quality and patient safety	2,5,7

SEMESTER – IV									
Course Title	CLINICAL PATHOLOGY, HEMATOLOGY AND BLOOD BANK								
Course code	24BOTT2205R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/IV semester of second year of the programme								
Course Objectives	1. Understand the basic principles of pathology, sample collection process and hematology. 2. Demonstrate proficiency in performing blood typing, cross matching, and compatibility testing in the blood bank setting								
CO1	Understand the fundamental of clinical pathology.								
CO2	Understand the process of different types of sample collection.								
CO3	Develop fundamental knowledge on blood components and phlebotomy.								
CO4	Acquire comprehensive knowledge on different techniques of hematology.								
CO5	Demonstrate skills and knowledge on blood banking, blood grouping and cross matching.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Clinical Pathology <ul style="list-style-type: none"> Introduction to clinical pathology Collection, transport, preservation and processing of various clinical specimens Urine examination- collection and preservation, Physical, chemical and microscopic examination for abnormal constituent 	10	Explain and describe the fundamental principles of clinical pathology, and demonstrate competence in the collection, transport, preservation, and processing of various clinical specimens, including the ability to conduct comprehensive urine examinations to identify abnormal constituents through physical, chemical, and microscopic analysis..					1,2,3	
II	<ul style="list-style-type: none"> Examination of Body fluids Examination of Cerebrospinal fluid (CSF) Sputum examination Examination of feces. 	5	Apply proficient in the examination of various body fluids, including cerebrospinal fluid (CSF), sputum, and feces, demonstrating the ability to perform and interpret tests to aid in the diagnosis and management of related diseases.					1,2,3,	
III	Hematology <ul style="list-style-type: none"> Introduction to hematology Normal constituents of Blood, their structure and functions Collection of Blood samples 	10	Develop the basics of hematology, including the structure and functions of normal blood constituents, and will demonstrate skill in the collection of blood samples, recognizing the significance of accurate sample handling in diagnostic procedures.					1,2,3	

IV	<ul style="list-style-type: none"> • Various anticoagulant used in Hematology • Hemoglobin estimation, different methods and normal values • Packed cell volume • Erythrocyte sedimentation rate • Normal Haemostasis • Bleeding time. Clotting time, prothrombin time, Activated partial Thromboplastin 	10	Explain the use of various anticoagulants in hematology, perform hemoglobin estimation using different methods, measure packed cell volume, determine erythrocyte sedimentation rate, and assess normal hemostasis through tests such as bleeding time, clotting time, prothrombin time, and activated partial thromboplastin time.	1,2,3,
V	Blood Bank- <ul style="list-style-type: none"> • Introduction blood banking • Blood group system • Collection and processing of blood for transfusion • Compatibility testing • Blood transfusion reactions 	10	Understand knowledgeable about the principles of blood banking, including the blood group system, and will be adept in the collection, processing, and compatibility testing of blood for transfusion, as well as understanding the management and prevention of blood transfusion reactions.	1,2,3

TEXT BOOKS:

T1: A text book of Clinical pathology by de Gruchy

T2: Modern Blood Banking & Transfusion Practices by Denise M. Harmening 7th Edition.

T3: A Text book of pathology by Harsh Mohan

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the fundamental of clinical pathology.	1,2,3
2	Understand the process of different types of sample collection.	1,2,3
3	Develop fundamental knowledge on blood components and phlebotomy.	1,2,3
4	Acquire comprehensive knowledge on different techniques of hematology.	1,2,3
5	Demonstrate skills and knowledge on blood banking, blood grouping and cross matching.	1,2,3

SEMESTER – IV									
Course Title	BIOMEDICAL WASTE MANAGEMENT								
Course code	24BOTT2206R	Total credits: 3 Total hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> To comprehend the types of biomedical waste and their color-coded disposal methods. To differentiate between biomedical waste types and understand their associated hazards. To illustrate the disposal process for human waste and contaminated sharps. 								
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								
Unit- No.	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"> Definition of Biomedical Waste, General and Hazardous health care waste. Color Coding and types of containers for disposal of medical waste, Segregation, Collection & Disposal 									
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"> Infectious waste, Genotoxic waste, Waste Sharps Categories, Categorization, and composition of Biomedical waste. Liquid Biomedical Waste - Radioactive wastes, Metals, Chemicals & drugs 									
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.									
IV	Types of Waste Disposal		10	Describe, illustrate and explain and apply knowledge and skill the different types of waste disposable				1,2,3	
<ul style="list-style-type: none"> Disinfections unit container for Autoclaving. Sharp waste containers for storage & transportation, Autoclaving, Incineration, Plasma Pyrolysis /Gasification systems, Composting 									
V	Recent Trends and Bioethics		10	Describe, illustrate and				1,2	

	<ul style="list-style-type: none"> • Protective Devices • Bioethics and Handling of Waste Management. 		explain the basics knowledge about bioethics	
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TEXTBOOKS:

- 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

REFERENCEBOOKS:

- 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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the different types of Biomedical waste and disposal of medical waste using color coding.	2,3,8
2	Differentiate biomedical waste and understanding the hazards of each waste.	2,3,8
3	Illustrate the types of human waste, contaminated sharps and its process of disposal.	2,3,8
4	Develop fundamental knowledge on modern technology and protective devices for handling biomedical wastes.	2,3,8
5	Identify the principles of bioethics and handling of waste management	2,3,6,8

SEMESTER – IV									
Course Title	ACLS (Advanced Cardiovascular Life Support)								
Course code	24BOTT2207R	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 Operation Theatre Technology								
Semester	Fall/IV semester of second year of the programme								
Course Objectives	<ol style="list-style-type: none"> 1. Demonstrate proficiency in recognizing and managing life-threatening medical emergencies. 2. Understand the basic principles of high-quality cardiopulmonary resuscitation (CPR) along with advanced airway management. 3. Apply ACLS algorithms and protocols for the management of medical emergencies including the use of automated external defibrillators (AEDs), Synchronized cardio version and pacing. 								
CO1	Understand the principles of ACLS along with the management of respiratory arrest.								
CO2	Develop skills and knowledge on the management algorithms of certain medical emergencies.								
CO3	Acquire skills of electrical therapy including defibrillation, cardio-version and pacing.								
CO4	Develop knowledge on the different pharmacological drugs used in ACLS.								
CO5	Understand the importance of team dynamics and knowledge on the roles of each members along with triaging.								
Unit-No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction - Course objectives and expectation. -Overview of ACLS algorithms and protocols -CPR Quality. -Use of an automated external defibrillator(AED) Management of respiratory arrest	5	Apply the principles of Advance cardiac Life Support (BLS) to perform CPR, ventilation, and use an AED correctly in emergency scenarios.					1,2,	
II	Acls algorithms -Cardiac Arrest Algorithm -Post - Cardiac Arrest Algorithm -Post-resuscitation care principles -Bradycardia Algorithm -Tachycardia Algorithm	5	Demonstrate the accurately apply the Cardiac Arrest Algorithm and Post-Cardiac Arrest Algorithm, including principles of post-resuscitation care, and effectively manage patients using the Bradycardia and Tachycardia algorithms.					1,2,3,4	

III	Electrical Therapy & Special Circumstances in ACLS - Defibrillation: indications, energy levels, safety considerations - Return of spontaneous circulation (ROSC) - Cardio version: synchronized cardio version for stable tachyarrhythmias - Cardiac arrest in special populations (pediatric, pregnant) - Stroke management in the context of ACLS	10	Analyze the indications, energy levels, and safety considerations for defibrillation, manage return of spontaneous circulation (ROSC), perform synchronized cardio version for stable tachyarrhythmias, and address cardiac arrest scenarios in special populations such as pediatric and pregnant patients, as well as manage stroke in the context of ACLS.	1,2,3,4
IV	ACLS Pharmacology - Medications used in ACLS protocols - Indications, dosages, and administration routes - Pharmacological management of cardiac emergencies - Drug interactions and contraindications	5	Evaluate knowledgeable about the medications used in ACLS protocols, including their indications, dosages, administration routes, pharmacological management of cardiac emergencies, and will understand potential drug interactions and contraindications.	1,2,3,4,5
V	Effective high-performance team dynamics - Introduction - Role of the team leader - Role of the team member - Element of Effective high performance team dynamics - What to communicate - How to communicate Triage system - Definition and purpose of triage - Primary goals - Different triage systems - Triage categories and criteria	5	demonstrate the ability to function effectively within a high-performance ACLS team, including understanding the roles of team leaders and members, elements of effective team dynamics, and methods of communication essential for team success and purpose of triage,	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 12th edition, Burlington, Massachusetts, USA; 2021.

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand the principles of ACLS along with the management of respiratory arrest.	1,2,3,4,7,
2	Develop skills and knowledge on the management algorithms of certain medical emergencies.	2,3,4,7
3	Acquire skills of electrical therapy including defibrillation, cardio-version and pacing.	2,3,4,5,7
4	Develop knowledge on the different pharmacological drugs used in ACLS.	2,3,4
5	Understand the importance of team dynamics and knowledge on the roles of each members along with triaging.	2,3,4,5,7

SEMESTER – IV									
Course Title	ENHANCED PROFESSIONAL SKILLS								
Course code	24UBPD2201R	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 Operation Theatre Technology								
Semester	Fall/IV semester of second year of the programme								
Course Objective	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	Identify and effectively utilize key elements of public speaking while overcoming associated fears.								
CO2	Demonstrate the ability to use non-verbal cues to enhance their public speeches.								
CO3	Produce and submit a polished, professional resume suitable for job applications.								
CO4	Understand different interview types, including telephonic, virtual, and face-to-face.								
CO5	Learn to answer common interview questions and adhere to appropriate dress code ethics.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	<ul style="list-style-type: none"> - Presentation Skills - ● Introduction - ● Essential characteristics of a good presentation - ● Preparation of a good presentation 		3	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	Public Skills <ul style="list-style-type: none"> ● Fear of Public Speaking, ● Understanding and Overcoming Fear of Public Speaking, ● Confidence and Control, ● Physiology and Stress-Control/Process, ● Tips for Presentations and Public Speaking, ● Tips for Using Visual Aids in Presentations, ● Process for Preparing and Creating Presentations, ● Delivering Presentations Successfully, ● Doubt Clearing and Summary 		3	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	Practical session on Resume, Curriculum Vitae, Writing cover letter & LinkedIn Profile Preparation, submission & screening of Resume <ul style="list-style-type: none"> • Practical session on cover letter screening session • Creating profile in LinkedIn • How to utilize it 	<p style="text-align: center;">3</p>	<p>Explain various strategies for developing vocabulary, including contextual learning and the use of phrasal verbs and idioms in conversation.</p>	<p style="text-align: center;">1,2,3,4</p>
IV	Leadership & Management Skills <ul style="list-style-type: none"> • Concepts of Leadership • Leadership Styles • Manager VS Leader • How to be an Effective Leader • Mock/Practice Session 	<p style="text-align: center;">3</p>	<p>Explain common interview questions and effective answering strategies, as well as the importance of dress code ethics during interviews.</p>	<p style="text-align: center;">1,2,</p>
V	Interview Skills & Dress code Ethics <ul style="list-style-type: none"> • Types of interview-telephonic, virtual & face to face • Online interview, personal interview o Panel interview, o Group interview, o JAM session, • Types of interview questions-traditional/common interview questions, • Case interview questions, • General Strategies for answering questions, • Marketing your skills and experiences, • Preparation before the interview, • How to dress up for an interview, • How to maintain eye contact and positive body language, • How to be presentable, • Interview dos and don'ts, • Introduction to Dress Code Ethics, • Purpose and Importance • How to Make FIRSTIMPRESSION, • What to Wear During Interviews or Any Other • Formal Meetings – Male & female 	<p style="text-align: center;">3</p>	<p>Identify common grammar errors related to word stress and syllable division.</p>	<p style="text-align: center;">1,2,3,4</p>

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

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Identify and effectively utilize key elements of public speaking while overcoming associated fears.	5,7,8
2	Demonstrate the ability to use non-verbal cues to enhance their public speeches.	5,7,8
3	Produce and submit a polished, professional resume suitable for job applications.	5,7,8
4	Understand different interview types, including telephonic, virtual, and face-to-face.	5,7,8
5	Learn to answer common interview questions and adhere to appropriate dress code ethics.	5,7,8

SEMESTER – IV									
Course Title	PERSONAL FINANCIAL PLANNING								
Course code	24UUFL2201R	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 Operation Theatre Technology								
Semester	Fall/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								
CO5	Students will learn how to assess and compare different investment options to make informed financial decisions.								
Unit -No.	Content				Contact Hour	Learning Outcome			KL
I	Introduction: <ul style="list-style-type: none"> • Meaning, need and importance of Financial Literacy; • Different components of Financial Literacy; • Pre requisites 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 a venues. 				5	Define financial literacy and its importance in personal finance management and Identify components such as savings, investments, financial institutions, and investment avenues.			1,2,3,4
II	Financial Planning <ul style="list-style-type: none"> • Meaning, need and importance for financial planning, • Budgeting and its importance in financial planning; • Steps to involved in Financial Planning Process; • Preparation of personal budgets, budget surplus and budget deficit, avenues for savings from surplus, sources for meeting deficit. • Informal Society funds and crowd funding 				10	Explain the significance of financial planning in achieving financial goals and understand budgeting as a tool for managing income and expenses			1,2,3,4

III	<p>Banks & Post Office - As financial service provider:</p> <ul style="list-style-type: none"> • Meaning and evolution of money, • Banks–meaning, types & functions; types of accounts; Formalities to open various accounts. • Different types of Post Office saving schemes: Recurring deposit, savings, term deposit; NSC; Kisan Vikas Patra; Monthly Income scheme (MIS) Account, • Public Provident Funds(PPF),Senior citizen savings scheme(SCSS),Sukanya Samriddhi Accounts, • Indian Postal Order;International Money transfer service;Forex Services; • Money remittance services; Jansuraksha Scheme 	10	Define different types of banks, their functions, and account opening formalities and Understand services like international money transfer, forex, and insurance offered by banks and post offices.	1,2, 3,4
IV	<p>Insurance-As financial service provider:</p> <ul style="list-style-type: none"> • Different types of Risks and their Management, Diversification of risk; • Meaning, need and importance of Insurance • Pension and retirement policies; • Post office life insurance schemes, Postal life insurance and rural postal life insurance. 	10	Identify types of insurance policies such as life insurance and retirement plans and learn about post office insurance schemes like Postal Life Insurance and Rural Postal Life Insurance.	1,2, 3,4,
V	<p>Transformations in Digital Money market:</p> <ul style="list-style-type: none"> • Various functions & innovative services of Banks; Mobile Banking, NEFT, IMPS, RTGS, • Money transfer, Different types of cards-Debit & Credit, E-Banking, Unified payment interface(UPI), • Credit Scoring-CIBIL, Digital Banking, crypto currency and related transactions, 	10	Explore innovative banking services like mobile banking, NEFT, IMPS, RTGS, and digital wallets and understand digital transactions, security measures, and credit scoring systems like CIBIL.	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 Pen down Press

REFERENCES:

- R1. The Richest Man in Babylon (Deluxe Hardbound Edition) by George S. Clasonixia Press Garden City, New York, Ships from and sold by MG BOOKS.
- R2. Financial literacy to financial planning by Dr.Purvi Kothari and Mr. Keyur Mehta Nexus Publications Surat Gujarat

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	The students would be able to understand the importance of financial Knowledge and prepare financial plans and budgets and plan and manage personal finances.	5,7,8
2	The students would be able to understand the need and various kind of banking institutions' instrument and their utilities	5,7,8
3	The student would be able to describe the importance of insurance services as social security measures.	5,7,8
4	The student would be able to manage the money and debt more effectively	5,7,8
5	Students will learn how to assess and compare different investment options to make informed financial decisions.	5,7,8

SEMESTER – IV									
Course Title	EXTRA-CURRICULAR/CO-CURRICULAR								
Course code	24UBEC2201/ 24UBCC2201	Total credits: 1 Total hours:	L	T	P	S	R	O/F	C
			0	0	0	4	0	0	1
Pre-requisite	NIL	Co-requisite	NIL						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/IV semester of second year of the programme								
Course Objectives	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

SEMESTER – IV									
Course Title	Indian Heritage								
Course code	24BOTTIH201	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 Operation Theatre Technology								
Semester	Fall/IV semester of second year of the programme								
Course Objectives	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

SEMESTER – V									
Course Title	CLINICAL OBSERVATION I (OT Procedure & Patient care)								
Course code	24BOTT3101R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 120P	0	0	8	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> To demonstrate proficiency in set up and prepare an operating room, ensuring all instruments and equipment are ready for various surgical procedures. To develop skill in perform basic procedures and assist in monitoring patients during surgery. To develop skill in provide essential pre and post-operative care, ensuring patient comfort and safety. 								
CO1	Apply knowledge and techniques to efficiently set up and prepare an operating room								
CO2	Illustrate skills and techniques to ensuring all instruments and equipment are ready for various surgical procedures								
CO3	Demonstrate proficiency to perform basic procedures such as catheterization, Cannulation etc.								
CO4	Apply knowledge and skills on assisting and monitoring patient during surgery.								
CO5	Demonstrate knowledge and techniques to provide essential post-operative care, ensuring patient comfort and safety.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Operating Room Setup <ul style="list-style-type: none"> Preparation of anaesthetic instruments, equipment, surgical instruments, equipment, and supplies according to the specific requirements of different surgical procedures. Ability to prepare the operating room before surgery, ensuring proper positioning of lights, tables, and other necessary tools. 	24	Describe, illustrate, explain, apply knowledge and skill to demonstrate to prepare and arrange the operating room by correctly setting up anaesthetic instruments, surgical equipment, and supplies specific to different surgical procedures, ensuring proper positioning of lights, tables, and necessary tools.					1,2, 3,4	
II	Checklist of OT equipments <ul style="list-style-type: none"> Patient Monitoring Systems Operating Table Surgical Lights Anesthesia Equipment Electrocautery machine Crash Cart Suction Equipment 	24	Apply knowledge and skill to accurately identify and describe the function of essential OT equipment, including patient monitoring systems, operating tables, surgical lights, anesthesia equipment, electro cautery machines, crash carts, and suction equipment.					1,2, 3,4	
III	Procedures <ul style="list-style-type: none"> Cannulation Catheterization 	24	Apply knowledge and skill to proficiently perform various procedures such as can nulation,					1,2, 3,4	

	<ul style="list-style-type: none"> • central venous catheterization • Ryle’s tube • IV lines • Arterial line 		catheterization, central venous catheterization, Ryle’s tube insertion, IV line establishment, and arterial line insertion, demonstrating proper techniques and maintaining sterility.	
IV	Patient Preparation <ul style="list-style-type: none"> • Explaining the upcoming procedures to the patient and obtaining consent. • Preparing the patient for certain procedures and administration of pre-operative drugs. • Knowledge of patient positioning techniques. • Ability to ensure patient comfort and safety during transfer to the operating table and positioning for the procedure. 	24	Apply knowledge and skill to effectively communicate with patients to explain upcoming procedures and obtain consent, prepare patients for surgery by administering pre-operative drugs, and apply patient positioning techniques to ensure comfort and safety during transfer to the operating table.	1,2,3,4
V	Postoperative Care: <ul style="list-style-type: none"> • Assisting with patient transfer to the recovery area and ensuring their comfort and safety post-operation. Providing wound care, dressing changes, and monitoring for any signs of complications post-operation. 	24	Apply knowledge and skill to assist in the safe transfer of patients to the recovery area post-operation, provide appropriate wound care and dressing changes, and monitor patients for signs of complications, ensuring their comfort and safety during the recovery period.	1,2,3,4

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply knowledge and techniques to efficiently set up and prepare an operating room	2,3,5,8
2	Illustrate skills and techniques to ensuring all instruments and equipment are ready for various surgical procedures	2,3,5,7,8
3	Demonstrate proficiency to perform basic procedures such as catheterization, Cannulation etc.	1,2,3,6,7,8
4	Apply knowledge and skills on assisting and monitoring patient during surgery.	2,3,6,8
5	Demonstrate knowledge and techniques to provide essential post-operative care, ensuring patient comfort and safety.	1,2,3,5,6,7,8

SEMESTER – V									
Course Title	CLINICAL OBSERVATION II (Sterilization & aseptic techniques)								
Course code	24BOTT3102R	Total credits: 4 Total hours: 120P	L	T	P	S	R	O/F	C
			0	0	8	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	1. To learn about basic sterilization techniques and CSSD procedure. 2. To develop skills in aseptic techniques competently within the OT. 3. To develop effective communication and teamwork skills								
CO1	Apply knowledge and techniques of sterilization to maintain a sterile environment.								
CO2	Demonstrate proficiency in CSSD process to ensure optimal sterilization and quality control.								
CO3	Apply knowledge and skill of aseptic principles to prevent contamination during surgical procedures.								
CO4	Illustrate proper hand hygiene, gowning, and gloving techniques to minimize the risk of infections.								
CO5	Develop effective communication and teamwork skills to ensure smooth coordination and optimal patient care with the surgical team.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Sterilization <ul style="list-style-type: none"> Understanding and implementing various sterilization methods for surgical instruments and equipment. Knowledge of autoclaving, chemical sterilization, and sterilization monitoring procedures to maintain a sterile environment. 		24	Apply knowledge and skill to understand and implement various sterilization methods for surgical instruments and equipment, demonstrating proficiency in autoclaving, chemical sterilization, and sterilization monitoring procedures to maintain a sterile environment.				1,2,3,4	
II	CSSD <ul style="list-style-type: none"> Decontamination Process Inspection, Assembly, and Packaging Sterilization Monitoring and Quality Control Storage and Distribution Documentation and Record Keeping 		24	Apply knowledge and skill to effectively manage the CSSD processes, including decontamination, inspection, assembly, and packaging of instruments, as well as monitor sterilization quality control, ensure proper storage and distribution, and maintain accurate documentation and record-keeping.				1,2,3,4	
III	Aseptic Technique : <ul style="list-style-type: none"> Mastery of aseptic principles to prevent contamination during surgical procedures. Practicing proper hand hygiene, Moment of hand washing Basic techniques to minimize 		24	Apply knowledge and skill to prevent contamination during surgical procedures, practicing proper hand hygiene, identifying moments for hand washing, and employing basic techniques to minimize the risk of infections.				1,2,3,4	

	the risk of infections.			
IV	Personnel protecting Equipments and Management of Biohazard material : <ul style="list-style-type: none"> Types & selection of PPE.(gowning Gloving methods) Donning and Doffing. Spillage kit Mercury spillage Blood , body fluid, vomit 	24	Apply knowledge and skill to accurately select and use appropriate PPE, demonstrating correct donning and doffing techniques, and effectively manage biohazard materials, including handling spillage kits for mercury, blood, body fluids, and vomit.	1,2,3,4
V	Communication and Teamwork: <ul style="list-style-type: none"> Effective communication with members of the surgical team to ensure smooth coordination during procedures. Collaboration with nurses, surgeons, anesthesiologists, and other healthcare professionals to provide optimal patient care 	24	Apply knowledge and skill to effective communication skills to ensure smooth coordination with the surgical team, collaborating efficiently with nurses, surgeons, anesthesiologists, and other healthcare professionals to provide optimal patient care.	1,2,3,4

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply knowledge and techniques of sterilization to maintain a sterile environment.	2,3,7,8
2	Demonstrate proficiency in CSSD process to ensure optimal sterilization and quality control.	2,3,5,7,8
3	Apply knowledge and skill of aseptic principles to prevent contamination during surgical procedures.	2,3,4,5,7,8
4	Illustrate proper hand hygiene, gowning, and gloving techniques to minimize the risk of infections.	2,3,4,8
5	Develop effective communication and teamwork skills to ensure smooth coordination and optimal patient care with the surgical team.	5,6,7

SEMESTER – V									
Course Title	CLINICAL OBSERVATION III (Anaesthesia & Surgical Procedure)								
Course code	24BOTT3103R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 120p	0	0	8	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> To learn about administering sedative drugs, monitoring vital signs, and providing support to anaesthetists throughout all surgical phases To develop proficiency in administering oxygen therapy and efficiently anticipate and meet procedural needs. To expertise in emergency drug management and equipped with essential skills and knowledge. 								
CO1	Apply knowledge and skill to effectively administer drugs, monitor vital signs and assist anaesthetists.								
CO2	Demonstrate knowledge and proficiency in administering oxygen therapy.								
CO3	Illustrate proficiently assist surgeons and the surgical team throughout the surgical process.								
CO4	Apply comprehensive knowledge and skill in emergency drug management.								
CO5	Apply equipped proficiency and skill to rapidly and effectively respond to emergencies								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Anaesthesia Support : <ul style="list-style-type: none"> Understanding the basics of sedative drugs, its administration and assisting anaesthetists during induction, maintenance, and emergency phases. Proficiency in monitoring vital signs and responding to changes in patient's vitals during surgery. 		24	Describe, illustrate and explain the historical background and the basics of anaesthesia				1,2	
II	Oxygen therapy <ul style="list-style-type: none"> Types of Oxygen Delivery devices Techniques for administering oxygen Oxygen Therapy in Special Populations flow rate and humidification Assessment and Monitoring Safety Measures Hypoxemia Management Complications and Side Effects 		24	Describe, illustrate and explain the physiological monitoring and the methods of anaesthesia				1,2	
III	Surgical Assistance: <ul style="list-style-type: none"> Assisting surgeons and other members of the surgical team during procedures as required. Anticipating the needs of the surgical team and providing support efficiently throughout the 		24	Describe, illustrate and explain the equipment's used while patient is in anaesthesia				1,2	

	procedure.			
IV	Medication: <ul style="list-style-type: none"> • Emergency Drug • Sound-alike-look-alike(LASA), high risk ,high alert, • Narcotic Drug • Drug Selection and Stocking • Dispensing and Administration • Storage and Handling • Documentation 	24	Describe, illustrate and explain the basics of general anaesthesia along with different stages and complications	1,2
V	Emergency Preparedness <ul style="list-style-type: none"> • Emergency codes • Being prepared to respond quickly and effectively to emergencies in the operating room, such as massive bleeding, malfunction of instrument. • BLS & ACLS • Fire Safety 	24	Describe, illustrate and explain the basics of in operation theatre room	1,2

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Apply knowledge and skill to effectively administer drugs, monitor vital signs and assist anaesthetists.	1,2,3,8
2	Demonstrate knowledge and proficiency in administering oxygen therapy.	2,3,8
3	Illustrate proficiently assist surgeons and the surgical team throughout the surgical process.	1,2,3,8
4	Apply comprehensive knowledge and skill in emergency drug management.	2,3,8
5	Apply equipped proficiency and skill to rapidly and effectively respond to emergencies	2,3,4,8

SEMESTER – V									
Course Title	SUMMER INTERNSHIP								
Course code	24BOTTSI01	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours:	0	0	0	0	0	24	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ V semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> To develop and enhance specific professional skills relevant to the intern's career path. To gain a comprehensive understanding of the industry and build a professional network. To identify and pursue personal and career goals through guided reflection and mentorship. 								
CO1	Understand and become familiar with the work environment.								
CO2	Understanding and practicing workplace professionalism.								
CO3	Develop specific skills like communication, teamwork, or technical abilities								
CO4	Develop a clear scope of career aspect.								
CO5	Develop practical knowledge and skills for application in real time.								

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Understand and become familiar with the work environment.	2,5,6,7,8
2	Understanding and practicing workplace professionalism.	2,3,5,6,7,8
3	Develop specific skills like communication, teamwork, or technical abilities	5,6,7,8
4	Develop a clear scope of career aspect.	2,5,6,7,8
5	Develop practical knowledge and skills for application in real time.	1,2,3,5,6,7,8

SEMESTER – VI									
Course Title	CLINICAL APPLICATION								
Course code	24BOTT3201R	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 Operation Theatre Technology								
Semester	Fall/ VI semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> To learn patient positioning techniques, focusing on monitoring and documentation. To identify equipment needed for surgeries and understand their maintenance. To learn how to management of unconscious patients, emphasizing interpersonal communication and legal/ethical considerations. 								
CO1	Explain the different techniques of patient positioning, including patient monitoring and documentation.								
CO2	Identify various equipment required for different surgical procedures								
CO3	Explain the purpose and maintenance of various surgical equipment.								
CO4	Demonstrate skills in management of unconscious patients according to differential diagnosis including the significance of interpersonal communication.								
CO5	Apply knowledge on legal and ethical issues that binds OT Technician.								
Unit-No.	Content		Contact Hour	Learning Outcome				KL	
I	positioning and monitoring in the operation theatre <ol style="list-style-type: none"> Medical and general guideline of patient positioning. Surgical positions for various procedures and tests. Equipment for positioning Patient monitoring devices Documentation 		4	Understand the general guideline of positioning and apply the skill used in different procedures for surgery and monitoring patents whenever required.				1,2,3	
II	Instrument planning for various surgical procedure <ol style="list-style-type: none"> Special instrument in general surgery Orthopedic surgery Laparoscopic surgery Powered surgical instrument Different stapler in surgical procedure. Day care surgery Remote location- MRI, CT,MECT 		5	Describe, illustrate and apply knowledge on how to use the instruments in different procedures.				1,2,3	
III	Other Equipment <ol style="list-style-type: none"> Electrocautery ABG machine Suction Device Fluid /blood warmer Heat and Moisture exchanger Ultrasound 		8	Understanding and operate and maintain other essential surgical equipment, including electrocautery devices, ABG machines, suction devices, fluid/blood warmers, heat and				1,2,3,4	

	<p>7. Intra-aortic ballon pump (IABP)</p> <p>8. Transoesophageal Electrocardiography (TEE)</p>		<p>moisture exchangers, ultrasound machines, intra-aortic balloon pumps (IABP), and transesophageal echocardiography (TEE) devices.</p>	
IV	<p>Fundamental of medical nursing</p> <ol style="list-style-type: none"> 1. Assessment , prevention and replacement therapy for fluid and electrolyte balance 2. Medical and surgical management of unconscious patients and neurological patients. 3. Standards pre-operative nursing practice 4. Duties of nurses and OT technician 5. Importance of teamwork and anticipating the need for surgeon 	8	<p>Describe, illustrate, explain and apply knowledge & skill to assess, prevent, and manage fluid and electrolyte imbalances, provide medical and surgical care for unconscious and neurological patients, adhere to pre-operative nursing standards, perform duties of nurses and OT technicians, and work effectively as part of a surgical team.</p>	1,2,3,4
V	<p>Legal , Regulatory and Ethical issues</p> <ol style="list-style-type: none"> 1. Surgical ethics 2. Informed consent 3. Legal right and issues in OT 4. Legal aspects of surgery 5. Ethical and personnel responsibility of OT personnel 	5	<p>Describe, illustrate and explain legal things and different types of ethics.</p>	1,2
Practical	<ul style="list-style-type: none"> • Practice standard patient positioning techniques and various surgical positions (supine, prone, lithotomy). • Set up and use patient monitors (ECG, pulse oximeter, BP monitor) and document details accurately. • Identify and use basic surgical tools and handle properly. • Operate all type instruments and use powered surgical tools safely. • Operate electrocautery devices and perform arterial blood gas 	30	<p>Describe, illustrate and explain and apply skill & techniques standard patient positioning techniques, set up and use patient monitors accurately, identify and handle basic surgical tools, operate all types of surgical instruments safely, perform arterial blood gas tests with an ABG machine, and manage fluid/electrolyte balance</p>	1,2,3,4

	<p>tests with an ABG machine.</p> <ul style="list-style-type: none"> • Access and manage fluid/electrolyte balance, including performing replacement therapy. • Manage medical and surgical care for unconscious and neurological patients following pre-operative nursing protocols. • Perform roles of nurses and OT technicians, collaborate effectively in the surgical team, and apply ethical principles, informed consent, and understand legal aspects in the OT. 		through assessment and replacement therapy.	
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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 different techniques of patient positioning, including patient monitoring and documentation.	1,2,3,6,7,8
2	Identify various equipment required for different surgical procedures	2,3,5
3	Explain the purpose and maintenance of various surgical equipment.	2,3,8
4	Demonstate skills in management of unconscious patients according to differential diagnosis including the significance of interpersonal communication.	2,3,4,5,7
5	Apply knowledge on legal and ethical issues that binds OT Technician.	6,7,8

SEMESTER – VI									
Course Title	ADVANCED ANAESTHESIA TECHNIQUE								
Course code	24BOTT3202R	Total credits: 3	L	T	P	S	R	O/F	C
		Total hours: 30T+30P	2	0	2	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Bachelor of Operation Theatre Technology								
Semester	Fall/ VI semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> To learn about advanced techniques in administering anesthesia. To develop proficiency in specialized anesthesia procedures. To enhance knowledge and skills for managing complex anesthesia scenarios. 								
CO1	Classify IV Anaesthetics and muscle relaxants used in surgical procedures.								
CO2	Demonstrate knowledge and skills on basic and manual airway manoeuvres including intubation.								
CO3	Recognize the principles, considerations and equipment of ventilation.								
CO4	Apply skills and knowledge on monitoring patient and equipment during surgery.								
CO5	Describe the purpose and value of anaesthesia workstation along with techniques of ventilation								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Intravenous Anaesthetics & Muscle Relaxants <ul style="list-style-type: none"> - Classification - Barbiturates and Non barbiturates agents - Does, Mechanism of action, routes of administration, elimination of life, advantages and disadvantages, contraindication. - Classification of Muscle relaxants (Depolarizing and non depolarizing) - Indication & contraindication 	5	Understand doses, mechanisms, routes of administration, and elimination of intravenous anaesthetics and differentiate between depolarizing and non-depolarizing muscle relaxants and their clinical uses.	1,2,3,4					
II	Airway Management and Intubation <ul style="list-style-type: none"> -Basic Airway Management -Manual airway maneuvers <ul style="list-style-type: none"> - Airway Adjuncts - Continuous Positive Airway Pressure (CPAP) and BiPAP - Supplemental O₂ therapy and delivery devices - Suctioning - Endo tracheal intubations - Kings It Airway - Digital intubations - Laryngeal mask airways and Combitube intubations - Rapid sequence intubations - Tracheostomy - Indication and contraindication of all. - Laryngoscopes, ET tubes-types and size 	10	Demonstrate basic airway management techniques and use airway adjuncts effectively and perform endotracheal intubations and manage airway emergencies like rapid sequence intubations.	1,2,3,4					
III	Breathing systems <ul style="list-style-type: none"> - General considerations; humidity and heat 	10	Identify components of breathing systems and understand their	1,2,3,4					

	<ul style="list-style-type: none"> - Common components -connectors, adapters, reservoir bags - Methods of humidification - Classification of breathing system - Mapleson system -A B C D E F * - Jackson Rees system - Bain circuit - Non rebreathing valves -ambu valves - AMBU BAG - The components of circle system - Soda lime, indicators 		humidification methods and describe different types of breathing circuits and their applications in anesthesia	
IV	Equipments and Monitoring under Anaesthesia <ul style="list-style-type: none"> - Monitoring (ECG ,SPO2 ,NIBP ,Temperature ,IBP ,CVP ,Etco2) - arterial blood pressure monitoring - Intravenous cannulation & I.V.Cannula (Size, colour and flow rate) - Difficult intubation cart - Humidification: 1. Goals of humidification, 2. Advantages of humidification, 3. Types of humidifiers 	15	Describe, illustrate and explain how to monitor vital signs and anesthesia parameters accurately and perform intravenous annulations and manage difficult airway scenarios.	1,2,3,4
V	Anaesthesia workstation and ventilation <ul style="list-style-type: none"> -Definition and purpose of anaesthesia workstations -Components and functionalities of modern anaesthesia workstations -Vaporizers and Types of vaporizers -Modes of mechanical ventilation -Monitoring ventilation parameters: tidal volume, minute ventilation, peak airway pressure, and plateau pressure -Alarms and safety mechanisms 	5	Describe, illustrate and explain the components and functionalities of anesthesia workstations and monitor ventilation parameters and understand safety mechanisms during mechanical ventilation.	1,2,3,4
Practical	<ul style="list-style-type: none"> • Identify and classify intravenous anaesthetics and muscle relaxants (barbiturates, non-barbiturates, depolarizing, non-depolarizing). • Demonstrate dosing, mechanisms of action, routes of administration, elimination, advantages, disadvantages, and contraindications for each agent. • Practice basic airway maneuvers and techniques for manual airway control. • Use airway adjuncts like CPAP, BiPAP, and supplemental oxygen therapy devices effectively. • Demonstrate techniques for endotracheal intubation, Kings LT airway, digital intubations, and use of laryngeal mask airways and Combitube. • Understand rapid sequence intubations 	30	Describe, illustrate and explain and apply skill & techniques for all practical procedure.	1,2,3,4

	<p>and indications for tracheostomy, considering contraindications.</p> <ul style="list-style-type: none"> • Identify components of breathing systems, connectors, adapters, and reservoir bags. • Perform intravenous cannulation, selecting appropriate cannula sizes, colors, and understanding flow rates. • Familiarize with the difficult intubation cart and its contents for emergency airway management. • Define and understand the purpose of anaesthesia workstations, including their components and functionalities. 			
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RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Classify IV Anaesthetics and muscle relaxants used in surgical procedures.	1,2,3,8
2	Demonstrate knowledge and skills on basic and manual airway manoeuvres including intubation.	1,2,3,4,8
3	Recognize the principles, considerations and equipment of ventilation.	1,2,3,4,8
4	Apply skills and knowledge on monitoring patient and equipment during surgery.	2,3,4,7,8
5	Describe the purpose and value of anaesthesia workstation along with techniques of ventilation	2,3,4,8

SEMESTER – VI									
Course Title	SURGICAL PROCEDURE AND EQUIPMENT USE IN THE OT								
Course code	24BOTT3203R	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 Operation Theatre Technology								
Semester	Fall/ VI semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> Understand various surgical procedures and their applications. Familiarize participants with a range of surgical instruments and equipment. Develop proficiency in assisting surgeons, maintaining sterility, and ensuring equipment functionality for safe and effective surgical outcomes. 								
CO1	Describe the basic principle, classification and indication of surgical procedures including patient preparation and positioning.								
CO2	Demonstrate skills and technique of suturing and its removal.								
CO3	Apply knowledge and skills on operating and maintenance of specialized equipment in the operation theatre.								
CO4	Classify various surgical procedures and identify the equipment required accordingly.								
CO5	Explain the principle, procedure and types of organ transplant.								
Unit- No.	Content	Contact Hour	Learning Outcome	KL					
I	Basic of surgery: <ul style="list-style-type: none"> ➤ Historical development and principle of surgery. ➤ Surgical terminology, types of incision and indication for the use of particular procedure ➤ Classification of surgical procedure and surgeries. ➤ Knowledge of patient positioning and draping. ➤ Pre-operative and post -operative care of the surgical patient emergency procedure 	8	Describe, illustrate and explain about the basic knowledge about surgery and classification of surgical procedure.	1,2					
II	Suture Materials: <ul style="list-style-type: none"> ➤ Classification of suture materials ➤ Methods of suturing ➤ Common suture technique ➤ Suture sizing and packaging ➤ Suture removal. ➤ Physical preparation and draping surgical site ➤ Instrument for preparing and draping 	10	Describe, illustrate and explain the common type and methods of suturing materials and removal techniques.	1,2					
III	Surgical Instrument & Specialized Equipment: <ul style="list-style-type: none"> ➤ Name & importance of all the surgical instrument. ➤ Laparoscopic instrument & accessories ➤ Surgical robot ➤ Endoscope & colonoscopy. ➤ Bronchoscope 	10	Describe, illustrate and explain the knowledge how to operate and maintain different surgical instrument	1,2					

	➤ Microsurgery, Laser surgery & Ultrasonic surgery			
IV	Surgical requirement in various surgical speciality like <ul style="list-style-type: none"> ➤ Neurosurgery, ➤ Paediatric Surgery, ➤ Thoracic & Cardiovascular Surgery, ➤ Orthopedic Surgery, ➤ Gynecological Surgery, ➤ Urological Surgery, ➤ Ophthalmic Surgery, ➤ Dental Surgery, ➤ General Surgery ➤ Plastic And Reconstructive Surgery, ➤ Thyroid & Vascular Surgery ➤ Otorhinolaryngology And Head And Neck Surgery. 	8	Describe, illustrate and explain how to assist and manage different type of surgical procedure	1,2,3,4
V	Organ procurement and transplantation <ul style="list-style-type: none"> ➤ Types of transplant ➤ Organs and tissues transplanted ➤ Types of donor ➤ Immunology of organ transplantation 	10	Describe, illustrate and explain the principles of organ donation and transplantation, including the ethical, legal, and social considerations related to the field.	1,2
Practical	<ul style="list-style-type: none"> • Learn surgical terms and types of incisions practically. • Practice proper patient positioning and surgical draping. • Identify and handle different suture materials and Practice various suturing techniques • Recognize common surgical instruments and their roles. • Familiarize with laparoscopic instruments, surgical robots, and endoscopes. • Understand and assist different types of surgery. • Learn about transplants and donor types practically. 	30	Describe, illustrate and explain and apply skill & techniques for all practical procedure.	1,2,3,4

TEXT BOOKS:

T1. Berry & Kohn's Operating room technique 12th edition

T2. Textbook on operation Theatre Technology 1st edition

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Describe the basic principle, classification and indication of surgical procedures including patient preparation and positioning.	1,2,3,6,7,8
2	Demonstrate skills and technique of suturing and its removal.	1,2,3,8
3	Apply knowledge and skills on operating and maintenance of specialized equipment in the operation theatre.	2,3,5,7,8
4	Classify various surgical procedures and identify the equipment required accordingly.	2,3,7,8
5	Explain the principle, procedure and types of organ transplant.	1,2,3,5,7,8

SEMESTER – VI									
Course Title	INTRODUCTION TO RESEARCH METHODOLOGY								
Course code	24BOTT3204R	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 Operation Theatre Technology								
Semester	Fall/ VI semester of third year of the programme								
Course Objectives	<ol style="list-style-type: none"> To gain a comprehensive understanding of foundational research concepts, including the research process, types of research, and ethical considerations. Acquire knowledge of various research designs, methodologies, and data collection techniques. Develop knowledge about research ethics. 								
CO1	Develop fundamental knowledge on the principles and types of research.								
CO2	Develop comprehensive understanding on research design.								
CO3	Acquire basic knowledge on the significance and conduction of literature review.								
CO4	Classify various types of data collection methods and techniques.								
CO5	Understand the different types of research ethics along with plagiarism.								
Unit- No.	Content	Contact Hour	Learning Outcome					KL	
I	Introduction to research <ul style="list-style-type: none"> Definition of research Importance and purpose of research Types of research (basic, applied, quantitative, qualitative, etc.) Research process overview 	5	Describe, illustrate and explain about the basic principles of research.					1,2	
II	Research design <ul style="list-style-type: none"> Formulating research questions and hypotheses Variables and operationalization Experimental, correlational, and descriptive research designs Choosing an appropriate research design 	10	Describe, illustrate and explain the different type of research design					1,2	
III	Literature review <ul style="list-style-type: none"> Conducting a literature search Evaluating and synthesizing research literature Identifying research gaps Importance of literature review in research 	5	Describe, illustrate and explain the basic knowledge about literature review					1,2	
IV	Data collection methods <ul style="list-style-type: none"> Surveys/questionnaires Interviews Observations Experiments Case studies 	10	Describe, illustrate and explain the different type of data collection methods.					1,2	

	<ul style="list-style-type: none"> Secondary data analysis Sampling techniques 			
V	Research ethics <ul style="list-style-type: none"> Ethical considerations in research Informed consent Confidentiality and anonymity Institutional review boards (IRBs) Avoiding plagiarism and other forms of academic misconduct 	15	Describe, illustrate and explain the principles of research ethics.	1,2

TEXT BOOKS:

- T1. Research methodology, Vivek Singh
T2. Fundamental of research methodology, KitabMahal

REFERENCE BOOKS:

- R1. Research methods the basic, Nichols walliman
R2. Research methodology methods and techniques, C.R. Kothari

RELATIONSHIP BETWEEN COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES

CO PO Mapping		
SN	Course Outcome (CO)	Mapped Program Outcome
1	Develop fundamental knowledge on the principles and types of research.	3,6,7,8
2	Develop comprehensive understanding on research design.	3,6,7,8
3	Acquire basic knowledge on the significance and conduction of literature review.	6,7,8
4	Classify various types of data collection methods and techniques.	3,5,6,7,8
5	Understand the different types of research ethics along with plagiarism.	3,6,7,8



Assam down town University

Curriculum and Syllabus

Master of Medical Laboratory Technology

**OUTCOME BASED EDUCATION FRAMEWORK
CHOICE BASED CREDIT SYSTEM**

Version: 2.2

**FACULTY OF PARAMEDICAL
SCIENCES**

July, 2024

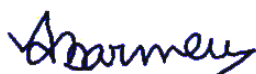
PREAMBLE

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 Board of Studies (BOS) meeting of the Faculty of Paramedical Sciences held on dated 20/06/2024 and approved by the 51ST Academic Council (AC) meeting held on dated 26/07/2024.



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 multi-disciplinary 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 conflict-free global society.
6. To be renowned for creating new knowledge through high quality inter disciplinary research for betterment of society.
7. Become a key hub for the growth and excellence of AdtU's stake holders 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 of Medical Laboratory Technology programme 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, 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 formulate, implement and monitor community oriented programmes and projects especially where level of involvement in adoption of innovative and 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 6 months of compulsory rotating internship in recognized hospital. Candidates who have passed BMLT through Correspondence, Vocational or Distance Education programme are not eligible.

III. Programme 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. Programme 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. Programme Outcome (PO):

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: Total credit need to sore for the successful completion of Master in Medical Laboratory Technology degree programme is **93** credits.

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. ThescopeofMasterofSciencemedicallaboratorytechnologyismentionedbelow:

- 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 programmes.

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 Programmeme 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 programme coordinators should upload the in-semester marks to the ERP and forward acknowledgement of all the courses of the programme 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 programme follow a unique pattern and the total marks is 60

Table 1: Question paper pattern for End semester examination

S.N.	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-Voice etc.:

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

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^{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.

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

- (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 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

(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, analyse, 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.

Breakdown of Credits

S.N.	Category		Total number of Credits
1	University Core(UC)	Skill Enhancement Course (SEC)	-
		Ability Enhancement Course(AEC)	6
		Field Training	-
		Discipline Specific Elective (DSE)	-
		Value Added Course (VAC)	2
2	University Elective (UE)	Multidisciplinary Course (MDC)	2
		Value Added Course (VAC)	4
3	Programme Core(PC)	Discipline Specific Core(DSC)	46
		Field Training	2
		Research /Industry Internship	24
		Summer Internship	4
4	Programme Elective (PE)	Discipline Specific Elective (DSE)	-
		Value Added Course (VAC)	-
5	Faculty Core(FC)	Skill Enhancement Course (SEC)	3
		Ability Enhancement Course(AEC)	-
Total			93

Breakdown by categories of courses

S.N.	Category	Credits	%
1	Paramedical	85	91.4%
2	Engineering	2	2.2%
3	Commerce and Management	-	-
4	Humanities and social science	6	6.5%
Total		93	100%

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*	PIE*	PEE		
Semester I	1.	24MMLT1101R	Biochemistry	DSC (Minor)	2	0	4	0	0	0	4	40	60	0	100	200
	2	24MMLT1102R	Clinical Pathology	DSC (Major)	2	0	4	0	0	0	4	40	60	0	100	200
	3	24MMLT1103R	Histopathology and Cytopathology	DSC (Minor)	2	0	4	0	0	0	4	40	60	0	100	200
	4	24MMLT1104R	Introduction to Microbiology	DSC (Minor)	2	0	4	0	0	0	4	40	60	0	100	200
	5	24UMPD1101R	Personal Development Programme I (Effective Communication)	AEC	0	0	4	0	0	0	2	0	0	0	100	100
	6	24UMFS1101R	Fundamental of Statistics	MDC	1	0	2	0	0	0	2	40	60	0	100	200
	7	24UBEC1101	Extra-Curricular Activities	Extra-Curricula	0	0	0	4	0	0	1	0	0	0	100	100
Total				16	0	9	0	22	4	0	0	21	200	700	1200	

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SEE*	PIE*	PEE	Total	
1	24MMLT1201R	Biomedical Techniques and Laboratory Management	DSC (Major)	1	0	4	0	0	0	3	40	60	0	100	200	
2	24MMLT1202R	Hematology	DSC (Major)	1	0	4	0	0	0	3	40	60	0	100	200	
3	24MMLT1203R	Introduction to Blood Banking	DSC (Major)	1	0	4	0	0	0	3	40	60	0	100	200	
4	24MMLT1204R	Microbiology & Immunology	DSC (Major)	1	0	4	0	0	0	3	40	60	0	100	200	
5	24MMLT1205R	Molecular Biology	DSC (Major)	1	0	2	0	0	0	2	40	60	0	100	200	
6	24UUHV101R	Universal Human values	VAC	1	0	2	0	0	0	2	40	60	0	100	200	
7	24MMLT1206R	Applied Laboratory Techniques (Techno Professional skills)	SEC	0	0	4	0	0	0	2	0	0	0	100	100	
8	24MMLT1207R	Postgraduate Teaching Practice	SEC	0	0	2	0	0	0	1	0	0	0	100	100	
9	24UMPD1201R	Communication Mastery (CLPP D)	AEC	0	0	4	0	0	0	2	0	0	0	100	100	
10	24UBCC1201	CO CURRICULAR ACTIVITIES	Co-Curricular	0	0	0	4	0	0	1	0	0	100	0	100	
11	24MMLT1208R	FIELD TRAINING	FT	0	0	0	0	0	8	1	0	0	0	100	100	
Total				6	0	30	4	0	8	23	240	360	100	900	1500	

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SEE*	PIE*	PEE	Total	
1	24MMLTFT201	Field Training	FT	0	0	0	0	0	8	1	0	0	0	100	100	
2	24MMLT2102R	Internship (Summer Training)	Internship	0	0	0	16	0	0	4	0	0	0	100	100	
3	24MMLT2103R	Research/ Clinical Posting	Research	0	0	0	14	8	0	8	0	0	0	100	100	
4	24UMPD2101R	Corporate Proficiency (CLPPD)	AEC	0	0	4	0	0	0	2	0	0	0	100	100	
(To opt 1 Specialization from the following Group)																
Group - A: Haematology and Blood Transfusion																
5	24MMLT2104R	Advanced Haematology	DSC (Major)	4	0	6	0	0	0	7	40	60	0	100	200	
6	24MMLT2105R	Advanced Blood Banking	DSC (Major)	4	0	6	0	0	0	7	40	60	0	100	200	
Group - B: Microbiology and Immunology																
7	24MMLT2106R	Medical Microbiology	DSC (Major)	4	0	6	0	0	0	7	40	60	0	100	200	
8	24MMLT2107R	Diagnostic Microbiology and Clinical Immunology	DSC (Major)	4	0	6	0	0	0	7	40	60	0	100	200	
Total				9	0	18	14	8	8	31	80	120	0	700	900	

S. N.	Course Code	Course Title	Course Category	Engagement								Maximum Marks for				
				L	T	P	S	R	O	C	IA*	SEE*	PIE*	PEE	Total	
1.	24MMLT2201R	Quality Control In Diagnostic Lab	DSC (Major)	3	0	0	0	0	0	3	40	60	0	0	100	
2	24MMLT2202R	Research Ethics	DSC (Major)	0	0	6	0	0	0	3	0	0	0	100	100	
3	24MMLT2203R	Research	Research	0	0	20	4	8	0	12	0	0	0	100	100	
Total				3	0	26	4	8	0	18	40	60	0	200	300	

SEMESTER – I											
Course Title	BIOCHEMISTRY										
Course Code	24MMLT1101R	Total Credits: 4			L	T	P	S	R	O/F	C
		Total Hours: 30T+60P			2	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite			Nil						
Programme	Master of Medical Laboratory Technology										
Semester	Fall/ I Semester of First Year of the Programme										
Course Objectives	<ol style="list-style-type: none"> The students will learn about the important biomolecules essential to life processes. To discuss aspects of the principles of organic chemistry in the structure and functions of important bio molecules. 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 clinical significance and diagnosis of various body fluids.										
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	CARBOHYDRATES - General features - Classification - Reactions of monosaccharides - Disorders of Carbohydrate metabolism.			6	Explain on carbohydrates' general features and classification, illustrate monosaccharide reactions, and explain disorders in carbohydrate metabolism.				1,2		
II	Proteins and Amino Acids - General features - Classification of Amino acids - Properties of Amino acids - Structural organization of proteins - Abnormalities of proteins in plasma.			6	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	CHEMISTRY OF LIPIDS - General features - Classification of Lipids - Properties of Lipids - Disorders of plasma lipids and lipoproteins			6	Describe the general features, classification, and properties of lipids, as well as explain disorders related to plasma lipids and lipoproteins, fostering a comprehensive understanding of lipid biochemistry and its clinical implications				1,2		

IV	NUCLEIC ACIDS AND ENZYMES <ul style="list-style-type: none"> - Nucleotides and its bases - RNA/DNA and its classification - classification of enzymes - factors affecting enzyme activity - specificity - enzyme kinetics enzymes in clinical diagnosis 	8	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
V	Clinical significance, principle of estimation: <ul style="list-style-type: none"> - Glucose tolerance test (GTT) importance and principle and techniques of GTT - Insulin tolerance test - Xylose absorption test - Analysis of calculi Blood gases and pH.	4	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
Practical	<ol style="list-style-type: none"> 1. Estimation of blood glucose by Folin method, CHOD-POD method. 2. Estimation of protein by Biuret method, Lowry, UV method 3. Estimation of serum creatinine by Jaffe's method 4. Estimation of urea in blood sample by urease 5. Estimation of Total cholesterol by CHOD/POD method. 6. Estimation of Triglycerides by GOP/PA method 7. Estimation of HDL Cholesterol by precipitation method 8. Estimation of SGOT in blood sample by kinetic method 9. Estimation of SGPT in blood sample by kinetic method 10. Estimation of alkaline phosphatase in blood sample by kinetic method 11. Estimation of acid phosphatase in blood sample by kinetic method 12. Estimation of bilirubin in blood sample 13. by kinetic method 14. Estimation of Na⁺, K⁺ & Ca⁺⁺ by electrode analyzer Estimation of common parameters in urine through use of strips.	60	Estimate and analyze blood and urine parameters, enhancing skills in clinical biochemistry and laboratory diagnostics.	1,2,3,4,5

TEXT BOOKS:

T1 Bishop M, Fody EP, Schoeff LE. Clinical Chemistry-Techniques, Principles, Correlations.

T2 Chatterjea MN, Shinde R. Textbook of medical biochemistry.

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.

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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Describe the structure, function, classification and biological importance carbohydrates	1,2
2	Classify proteins and amino acids, exploring their molecular structures and involvement in biochemical processes.	1,2
3	Discuss the structures, functions of lipids and its effects on various disorders.	1,2
4	Demonstrate expertise in nucleic acids and enzymes, understanding their roles within cellular processes.	1,2,3
5	Explain the clinical biochemistry techniques to analyse and interpret biochemical data effectively for diagnostic and research applications.	1,2,3

SEMESTER – I									
Course Title	CLINICAL PATHOLOGY								
Course Code	24MMLT1102R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 30T+60P	2	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of 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.	3	Describe, illustrate and explain composition and methods of estimating different components of urine, stool, body fluids etc				1,2		
II	Urine examination: Physical, chemical and microscopic examination Urine analysis by Strip method Stool Examination: Macroscopic, Chemical examination and Microscopic examination Concentration method and Flotation method Test for Occult blood-Benzidine Test Sputum examination- Physical, Chemical and Microscopic examination of sputum.	8	Describe, illustrate and explain for selected sophisticated laboratory techniques with adequate knowledge of various principles				1,2,3		
III	Body fluids: Physical chemical and Microscopic examination of Pleural, Pericardial Synovial, Ascitic and Peritoneal fluid. Cerebrospinal fluid Physical, chemical, microscopic, bacteriological and cytological examination.	8	Describe, illustrate and explain various kind of clinical samples which can be used for cancer diagnosis				1,3		

IV	Gastric analysis Methods of collection Indications and contraindication. Macroscopic and microscopic examination. <ul style="list-style-type: none"> Fractional test meal Augmented Histamine test Hollanders test 	7	Describe, illustrate and explain about Gastric analysis its clinical significance which can help in diagnosis of various kind of Cancer	2,3
V	Pregnancy-Test, Method Interpretation Semen analysis	4	Describe, illustrate and explain various method for estimating HCG value.	2,3
Practical	Urine examination: Physical, chemical and microscopic. Urine analysis by Strip method Stool Examination: Macroscopic Examination Concentration method, Flotation method Microscopic examination Chemical examination Test for Occult blood-Benzidine Test Pregnancy-Test, Method Interpretation Semen analysis	60	Describe, illustrate and explain to understand Urine examination, Stool examination, pregnancy test and Semen examination	1,2,3,4

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

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	To summarize how to collect, preserve and transport various clinical samples.	1,2,3
2	To understand about Physical, chemical and microscopic examination of urine, stool.	1,2
3	Discuss the clinical significance and diagnosis of various body fluids.	1,2,3,4
4	Outline the various types of gastric juice analysis and its clinical significance.	1,2
5	Illustrate the fundamental principles of pregnancy test.	1,3

SEMESTER – I									
Course Title	HISTOPATHOLOGY AND CYTOPATHOLOGY								
Course Code	24MMLT1103R	Total credits: 4	L	T	P	S	R	O/F	C
		Total hours: 30T+60P	2	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	1. Students become familiar with the basics in operating computer 2. Introduce fundamental concepts of computer hardware and software. 3. Proficiency in using common computer applications and tools.								
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	3	Describe, illustrate and explain Histopathological and Cytological tests per for guidelines of the laboratory.					1,2,3	
II	Fixatives, Cytological fixative and mailing	8	Describe, illustrate and explain knowledge about Fixatives, Cytological fixative and mailing					1,3,4	
III	Tissue processing Decalcification Cell block preparation Microtome Frozen section	8	Describe, illustrate and explain understand Tissue processing Decalcification Cell block preparation Microtomy Frozen section for tissue processing					3,4	
IV	Staining Dyes ,Routine staining, Special staining, Pigments and its staining	6	Describe, illustrate and explain about various Staining techniques in his to and cytopathology laboratory.					1,2,3	
V	Immuno histochemistry, Cytology classification Establishment of histopathological laboratory, Cancer biology	5	Describe, illustrate and explain the procedure and importance of Immuno histochemistry, Cytology and basic knowledge about cancer biology					3,4,5	

Practical	<ol style="list-style-type: none"> 1. Fixatives 2. Cytological fixative and mailing 3. Tissue processing 4. Decalcification 5. Cell block preparation 6. Microtomy 7. Frozen section 8. Staining 9. Dyes, 10. Routine staining, 11. Special staining, 12. Pigments and its staining 13. Immuno histochemistry 14. Cytology classification 15. Establishment of histopathological laboratory. 16. Cancer biology. 	60	Describe, illustrate and explain the procedure and Importance of Immunohistochemistry, Cytology	1,2,3,4
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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 Suvarna, Christopher Layton, John D. Bancroft.
R2-Histopathology, A self-instructional text by FreidaL.Carson.
R3-Textbook of pathology by Harsh Mohan.
R4-Textbook of Medical Laboratory Technology– PrafulB. Godkar, Darshan PGodkar.
R5- Medical Laboratory Technology Methods & interpretation– RamnikSood
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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Explain the basic principles of histopathology and cytopathology	1,2,3
2	Identify and understand the principles of fixatives and their use in different types of specimens and cytological preparations.	1,2,3
3	Demonstrate the process involve in tissue processing and microscopic examination.	1,2,3
4	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	1,2,3
5	Explain the basic principles of histopathology and cytopathology	1,2,3

SEMESTER – I									
Course Title	INTRODUCTION TO MICROBIOLOGY								
Course Code	24MMLT1104R	Total Credits: 4	L	T	P	S	R	O/F	C
		Total Hours: 30T+60P	2	0	4	0	0	0	4
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Fall/ I Semester of First Year of the Programme								
Course Objectives	1. To teach basic introduction, general characteristic, morphology and classification of microorganism/bacteriology. 2. To teach about basic infection, types of infection and immunity & Immunoglobulin. 3. To teach about various staining methods to identify bacteria.								
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	Historical back ground. - Microscopy. - Culture methods and media.	4	Describe, illustrate and explain the historical background of Microbiology, the types and parts of Microscope and culture methods and media.					1,2	
II	Bacterial genetics: -Transcription and Translation -Mutation and its type -Gene transfer -Genetic Mechanisms of drug resistance.	7	Describe, illustrate and explain the bacterial genetics.					1,2,3	
III	Introduction to parasitology: Parasitism, direct and indirect lifecycles, hosts.-Commensalism, symbiosis. -General Laboratory diagnosis -Classification of parasites	6	Describe, illustrate and explain the parasites and classification of parasites.					1,2	
IV	General Virology -Morphology and nomenclature. -Virus replication. -Cultivation of virus. -Vaccines and antiviral drugs.	6	Describe, illustrate and explain the general virology, vaccines and antiviral drugs.					1,2	
V	Immunology: -History of immunology, Innate and acquired immunity. -Immunoglobulin: Structure and function, classes and subclasses. -Antigens and types of antigens	7	Describe, illustrate and explain immunology, types of immunoglobulin's and antigens.					1,2	

Practical	Instrumentation in microbiology. - Code and conduct of laboratory personnel. Laboratory diagnosis of blood parasites: - Plasmodium, Leishmania Microfilaria Trypanosomes - Stool examination for parasites (Wet mount preparation)	60	Describe, illustrate, explain instrumentation in Microbiology and apply staining techniques and carry out microscopic examination.	1,2,3,4
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TEXT BOOKS:

T1. Textbook of Microbiology Immunology by Subash Chandra Parija 2nd edition.

REFERENCE BOOKS:

R1. C.P Baveja, "Textbook of Microbiology, 5th Edition.

R2. Ananthanarayan and Paniker, "Textbook of Microbiology 8th edition.

R3. Textbook of Essentials Microbiology Apurba Sankar Sastry Sandhya Bhat 4th edition.

OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understand the Historical background of Microbiology, the types and parts of Microscope and culture methods and media.	1,3
2	Acquire knowledge and understand bacterial genetics.	1,4
3	Explain on the classification of parasites.	1,2
4	Outline the basic knowledge of general virology.	1,2
5	Describe a comprehensive knowledge on Immunology, immunoglobulin and antigens.	1,2 3

SEMESTER – I									
Course Title	EFFECTIVE ENGLISH (Communicative English & Soft Skills)								
Course Code	24UMPD1101R	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	All PG Programme								
Semester	Spring/ II semester of First Year of the Programme								
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								
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	IntroductiontoPhoneticsanditsimportancewillimprovethellearners'pronunciation								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	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		3	Enable to analyse and identify the different types of sentences				1,2	
II	Module2-ReadingSkills i. Techniques of Effective Reading ii. Gathering ideas and information from a text The SQ3R Technique Interpret the text		3	Ability to integrate the skills of reading and speaking in Professional communication				1,2	
III	Module 3-Listening Skills 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		2	Dress code Etiquette sessions will boost their confidence and morals				1,2	

IV	Module4-ConflictManagement i. Definition ii. Type of Conflict Management iii. Effects of Conflict Management iv. Methods to deal with Conflicts (Negative)	3	Acquire knowledge about the effective and efficient utilization of time	1,2
V	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	2	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.

T2- English Grammar in Use, Raymond Murphy4th edition, CUP.

T3- Barrett, Grant. 2016. Perfect English Grammar: The Indispensible 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/>

SEMESTER – I									
Course Title	FUNDAMENTAL OF STATISTICS								
Course Code	24UMFS1101R	Total Credits: 2 Total Hours: 15T+30P	L 1	T 0	P 2	S 0	R 0	O/F 0	C 2
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 analyse 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, poisson).								
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	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.	3	Describe, illustrate and explain Basic knowledge of Statistical methods.					1,2	
II	Presentation: tabular and graphical, including histogram and gives. Measures of Central Tendency: mathematical and positional. Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation, skewness and kurtosis	3	Describe, illustrate and explain gain the knowledge of organizing & Cleaning Of Data					1,2	
III	Bivariate data: Definition, scatter diagram, simple, partial and multiple correlation (3variables only), rank correlation. Simple linear regression, fitting of polynomials and exponential curves.	3	Describe, illustrate and explain gain the Analytical Skill concept					1,2	
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	3	Describe, illustrate and explain acquire the knowledge of basic Data Analysis Procedure for day-to-day use.					1,2	

	probability, total and compound probability rules, Normal probability, Distribution, Binomial probability Distribution, Poisson Probability Distribution, Bayes' theorem and its applications			
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 walis test	2	Describe, illustrate and explain acquire the Testing of hypothesis, parametric test: t-test, z-test, chi-square test. Non-	1,2
Practical	<p>Introduction to RA 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 set.</p> <ol style="list-style-type: none"> 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 at tributes. 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 -export. Graph function. Graphics 2. In R Visualizing the multivariate data: Scatter plot, Q-Q plot, P-P plot. 3. Performing dataanalysis tasks: Reading data with scan, Exploring data using graphical tools, computing descriptive statistics, one sample tests, two sample tests, Goodness of fit tests. Parametric test and Non-Parametric test 	30	Describe, illustrate and explain acquire the data objective, programming	1,2,3,4

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	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 – II										
Course Title	BIOMEDICAL TECHNIQUES AND LABORATORY MANAGEMENT									
Course Code	24MMLT1201R	Total Credits: 3		L	T	P	S	R	O/F	C
		Total Hours: 15T+60P		1	0	4	0	0	0	3
Pre-requisite	Nil	Co-requisite		Nil						
Programme	Master of Medical Laboratory Technology									
Semester	Spring/ II Semester of First Year of the Programme									
Course Objectives	1. The students will understand and create methods of qualitative analysis of biomolecules and detection. 2. The students will have an understanding on the measurement of radioactive isotopes, and application of isotopes in research and clinical biochemistry. 3. The student will have comprehensive knowledge on Lab automation.									
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.		3	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.		4	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. CELLFRACTIONATION: Biochemical activities of different fractions, marker enzymes.		3	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, radiation and infection control, hazardous waste and transport of hazardous materials. -Responsibilities of laboratory personnel -Documentation and Maintenance of records in lab -Laboratory information Systems (LIS), Hospital information systems (HIS).	3	Illustrate on laboratory management, safety protocols, personnel responsibilities, documentation, and information systems for efficient lab operation and regulatory compliance.	1,2,3
V	Automation in Biochemistry Laboratory- History, processes, types, steps of analysis. Point-of-care testing (POCT)- Requirements, Classification, Applications	2	Illustrate and explain on biochemistry lab automation and point-of-care testing, ensuring efficient diagnostic procedures.	2,3,4
Practical	Chromatography: Paper, Thin layer chromatography, Principle and Instrumentation of gel, ion-exchange chromatography, HPLC. Electrophoresis: Agarose gel electrophoresis, Principle and Instrumentation of slide gel, PAGE, SDS-PAGE. Photometry, Spectrophotometry - Principle, Instrumentation and analysis of blood samples Atomic absorption Spectrophotometry (Principle and Instrumentation). Cell fractionation–methods	60	Apply principles and instrumentation techniques of chromatography, electrophoresis, photometry, spectrophotometry, and atomic absorption spectrophotometry in biochemical analysis, as well as cell fractionation methods.	1,2,3,4,5

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 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-.

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:

R1 Godkar PB, Godkar DP. Textbook of medical laboratory technology. Bhalani publishing house; 2006.

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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate an in-depth understanding of the principles and practical applications of qualitative analysis techniques.	1,3
2	Demonstrate extensive proficiency in a range of photometric techniques, covering both theoretical foundations and practical execution.	1,2
3	Apply isotope applications with a practical understanding of their versatile uses and implications.	1,2,3
4	Illustrate advanced proficiency in essential laboratory management skills, displaying expertise in organizational and supervisory roles.	5,6,7
5	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.	1,2,3

SEMESTER – II									
Course Title	HEMATOLOGY								
Course Code	24MMLT1202R	Total Credits: 3 Total Hours: 15T+60P	L	T	P	S	R	O/F	C
			1	0	4	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Spring/ II Semester of First Year of the Programme								
Course Objectives	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.								
CO1	Understand the origins, development, and disorders of red and white blood cells								
CO2	Analyze the various investigations and clinical features of anemia.								
CO3	Evaluate the origin, development, and disorders of white blood cells.								
CO4	Examine laboratory investigations pertaining to plasma cell disorders.								
CO5	Classify the types and laboratory investigations of platelet disorders.								
Unit- No.	Content		Contact Hour	Learning Outcome				KL	
I	Hematopoiesis- Origin, development, function and fate of blood cells. Erythropoiesis Origin, development of RBCs.		3	Describe, illustrate and explain the formation of blood cells.				1,2	
II	Anaemia: Morphologic and Etiologic classification Investigations of anaemia.		3	Describe, illustrate and explain red cells disorders, anaemia.				1,2	
III	Leucocyte– Origin types And functions. Disorders of White blood cells: Leukaemia, Definition, Etiology, Classification and Clinical features.		3	Describe, illustrate and explain the WBC disorders its classification and the clinical significance.				1,2	
IV	Plasma cell disorders –classification Plasma cell myeloma -definition, clinical features and investigations. Bone marrow Examination		4	Describe, illustrate and explain the morphology and functions of plasma cells and classify its types and understand bone marrow examination for diagnosis.				1,2	
V	Thrombolytic –Formation And function. Normal haemostasis. Classification and Investigation of haemorrhagic disorders		2	Describe, illustrate and explain about thrombocytes. Its function related to hemostasis and various disorders related to hemostasis disorders.				1,2	

Practical	<ol style="list-style-type: none"> 1. Anticoagulants used in Hematology. 2. Blood collection. Preparation of thick and thin blood film and staining 3. Blood smear staining and Interpretation. 4. Leishman's staining, Field stain, Albert staining, Giemsa Staining and MGG staining. 4. Estimation of E.S.R 5. Estimation of Differential 6. leucocyte count. 7. Platelet count. 8. Total RBC count. 9. Total leucocyte count. 10. Absolute Eosinophil count Reticulocyte count 11. Estimation of PCV. 12. Red cell indices. 13. Blood grouping. Coomb's test 14. Determination of BT, CT, PT and APTT 	60	Describe, illustrate and explain various haematological techniques and carry out microscopic examination.	1,2,3,4
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TEXT BOOKS:

T1: Text book of Pathology (Sixth Edition) – By Harsh Mohan

REFERENCE BOOKS:

R1: Clinical Haematology Principles, procedure, correlations by E. Anne Stiene Martin, Cheryl A. Lotspiech – steininger, John A. Koepke.

R2: Clinical Haematology in Medical Practice – de Gruchy

R3: Medical Laboratory Technology Methods & interpretation – Ramnik Sood

OTHER LEARNING RESOURCES:

https://www.researchgate.net/publication/260266684_CLINICAL_HEMATOLOGY

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understand the origins, development, and disorders of red and white blood cells	1,2
2	Analyze the various investigations and clinical features of anemia.	1,3
3	Evaluate the origin, development, and disorders of white blood cells.	1,3
4	Examine laboratory investigations pertaining to plasma cell disorders.	2,3
5	Classify the types and laboratory investigations of platelet disorders.	1,3

SEMESTER – II									
Course Title	INTRODUCTION TO BLOOD BANKING								
Course Code	24MMLT1203R	Total Credits: 3	L	T	P	S	R	O/F	C
		Total Hours: 15T+60P	1	0	4	0	0	0	3
Pre-requisite	Nil	Co-requisite	Nil						
Program	Master of Medical Laboratory Technology								
Semester	Spring/ II Semester of First Year of the Programme								
Course Objectives	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	3	Understand the different Blood group systems, Elaborate on the ABO and Rh blood group system					1, 2,	
II	Blood components Types, Indications Preparation of blood	2	Describe the different Blood components, Discuss on Indications and Preparation of blood components					1,2,	
III	Blood donation Donor registration, Donor Selection and Phlebotomy. Adverse donor reaction Transfusion-Transmitted Infectious Diseases and Disease Agents	3	Understand and explain the blood donation procedures, evaluate the Transfusion-Transmitted Infectious Diseases and Disease Agents					1, 2,4	
IV	Blood storage Anticoagulants used to store blood Changes occurring in the stored blood	3	Understand the basic knowledge about Anticoagulants used to store blood					1,2, 3	
V	Basic immune hematology Antigen–antibody reactions ABO system- Forward grouping, reverse group Coomb’s test – Application – DCT, ICT Compatibility testing – Major, Minor	4	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					1, 2, 3,4,5	

Practical	<ol style="list-style-type: none"> 1. Blood grouping – ABO grouping, Forward grouping (slide & tube method) 2. Reverse grouping – preparation of pooled A, B & O cells 3. Grading of Reaction. Other methods of grouping. 4. Rh grouping & Rh typing (slide & tube method) 5. Du Testing 6. Direct and Indirect , Preparation of Coomb's Control Cells 7. Compatibility Testing 8. Selection of blood 9. Crossmatching Technique – Major, Minor, Saline, Albumin, Coomb's 10. Emergency –Cross matches 11. Blood Collection 12. Donor selection 13. Blood collection [Phlebotomy] 14. Post-donation Care 15. Cross-matching in Special Situations 16. Investigation of Blood Transfusion reaction 	60		
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TEXT BOOKS:

- T1:** Mollison's blood transfusion in clinical medicine, Harvey G. Klein MD Chief, Department of Transfusion Medicine 12th edition
T2: Modern blood banking & Transfusion Practices Sixth edition
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:

- 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understand the basics of Immuno- Hematology, Blood groups, and genetics	1,2,3,4,5
2	Explain the types of blood components and their indications for transfusion	1,2,3,4,5,6,7
3	Understand, evaluate, demonstrate, and classify the different types of Antigen-antibody reactions in Immuno- hematological testing	2,3,4,8
4	Understand the basic knowledge about Anticoagulants used to store blood	2,3,4
5	Elaborate on Blood group systems -ABO system, Rh, MNS, Bombay blood group	1,2,3

SEMESTER – II										
Course Title	MICROBIOLOGY AND IMMUNOLOGY									
Course Code	24MMLT1205R	Total Credits: 3		L	T	P	S	R	O/F	C
		Total Hours: 15T+60P		1	0	4	0	0	0	3
Pre-requisite	Nil	Co-requisite		Nil						
Programme	Master of Medical Laboratory Technology									
Semester	Spring/ II Semester of First Year of the Programme									
Course Objectives	<ol style="list-style-type: none"> To teach the students to Understand the Compliment system Student will be made to understand about the Antimicrobial resistance and the control measures. And about Antigen-antibody reactions. 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	Medically important bacteria associated with: -Communicable diseases -Non-Communicable diseases		3	To find out Medically important bacteria and Understanding Compliment system			1,2			
II	Compliment system: Function, compliment receptors, activation pathways, control mechanisms, role in inflammation, Hypersensitivity, Autoimmunity Immunodeficiency diseases.		4	Understanding the Compliment System.			1,2			
III	Antimicrobial Resistance -MDR, XDR, PDR -Risk factor for Antimicrobial resistance -Control measures.		3	Students will be made to understand about the Antimicrobial Resistance and the control measures			1,2			
IV	Antigen-antibody reactions: -Agglutination -Precipitation -Complement fixation -Immuno fluorescence		3	Students will Be made to understand Antigen antibody reactions			1,2			
V	Introduction to Mycology: -Classification of fungus. -Medically important Fungi		2	Basic knowledge about Mycology			1,2			

Practical	<ul style="list-style-type: none"> - Germ tube technique - KOH mount - Calcofluor staining - Antimicrobial sensitivity testing (AST): - Diffusion methods - Dilution methods - Serological tests: <ul style="list-style-type: none"> - Widal test, Weiffelix test, HBsAg Detection - Biomedical waste Management - Handling Laboratory Accidents 	60	Student will be made to understand Germ tube, AST, Serological tests, etc.	1,2,3,4
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TEXT BOOKS:

1. T1: Textbook of Microbiology by CP Baveja, 7th 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Students will learn about Communicable diseases and non-Communicable diseases.	1,2
2	Understanding the Compliment system	1,2
3	Students will be made to understand about the Antimicrobial resistance and the control measures.	1,2,3,4
4	Students will be made to understand Antigen-antibody reactions.	1,2
5	Basic knowledge about Mycology.	1,2

SEMESTER – II									
Course Title	MOLECULAR BIOLOGY								
Course Code	24MMLT1205R	Total Credits: 2	L	T	P	S	R	O/F	C
		Total Hours: 15T+30P	1	0	2	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Spring/ II Semester of First Year of the Programme								
Course Objectives	1. To teach the students about basic concept about the Structure, types,coiling and super coiling, topoisomerases, replication, satellite DNA. 2. To teach the students about Transcription and translation. 3. To teach the students hemoglobinopathies, phenyl ketonuria, alkaptonuria, homocystinuria.								
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	4	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.	2	Describe, illustrate and explain on Transcription and translation and Mutation spontaneous, induced, point mutation and silent mutation, frame shift mutation, physical and chemical mutagen and Recombinant DNA technology				1,2		
III	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.	2	Describe, illustrate and explain to understand Structural organization of proteins				3,4		

IV	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.	2	Describe, illustrate and explain about Recombinant DNA Technology: necessary elements –enzymes and vectors–plasmids	3,4
V	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.	5	Describe, illustrate and explain the Knowledge about Genetics in medicine.	2,3,4
Practical	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	30	Describe, illustrate and explain the Knowledge about Molecular techniques.	1,2,3,4

TEXT BOOKS:

T1: Molecular biology of the cell by Bruce Albert.

REFERENCE BOOKS:

R1: Pathfinder Life science fundamentals and practice Part I and Part II by Pranav Kumar (Fifth revised edition).

R2: Wilson and Walkers Principles and Techniques of Biochemistry and Molecular biology.

R3: Molecular biology of gene by Watson.

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understand DNA structure, types, coiling, and topoisomerases.	1,3,4
2	Explain transcription, translation, genetic codes, operons, and regulatory mechanisms.	1,3,4
3	Analyze mutations, comprehend mutagenesis, and understand DNA repair mechanisms.	1,3,4
4	Acquire proficiency in recombinant DNA technology principles, construct recombinant DNA, and apply cloning strategies.	1,3,4
5	Apply genetic knowledge in medicine, including medical conditions, prenatal diagnosis, and applications in healthcare.	1,3,4

SEMESTER – II										
Course Title	UNIVERSAL HUMAN VALUES (UHV) + PROFESSIONAL ETHICS									
Course code	23UUHV101R	Total credits: 2	L	T	P	S	R	O/F	C	
		Total hours: 15T	1	0	2	0	0	0	2	
Prerequisite	Nil	Co-requisite	NIL							
Programme	All UG and PG Programmes									
Semester	Spring/ II Semester of First Year of the Programme									
Course Objectives	1. 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.									
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 behaviour 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	Introduction- 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 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.	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,						

<p>II</p>	<p>Understanding Harmony in the Human Being- 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>	<p>3</p>	<p>Students will learn to achieve personal harmony by balancing the needs of the self and body through self-control and health practices.</p>	<p>1,2,,4,</p>
<p>III</p>	<p>Understanding Harmony in the Family and Society-Harmony in Human Relationship: Understanding Harmony in the family–the basic unit of human interaction Understanding values in 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. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of <i>Samman</i> 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 (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!-Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>		<p>Students will learn to apply principles of trust, respect, and universal goals to achieve harmony in family and society.</p>	
<p>IV</p>	<p>Understanding Harmony in the Nature and Existence- Whole existence as Coexistence Understanding the harmony in the Nature Interconnectedness and mutual fulfilment</p>		<p>Students will grasp the harmony and interconnectedness in nature and existence through practical exercises and case studies.</p>	

	among the four order so 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-Practice Exercises and Case Studies will be taken up in Practice Sessions.		
V	<p>Understanding of Harmony on Professional Ethics</p> <p>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 managers 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.

TEXT BOOKS:

1. The text book R.R.Gaur,R.Sangal, GPBagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN978-8-174-46781-2
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
3. 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. BL Bajpai, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow.
2. PLDhar, RR Gaur, *Science and Humanism*, Common wealth Publishers.
3. Sussan George, *How the Other Half Dies*, Penguin Press.
4. IvanIllich, *Energy & Equity*, The Trinity Press, Worcester, and Harper Collins, USA
5. Donella H .Meadows, Dennis L. Meadows, Jorgen Randers, William W.Behrens III, limits to

Growth, Club of Rome's Report, Universe Books.

6. Subhas Palekar, *How to practice Natural Farming*, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
7. A Nagraj, *Jeevan Vidyaek Parichay*, Divya Path Sans than, Amarkantak.
8. E.F.Schumacher, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
9. A.N. Tripathy, *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*

SEMESTER – II									
Course Title	APPLIED LABORATORY TECHNIQUE (Techno Professional Skills)								
Course Code	24MMLT1206R	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	Master of Medical Laboratory Technology								
Semester	Spring/ II Semester of First Year of the Programme								
Course Objectives	1. Adhere to safety protocols, Good Laboratory Practices (GLP), and quality control measures for accurate and reliable laboratory results. 2. Operate microscopes, prepare culture media, and perform staining techniques for microbial and hematological analysis. 3. Execute proper blood sample collection, pipetting methods, and hematological assessments with accuracy and error prevention.								
CO1	Implement safety protocols, Good Laboratory Practices (GLP), and quality control measures to ensure accurate and ethical laboratory operations.								
CO2	Understand the principles, types, applications, maintenance, and troubleshooting of microscopes for effective laboratory analysis.								
CO3	Prepare different culture media, conduct Gram staining and other staining techniques for microbial identification.								
CO4	Collect blood samples using appropriate anticoagulants, prepare and stain blood smears, and estimate hemoglobin levels accurately.								
CO5	Use different types of pipettes, apply proper pipetting methods, and prevent errors to maintain precision in laboratory procedures.								
Unit No.	Content	Contact Hour	Learning Outcome						KL
I	Overview of Medical Laboratory Science Importance of Laboratory Safety Good Laboratory Practices (GLP) Quality Control & Assurance in the Laboratory.	12	Students will understand the role of medical laboratory science, apply laboratory safety measures, implement Good Laboratory Practices (GLP), and ensure quality control and assurance in laboratory procedures.						1,2
II	Microscope, Principles of Microscopy, Types of Microscopes, Applications, maintenance and troubleshooting	10	Students will understand the principles of microscopy, identify different types of microscopes, their applications in medical laboratory science, and demonstrate proper maintenance and troubleshooting techniques.						3,4
III	Culture Media Preparation & Types Gram Staining & Other Staining Techniques	12	Students will be able to prepare and classify culture media, perform Gram staining and other staining techniques for microbial identification in laboratory diagnostics.						3,4
IV	Blood Sample Collection & Anticoagulants Preparation of Blood Smears & Staining Hemoglobin Estimation	10	Students will be able to collect blood samples using appropriate anticoagulants, prepare and stain blood smears, and perform hemoglobin estimation for hematological analysis.						3,4,5

V	Types of pipettes, Proper pipetting techniques and error prevention	16	Students will understand the types of pipettes, demonstrate proper pipetting techniques, and apply error prevention methods to ensure accuracy in laboratory procedures.	3,4,5
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TEXT BOOKS:

T1: A textbook of Medical laboratory technology by Praful B. Godkar and Darshan P. Godkar

REFERENCE BOOKS:

R1: Laboratory management (Quality in Laboratory Diagnosis) by Candis A. Kinkus

R2: A text book of quality control and Quality assurance by Deepanti Gajjar, Ashish Budhrani, Dr.Md.Rageeb Md.Usman, Dr.Dilpreet Singh.

R3: A text book of Medical laboratory technology by PrafulB.GodkarandDarshanP.Godkar.Vol.1

R4: 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Implement safety protocols, Good Laboratory Practices (GLP), and quality control measures to ensure accurate and ethical laboratory operations.	1,2,3,6
2	Understand the principles, types, applications, maintenance, and troubleshooting of microscopes for effective laboratory analysis.	2,3
3	Prepare different culture media, conduct Gram staining and other staining techniques for microbial identification.	3,6,7
4	Collect blood samples using appropriate anticoagulants, prepare and stain blood smears, and estimate hemoglobin levels accurately.	2,3,4,5,6,7
5	Use different types of pipettes, apply proper pipetting methods, and prevent errors to maintain precision in laboratory procedures.	1,2,3,4

SEMESTER – II										
Course Title	ADVANCED COMMUNICATION									
Course code	24UMPD1201R	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 Medical Laboratory Technology									
Semester	Spring/ 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 in different areas including CV and cover letter writing. 3. To convey meaning by reinforcing, substituting for, or contradicting verbal communication.									
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	Module1-Grammar 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	Module2-Grammar 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	Module3-WritingSkills i. The Basics of Writing; avoid ambiguity and vagueness ii. Paragraph Writing iii. Précis Writing iv. Letter Writing v. Resume, CV and Cover Letter			3	Students will be proficient in writing clear and concise content, including paragraphs, precis, letters,				1,2	
IV	Module4-Self-ManagementSkills i. SWOT Analysis ii. Self-Regulation-Goal Setting iii. Personal Hygiene			4	Able to conduct SWOT analysis, set and regulate goals effectively, and maintain personal hygiene for enhanced self-management skills.				1,2	

V	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.	3	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
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TEXT BOOKS:

T1: Barrett, Grant. 2016. Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.

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

REFERENCE BOOKS:

R1: Communication Skills Training: A Practical Guide to Improving Your Social Intelligence, Presentation and Social Speaking, I an Tuhovsky.

R2: A Text book for AECC English Communication: Interface, Dr. Kironmoy Chetia and Pranami Bania Breez Mohan Hazarika.

OTHER LEARNING RESOURCES:

- <https://youtu.be/x60GHpQ8gJk>
- https://youtu.be/Ke_oSN-BCaY
- <https://youtu.be/TDPDtrLxT-c>

SEMESTER – III									
Course Title	RESEARCH/ CLINICAL POSTING								
Course Code	24MMLT2103R	Total Credits: 8	L	T	P	S	R	O/F	C
		Total Hours: 120P	0	0	14	0	8	0	8
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Fall/ Third Semester of Second Year of the programme								
Course Objectives	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.								
CO1	Applied Theoretical Knowledge								
CO2	Practical Laboratory Skills								
CO3	Understanding Laboratory Workflow								
CO4	Ensured Quality Control Practices								
CO5	Collaboration in a Team Environment								
Unit- No.	Content				Contact Hour	Learning Outcome			KL
I	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				120	Describe, illustrate and explain theoretical knowledge to interpret laboratory results accurately.			1,2
II	Practical Laboratory Skills: 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
III	Laboratory Workflow: Laboratory Workflow Management Specimen Processing and Management Data Entry and Record-Keeping Practices Turnaround Time Optimization Communication within the Laboratory Team					Describe, illustrate and explain Process specimens efficiently from collection to result reporting.			2,3

IV	Ensured Quality Control Practices: 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
V	Collaboration in a Team Environment: 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Applied Theoretical Knowledge	1,2
2	Practical Laboratory Skills	2,3
3	Understanding Laboratory Workflow	5,6,7
4	Ensured Quality Control Practices	1,2
5	Collaboration in a Team Environment	5,6,7,8

SEMESTER – III									
Course Title	CORPORATE PROFICIENCY								
Course Code	24UMPD2101R	Total Credits: 2	L	T	P	S	R	O/F	C
		Total Hours: 30P	0	0	4	0	0	0	2
Pre-requisite	Nil	Co-requisite	Nil						
Programme	All PG Programme								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	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	Module1-Presentation Skills i. Introduction ii. Essential characteristics of a good presentation iii. Preparation of a good presentation	5	Describe and explain about the Presentation Skills, Preparation of a good presentation.					1,2	
II	Module2-Public Skills i. Fear of Public Speaking, ii. Understanding and Overcoming Fear of Public Speaking, iii. Confidence and Control, iv. Physiology and Stress-Control/Process, v. Tips for Presentations and Public Speaking, vi. 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	6	Describe and explain about the Fear of Public Speaking					1,2	
III	Module3-Practical session on Resume, Curriculum Vitae, Writing cover letter& Linked In Profile i. Preparation, submission & screening of	6	Describe and explain about the Practical session on Resume, Curriculum Vitae, Writing cover letter &					1,2	

	<p>Resume.</p> <p>ii. Practical session on cover letter screening session</p> <p>iii. Creating a profile on LinkedIn How to utilize it</p>		<p>LinkedIn Profile.</p>	
IV	<p>Module 4-Leadership & Management Skills and Module 5- Research Paper–Writing Skills</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>Module 5-Research Paper–Writing Skills</p> <p>i. How to write a research paper</p> <p>ii. Key point in Research Work</p>	5	<p>Describe and explain of Leadership & Management Skills and Research Paper–Writing Skills</p>	1,2
V	<p>Module6- Interview Skills & Dress code Ethics and Module7-Mock Interview</p> <p>i. Types of the interview-telephonic, virtual & 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 os and don'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 & Female</p> <p>Module7-Mock Interview</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>	8	<p>Describe and explain of-Interview Skills & Dress code Ethics and Mock Interview</p>	1,2

TEXT BOOKS:

1. Barrett, Grant.2016.Perfect English Grammar: The Indispensable Guide to Excellent Writing and Speaking, Zephyros Press.
2. Mc Dowell, Gayle Laakmann.2008.Cracking the Coding Interview (Indian Edition).

REFERENCE BOOKS:

1. Garg. Manoj Kr. (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>

Group-A (Haematology and Blood Banking)

SEMESTER – III									
Course Title	ADVANCED HEMATOLOGY								
Course Code	24MMLT2104R	Total Credits: 7	L	T	P	S	R	O/F	C
		Total Hours: 60(T)+90P)	4	0	6	0	0	0	7
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Fall/ Third Semester of Second Year of the programme								
Course Objectives	<ol style="list-style-type: none"> 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. 2. The students will have knowledge on Plasma cell myeloma and laboratory investigations. 3. The students will understand to Elaborate on the Pathogenesis, Clinical feature on Vascular disorders, Platelet disorders, coagulation 								
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. Basic aspects of anaemia Classification, pathophysiology and clinical features of anemia Investigation of Anemia in general. Microcytic anaemias: Sidero blastic anemia, Anaemia of chronic infection. Haemoglobinopathies Thalassaemia, Iron deficiency anaemia.	10	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	Macrocytic Anaemias Megaloblastic anaemia Pernicious anaemia Non Megaloblastic Anemia. Normocytic normo chronic anaemia. Anaemia in systemic disorders Acute blood loss, Renal failure Liver disorders etc. Haemolytic anaemia Polycythaemia Haemorrhagic disorders: Definition Pathogenesis and clinical features. Classification of Vascular disorders, platelet disorders, Coagulation disorders.	12	Describe, illustrate and explain about macrocytic, anemias, Normocytic normal chromic anemia and various hemorrhagic disorders and its laboratory diagnosis.				1,2		

III	<p>Leucocyte disorders: Leukemia, types and Cytochemical investigations for Leukemias. Leukopenia Leucocytosis. Leukemoid reaction, Myelodysplastic syndrome (MDS). Philadelphia chromosome. Leukocyte Alkaline Phosphatase [LAPscore.]</p>	12	Describe, illustrate and explain the Various white blood cell disorders and various cyto-chemical stains for diagnosis of leukemia.	1,2
IV	<p>Plasma cell disorders-</p> <p>Quantitative platelet disorders: Thrombocytopenia: Definition, Etiology, Lab Investigations, ITP Classification, Clinical, features, Diagnosis and B.M findings in ITP.</p> <p>Qualitative platelet disorders. Thrombocytosis- Definition, Etiology, Lab Investigations.</p> <p>Coagulation disorders Inherited-Haemophilia A and B Von Willebrand's disease Acquired; Vit.K deficiency, Liver disease, DIC</p> <p>Tests of vascular and platelet function. Bone Marrow examination Tests for coagulation disorders: Screening tests-First line tests. Second line tests – Mixing experiments.</p> <p>Coagulation factory assay. Urea solubility tests for Factor XIII</p> <p>Factor VIII inhibitor study.</p> <p>Fibrinogen assay Disseminated intra vascular coagulation-Definition, Pathogenesis, laboratory investigations</p>	12	Describe , illustrate and explain the quantitative and qualitative platelet disorders its clinical features and laboratory diagnosis of platelets disorders.	1,2
V	<p>Thrombotic disorders: Classification-Inherited and Acquired.</p> <p>Clinical features, Investigation of thrombotic disorders:</p> <p>Tests</p> <ol style="list-style-type: none"> i. Protein C ii. Protein S iii. AT-III iv. Factor V leiden v. Anti phosphorlipid antibody syndrome vi. Definition clinical feature laboratory investigation. 	14	Describe, illustrate and explain about thrombotic disorders its investigations and special test for diagnosis of thrombosis.	1,2

Practical	<ol style="list-style-type: none"> 1. Staining and Interpretation of Peripheral smears. 2. Microcytic hypo chromic anaemia- 3. Peripheral smear, bone marrow Examination iron. 4. Serum Total iron binding capacity [TIBC] bone marrow .Iron stain. 5. Macrocytic Anaemia-Peripheral smear, bone marrow. Examination, 6. VitB12 assay, Folate assay, Schilling Test. 7. Plasma Hb Estimation Haemolytic Workup Peripheral smear – specific morphologic abnormalities Special tests <ol style="list-style-type: none"> a) Osmotic fragility test b) Sickling test c) Kleihauer acid elution test d) Alkaline denaturation Test e) Ham’s test, Sucrolysis test f) Coomb’s test g) Electrophoresis– HbF, HbA₂ estimation h) Tests for G-6PD deficiency Leukaemias: <ol style="list-style-type: none"> i. Myeloperoxidase ii. Periodic Acid Phosphatase[PAS] iii. Sudan Black iv. Esterase, Non-specific esterase v. Leucocyte alkaline Phosphatase <p>Tests for coagulation disorders: Screening tests – First line tests- Prothrombin time (PT), Activated partial thrombtime (APTT), Thrombin time (TT), INR.</p>	90	Describe, illustrate and explain various haematological techniques and carry out microscopic examination.	1,2,3,4
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TEXT BOOKS:

T1: Text book of Pathology (Sixth Edition) –By Harsh Mohan

T2: Essential of clinical pathology -Shirish M Kawthalkar

REFERENCE BOOKS:

R1: Clinical Haematology Principles, procedure, correlations by E. Anne Stiene Martin, Cheryl A. Lotspiech –Steininger, John A. Koepke.

R2: Clinical Haematology in Medical Practice – de Gruchy

R3: Medical Laboratory Technology Methods & interpretation – Ramnik Sood

OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK593683/>

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Demonstrate knowledge acquisition regarding hematopoietic stem cells and the synthesis of cell formations.	1,2,3
2	Evaluate and diagnose different types of anemia in the laboratory.	3,8
3	Analyze the types and diagnose Leukemias.	5,3,2
4	Understand various types of platelet disorders and conduct laboratory investigations for diagnosis.	1,3
5	Examine thrombotic disorders and plasma cell disorders along with their laboratory investigations.	2,3,8

SEMESTER – III									
Course Title	ADVANCED BLOOD BANKING								
Course code	24MMLT2105R	Total credits: 7 Total hours: 60T+90P	L	T	P	S	R	O/F	C
			4	0	6	0	0	0	7
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical laboratory Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	1. Recall the different blood group systems and genetics and indicate the different types of blood product and their uses, Identify and categorize different types of anticoagulants used to store blood, 2. Build a strong knowledge on the medico legal aspects of blood transfusion centers., 3. Understand the importance of apheresis and explore the future trends in blood transfusion practices.								
CO1	Understand the basics of Immuno- Hematology, Blood groups, and genetics								
CO2	Explain the types of blood components and their indications for transfusion, evaluate hemapheresis.								
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, quality assurance in blood centers.								
CO5	Elaborate on Blood group systems -ABO system, Rh, MNS, Bombay blood group, understand and apply the laws and orders concerning blood transfusion.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	Immuno Haematology: 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.	10	Understand and Explain the basic introduction to Immuno-Hematology, Systems and genetics, Rh system, Bombay group, classify and compare secretors, non- secretors				1,2		
II	Blood transfusion 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	10	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.				1,2,3,4		

III	Blood donation Donor Registration, Donor selection, Blood collection, Adverse donor reaction Anticoagulants used to store blood Changes occurring in the stored blood Blood components – Indications, Preparation of blood components	10	Understand the basic knowledge about Anticoagulants used to store blood	1,2,3,4
IV	Immuno modulation and graft versus host reaction Haema pheresis Definition, Types of Apheresis, Machines and Techniques. Tissue banking, Cord blood banking Stem cell processing, storage, and transplantation. 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	15	Elaborate on the practices of hemapheresis, understand techniques, types and machines and Medico legal aspects of blood transfusion.	1,2,3,4
V	Quality Assurance -General condition, Equipment Reagents, Donor processing, Drugs control regulation and Blood Bank	15	Comprehend on the quality assurance, apply the quality control procedures, analyse the quality control protocol	1,2,3,4, 5
Practical	Blood grouping – ABO grouping, Forward grouping (slide & tube method) Reverse grouping – preparation of pooled A, B & O cells Grading of Reaction. Other methods of grouping. ABO antibody titration, Cold antibody titration. Rh grouping & Rh typing (slide & tube method) Du Testing Rh antibody titration Antiglobulin Testing Direct and Indirect Preparation of Coomb’s Control Cells. Compatibility Testing Selection of blood Cross matching Technique – Major, Minor, Saline, Albumin, Emergency –Cross matches Blood Collection Donor selection Blood collection [Phlebotomy] Post-donation Care Preservation and Storage of blood Preparation and Storage of Blood	120		

<p>Components Packed Cells, Fresh Frozen plasma [FFP], Platelet Concentrate, Cryoprecipitate Component transfusion – selection of blood group Cross matching in Special Situations Exchange transfusion – selection of blood group Autoimmune haemolytic anaemia Investigation of Blood Transfusion reaction Testing for transfusion Transmitted Diseases Elisa-HIV, HBsAg, HCV, VDRL Test, Malaria Quality control – Methods Reagents Test methods Products Documents Equipment Apheresis procedures - Types of pheresis, Machines, and Techniques. Biomedical Waste Management – Demonstration Record keeping – To be observe Documentation</p>			
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TEXT BOOKS:

- T1:** Mollison’s blood transfusion in clinical medicine, Harvey G. Klein MD Chief, Department of Transfusion Medicine 12th edition
T2: Modern blood banking &Transfusion Practices Sixth edition
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:

- 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Understand the basics of Immuno- Hematology, Blood groups, and genetics	1,2,3,4,
2	Explain the types of blood components and their indications for transfusion, evaluate hemapheresis.	1,2,3,4,7,8
3	Understand, evaluate, demonstrate, and classify the different types of Antigen-antibody reactions in Immuno-hematological testing	2,3,4,5,6,8
4	Understand the basic knowledge about Anticoagulants used to store blood, quality assurance in blood centers.	2,3,4,8
5	Elaborate on Blood group systems -ABO system, Rh, MNS, Bombay blood group, understand and apply the laws and orders concerning blood transfusion.	1,2,7,8

Group B: Microbiology and Immunology

SEMESTER – III									
Course Title	MEDICAL MICROBIOLOGY								
Course code	24MMLT2106R	Total Credits: 8	L	T	P	S	R	O/F	C
		Total Hours: 60T+90P	4	0	6	0	0	0	7
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical laboratory Technology								
Semester	Fall/ III Semester of Second Year of the Programme								
Course Objectives	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								
CO1	Analyze the epidemiology, pathogenesis, antigenic characteristics, and laboratory diagnosis of diseases caused by bacteria.								
CO2	Classify and understand different types of viruses.								
CO3	Evaluate the characteristics and laboratory diagnosis of diseases caused by parasites								
CO4	Demonstrate comprehensive knowledge about mycology.								
CO5	Apply in-depth knowledge to assess and implement quality control in microbiology.								
Unit -No.	Content	Contact Hour	Learning Outcome				KL		
I	BACTERIOLOGY: The epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused by: -Vibrios, Aeromonas, Plesiomonas -Campylobacter, H.pylori and Spirillum. Pseudomonas, Stenotrophomonas, Burkholderia. -Haemophilus and Bordetella. -Brucella. -Mycobacteria. -Spirochaetes,- Actinomycetes, Nocardia- Mycoplasma.- Rickettsiae.- Chlamydia	16	Describe, illustrate and explain epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused by bacteria.				1,2		
II	VIROLOGY -Poxviruses, -Herpes viruses, -Influenza virus -Adenoviruses	10	Describe, illustrate and explain different types of viruses.				1,2		
III	PARASITOLOGY Protozoan parasites of medical importance: Entamoeba, Giardia, Trichomonas, Leishmania, Trypanosome, Plasmodium, Cryptosporidium, Balantidium, Isospora.	15	Describe, illustrate and explain laboratory diagnosis of disease caused by parasites				1,2		
IV	MYCOLOGY -The morphology and reproduction of fungi and anti mycotic agents -Contaminant and opportunistic fungi -Fungi causing superficial mycoses and subcutaneous mycoses	15	Describe, illustrate and explain comprehensive knowledge about mycology				1,2		

	-Fungi causing systemic infections			
V	QUALITY CONTROL IN MICROBIOLOGY	4	Describe, illustrate and explain on Quality control in microbiology	1,2
Practical	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.	90	Student will be made to learn and understand slide culture, LPCB,MRSA, Biofilm detection etc.	1,2,3,4

TEXT BOOKS:

T1: Textbook of Microbiology by CP Baveja, 7th edition.

REFERENCE BOOKS:

R1: Reference: Textbook of microbiology and immunology by S.C. Parija

R2: Microbiology by Prescott, Harley, Kleis

R3: Textbook of Microbiology by Ananthanarayan and Paniker.

OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	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	24MMLT2107R	Total Credits: 7		L	T	P	S	R	O/F	C
		Total Hours: 60T+90P		4	0	6	0	0	0	7
Pre-requisite	Nil	Co-requisite		Nil						
Programme	Master of Medical laboratory Technology									
Semester	Fall/ III Semester of Second Year of the Programme									
Course Objectives	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	Structure and function of the immune system:- 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 Host defense mechanisms and Inflammation: -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.			16	Describe, illustrate and explain about the Structure and function of the immune system.			1,2		
II	Transplant Immunity &Tumor immunity. - Concepts and challenges in transplantation -The HLA. Major histocompatibility complex -HLA classes, MHC, HLA typing, MHC restriction.			15	Describe, illustrate and explain about the Transplant Immunity & Tumor immunity			1,2		

III	VIROLOGY. - Paramyxoviridae - Enteroviruses: Polio, Echo, Coxsackie viruses - Oncogenic viruses - Viruses of gastroenteritis.	10	Describe, illustrate and explain Knowledge and Understanding about Viruses and their infections.	1,2
IV	PARASITOLOGY Helminthology: Cestodes: Diphyllbothrium, Taenia, Echinococcus, Hymenolepis. Trematoda: Schistosomes, Fasciola, Paragonimus, Clonorchis, Opisthorchis. Nematodes: Trichuris, Trichinella, Strongyloides, Enterobius, Filarial worms	15	Describe, illustrate and explain the comprehensive knowledge about Parasitology	1,2
V	ENTOMOLOGY: Ectoparasites: Common arthropods and other vectors viz., Mosquito, Sand fly Ticks, Mite, and Cyclops	4	Describe, illustrate and explain about Entomology	1,2
Practical	BACTERIOLOGY: 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 Evaluating immunological functions: 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.	90	Describe, illustrate and explain staining techniques and microscopic examination.	1,2,3,4

	<p>MYCOLOGY: Sample collection and processing in mycology: Identification and isolation of possible fungal pathogens from clinical samples:</p> <ol style="list-style-type: none"> a) CSF b) Urine c) Blood d) Hair, nail, skin scrapings e) Sputum. <p>Disposal of contaminated material like cultures. Maintenance of stock culture. Examination of feces for parasite -Microscopic examination -Concentration method</p>		
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TEXT BOOKS:

T1: Textbook of Microbiology by C.P Baveja 5th Edition

T2: Textbook of Microbiology Immunology by Subash Chandra Parija 2nd edition.

REFERENCE BOOKS:

R1: Textbook of Medical Lab Technology– Praful B.Godkar, Darshan P. Godkar 3rd edition

R2: Ananthanarayan and Paniker, “Textbook of Microbiology 8th edition.

R3: Textbook of Essentials Microbiology Apurba Sankar Sastry Sandhya Bhat 4th edition.

OTHER LEARNING RESOURCES:

<https://www.ncbi.nlm.nih.gov/books/NBK7627/>

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Explain the structure and function of the immune system.	1,2
2	Summarize the principles of Transplant Immunity and Tumor Immunity.	1,2, 4
3	Demonstrate knowledge and understanding of viruses and their infections.	1, 7
4	Discuss about various chronic illness and its management	1,6,7
5	Summarize the key concepts in Entomology.	4,6,7

SEMESTER – IV									
Course Title	QUALITY CONTROL IN DIAGNOSTIC LAB								
Course Code	24MMLT2201R	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	Master of Medical Laboratory Technology								
Semester	Spring/ IV Semester of Second Year of the Programme								
Course Objectives	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.								
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: • Internal quality control • External quality control		10	Describe, illustrate and explain to learn importance of quality control and Types.				1,2	
II	Sources of Laboratory errors: • Pre-analytical phase • Analytical phase • post analytical phase		10	Describe, illustrate and explain the different errors and sources.				3,4	
III	Control charts: • X-chart and R-chart • Control chart for attributes		9	Describe, illustrate and explain about control charts.				3,4	
IV	Quality Circles: • Benefits of Quality circle		9	Describe, illustrate and explain understand quality circles.				3,4	
V	Total Quality Management		7	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:

- R1.** Gras JM. Laboratory quality control and patient safety. Walter de Gruyter GmbH & Co KG; 2017.
- 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	To understand the needs of the quality control Programme.	1,2
2	To ascertain sources of various errors in laboratory.	2,3
3	Understanding control charts.	1,2
4	Outline the basic concepts of Quality circles.	5,6
5	Illustrating over all knowledge of Total Quality Management.	1,2,3,5,6

SEMESTER – IV									
Course Title	RESEARCH ETHICS								
Course Code	24MMLT2202R	Total Credits: 3 Total Hours: 45T	L	T	P	S	R	O/F	C
			3	0	0	0	0	0	3
Pre-requisite	Nil		Co-requisite		Nil				
Programme	Master of Medical Laboratory Technology								
Semester	Spring/ IV Semester of Second Year of the Programme								
Course Objectives	1. This course aims to lay a foundation for empirical research in medical laboratory technology. 2. It makes students aware of relevant guidelines, policies, and codes related to ethical research. 3. The course provides an understanding of ethical theories and concepts through comprehensive study.								
CO1	Able to describe and apply theories 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 endeavors.								
Unit- No.	Content	Contact Hour	Learning Outcome				KL		
I	ETHICS AND SCIENTIFIC CONDUCT: 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 - 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.	8	Describe, explain and classify the ethics and scientific conduct in research.				3,4		

II	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 and vice versa, types. Violation of publication ethics, authorship, and contributor ship. Identification of publication misconduct, Complaints and appeals. Predatory publishers and journals.	4	Describe and explain the importance of ethics for publication of a research paper	3,4
III	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 tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.	4	Describe and explain the Policies related to copyrights using various tools.	3,4
IV	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 Turnitin, Urkund and other open-source software tools.	4	Describe and explain the software tools for any misconduct during publication.	3,4
V	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.	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 academics Press.
- R2: George R., (2011). Sociological Theory, Rawat Publication, New Delhi, India. George R., (2019). Post Modern Social Theory, Rawat Publication, New Delhi, India.

RELATIONSHIP BETWEEN COURSE OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Able to describe and apply theories and methods in ethics and research ethics.	2,4,7
2	Acquire an overview of important tissues in research ethics, like responsibility for research, ethical vetting, and scientific misconduct.	2,4,7
3	Acquire skills of presenting arguments and results of ethical inquiries.	2,4,7
4	Able to Identify the concepts and procedures of sampling, data collection, analysis and reporting	2,4,7
5	Equip with the skills and knowledge necessary to navigate and utilize research databases and metrics effectively in their research endeavours.	2,4,7

SEMESTER – IV									
Course Title	RESEARCH								
Course Code	24MMLT2203R	Total Credits: 16 Total Hours: 96 P	L	T	P	S	R	O/F	C
			0	0	0	4	12	0	16
Pre-requisite	Nil	Co-requisite	Nil						
Programme	Master of Medical Laboratory Technology								
Semester	Spring/ IV Semester of Second Year of the Programme								
Course Objectives	1 To acquire statistical analysis skills, and enhance data interpretation capabilities for effective analysis. 2 To Conduct in-depth discussions and critical evaluations, and acquire techniques for clear articulation of feature scope. 3 To Use 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 OUTCOME (CO) AND PROGRAMME OUTCOME (PO)

CO PO Mapping		
S.N.	Course Outcome (CO)	Mapped Program Outcome
1	Discuss the process of understanding and acquiring statistical analysis skills.	1,2,3,4,5,6,7,8
2	Describe methods to enhance data interpretation capabilities for effective analysis.	1,2,3,4,5,6,7,8
3	Discuss strategies for conducting in-depth discussions and critical evaluations.	1,2,3,4,5,6,7,8
4	Acquire techniques for clear articulation of feature scope.	1,2,3,4,5,6,7,8
5	Describe approaches for professionally presenting the final thesis.	1,2,3,4,5,6,7,8