

## SEMESTER VI (Hospital)

### 0201245: HOSPITAL PLANNING AND DESIGNING

Full Marks: 100

#### **The Hospital in the Regional Health Service**

Marks: 12

Introduction; The Roles Regional Health Improvement Collaborative Play: Performance Measurement; Quality of Physician Services, Quality of Hospital Services, Quality of Health Plans, Patient Experience of Care, Cost of Healthcare Services, Disparities in Quality, Payment and Delivery System Reform; Training and Assistance in Performance Improvement; Patient Education on Engagement; Strategic Planning and Coordination; Sustainability of Regional Health Improvement Collaborative ; Ensuring; Successful Reform of Healthcare System

#### **Hospital Cost and Utilisation**

Marks: 14

Introduction: The General Hospital; Cost of Hospital Services: Hospital Utilisation and Statistics; Indices of Measurement of Hospital Utilisation: Hospital Beds, Admissions, Discharges and Deaths, Bed-Days or Patient-Days; Indices Relating to the Hospital: Average Length of Stay (L), Bed-Occupancy Rate (O), Turnover Interval (T); Indices Relating to the Population at Risk: Admission Rate, Hospitalisation Rate per Person, Bed-Occupancy Ratio, Bed Population Index; Factors Influencing Hospital Utilisation : Availability of Hospital Beds, Methods of Payment for Hospital Services , Age of the Population, Service Coverage and Bed Distribution, Availability of Extramural Medical Services, Hospital “Bottlenecks”, Medical Customs and Social Patterns, Supply of Physicians, Research and Training, Existence of Proprietary Hospitals, Housing, Morbidity, Internal Organisation

#### **Hospital Administration and Organisation**

Marks: 12

Introduction; Regional Planning: The Rural Hospital; Public Hospitals and Private Hospitals: Public Hospitals, Private Hospitals, Public Control; Hospital Administration; Hospital Organisation: Principal Types; Hospital Organisation in Different Countries: The United Kingdom and the USA, Latin America and Western Europe, Eastern Europe, Emerging Countries; General Principles of Hospital Organisation; Countries in Early Stages of Development; Countries Enjoying Dynamic Economic Development; Countries that have Achieved a High Level of Economic Development

#### **Some Special Roles of the Hospital**

Marks: 11

Introduction; Why Hospitals?; The Hospital as Teaching Centre; Hospital and Public Health Laboratory Services; Role of the General Hospital in the Mental Health Programme; The Hospital as Consumer Central Stores; Administrative Considerations: The Accumulation of Data, Estimating Requirements, Purchasing, Storage, Distribution

#### **Planning Procedures and Estimates**

Marks: 14

Introduction; Planning Methods: Project Start Up Session and Questionnaire, Situation Assessment and Area Wide Factors, Interview Sessions with Directors, Departmental Space Allocation Program and Master Plan Concepts, Master Facility Plan and Building Zoning Concepts, Develop Site Plan Alternative Concepts, Total Project Budget, Schedule and Phasing, Present Master Plan Options to Hospital Leadership, Final Budget/Phasing Options, Final Presentation to the Board of Directors, Results; Steps in Hospital Planning; Estimation of Requirements

#### **Hospital Design**

Marks: 10

Introduction: Choosing a Site; The Master Plan; Hospital Zoning Plan; Planning for Growth and Change; Considerations Based on Climate; Light and Colour; Visual Impact of the Hospital; Hospital Engineering; Hospital Hygiene; The Architect’s Brief

## **Staffing the Hospital**

Marks: 14

Introduction; Methods of Staff Selection: Screening, Quality Assessment and Data Extraction; Medical Staff, Nurses, Nursing Aspects of Patient Service Areas; Organisation and Administration; Other Administrative Staff: The Finance Officer, Professional and Technical Staff Medico-Social Workers, Medico Social Worker, Physiotherapists and Occupational Therapists, Pharmacists, Radiographers, Laboratory Technicians, Dieticians, Catering Officers, Records Officer (Records Librarian); Other Staff

## **Evaluating the Quality of Medical Care**

Marks: 13

Introduction; Definition of Quality; Approaches to Assessment: What to Assess?; Sources and Methods of Obtaining Information; Sampling and Selection; Measurement Standards: Empirical Standards, Normative Standards; Other Standards, Measurement Scales: Reliability, Bias, Validity

### **Reference Books:**

1. Miller, M. K., 2006. Planning, Design, And Construction of Health Care Facilities, 1st ed., Joint Commission Resources.
2. Paradkar, R. A., 2008. Hospital and Clinical Pharmacy, 1st ed., Pragati Books Pvt.Ltd.
3. Ruggiero, S. J., 2008. Staffing patterns in hospital pharmacy: four case studies, 2nd ed., Duquesne University Press.
4. Schneider, J. M., 2010. Introduction to Public Health, 3rd ed., Jones and Bartlett Publishers, Inc.
5. Shi, L. & Singh, A. D., 2009. Delivering Health Care in America, 4th ed., Jones & Bartlett Publishers.
6. Turnock, J. B., 2004. Public Health, 3rd ed., Jones and Bartlett Publishers, Inc.

## **0201244: HEALTH ECONOMICS AND INSURANCE**

Full Marks: 100

### **Why Study Health Economics?**

Marks: 10

Introduction; Economics and Health Economics; Economic Problems; The Concepts of Economics; Markets; Categorising Economics; Positive and Normative Economics; Can Economics be Applied to Health?; Wage Effects of Health; Effects of Health on Labour Supply; Effects of Health on Self-employment Profits; Productivity Effects of Health in Subsistence Agriculture; Effect of Income on Health; Identifying Causal Effects of Better Health: Examples

### **Health Economics for Low Income Countries**

Marks: 15

Introduction; Health Economics; Health Economics for Low-Income Countries; Review: Special Characteristics of Health and Health Care, The Nature of Demand, Expected Behaviour of Health Care Providers, Product Uncertainty and Information Asymmetry, Supply Conditions and Pricing Practices, Health Production Functions and Health Input Demand Functions; Income and Health; Measurement of Health: Indicators of General Health, Migration Status, Biomedical Evidence, Haemoglobin Levels of Individuals, Disease Types

### **eHealth**

Marks: 13

Introduction; Trends: Genomic Medicine, Standardised Electronic Health Records; Remote Healthcare and Diagnostics; Aggregated Public Health Data; Landscape of eHealth Standardisation: DICOM, CEN/TC 251, The HL7, ISO/TC 215, ISO/IEEE 11073; ITU-T Multimedia Framework for eHealth Applications; Standards and eHealth

## **Health Profile of India**

Marks: 11

Introduction; Health Profile of India; Demographic and Socio-Economic Indicators; Disease Burden Indicators; Healthcare Finance Indicators; Infrastructure Indicators; HR Indicators; Infrastructure Development; Successful Programs Across The Indian States

## **Financing Mechanisms**

Marks: 12

Introduction; Private Sources: Debt Financing, Foreign Direct Investment, External Commercial Borrowings, Private Equity, Individual Investors; Public Sources: Annual Government Budget for Rural Health; Infrastructure; Annual Government Budget for Urban Healthcare; Other Sources: Foreign Donations, PPP Project Funding, Community Based Schemes

## **Cost Concepts and Economic Evaluation**

Marks: 14

Definition of Cost; Types; Which Costs should be Included?: Health Service Costs, Costs Borne by Patients and their Families, External Costs; How should Costs be Valued?; Average, Marginal, and Joint Costs; Capital Costs; Viewpoint of an Economic Evaluation: Features that Characterise an Economic Evaluation/ Analysis; Types of Economic Evaluation: Cost-Effectiveness Analysis, Measures of Effectiveness, Costs-Minimisation Analysis, Cost-Utility Analysis (CUA), Cost-Benefit Analysis

## **Model of Demand in Healthcare**

Marks: 14

Introduction: Key Terms; The Demand Function: Demand; The Law of Demand; Demand Curve and Demand Schedule; Willingness and Ability to Pay: Prices of Related Goods, Income, Expected Future Prices; Population; Preferences: Activity 1; Individual Demand and Market Demand: Budget Line, Preferences and Utility, Total Utility, Marginal Utility; The Demand for Health Care; Consumer Surplus: Consumer Surplus - An Example

## **Supply and Price Determination**

Marks: 11

Introduction: Key Terms of Supply and Price Determination; The Market: Activity, Feedback, Activity, Feedback; The Determination of Price

## **Reference Books:**

1. Andersen, K. S., 2008. EHealth Beyond the Horizon - Get It There: Proceedings of MIE2008, IOS Press.
2. Annemans, L., 2008. Health Economics for Non-Economists, Academia Press.
3. Baru, V. R., 2009. School Health Services in India: The Social and Economic Contexts, SAGE Publications Ltd.
4. Blobel, B., 2008. EHealth: Combining Health Telematics, Telemedicine, Biomedical Engineering and Bioinformatics to the Edge: CeHR Conference Proceedings 2007, Pro Universitate.
5. Chernichovsky, D. & Hanson, K., 2009. Innovations in Health Care Financing in Low and Middle Income Countries, Emerald Group Publishing.
6. Donaldson, C., 1998. Why a National Health Service? The Economic Rationale, Institute for Public Policy Research.

## 0201250: HOSPITAL MANAGEMENT AND LAW

Full Marks: 100

### **Introduction to Hospital Management and Administration**

Marks: 12

Introduction: Definition; Nature and Scope: Changes in Hospital Organisation; Classification: Classification According to Ownership/Control, According to Length of Stay of Patients, According to Clinical Basis, According to Directory of Hospitals; Hospital Administration: Distinction between a Hospital and an Industrial Organisation; Functions of the Hospital; Hospital Ethics; Challenges to Hospital Administration; Conditions Peculiar to Administrative Work in Hospitals; Role of Hospital Administrators in Legal Matters; Counselling as a Tool in Hospital Administration

### **Human Resource Management in Hospitals**

Marks: 12

Introduction; Nature; Fundamental Principles; Human Resource Utilisation; Human Resource Development; Characteristics; Functions; Importance; Use of Hi-Tech Machines-An Adjunct to Human Resource Management; Human Resource Manager; Causes for Poor Human Resource Management; Human Resource Manager's Plan; Human Resource Accounting, Auditing and Research; Tips for Human Resource Managers in Hospitals; Role of Human Resource Management in Hospitals

### **Organising Human Resource Department and Manpower in Hospitals**

Marks: 14

Learning outcome; Introduction; Human Resource Department; Internal Organisation of the Human Resource Department: Human Resource Plan, Philosophy, Objectives, Tools of the Human Resource Department, The Human Resource Office, Human Resource Inventory, Human Resource Records and Forms; Human Resource Policies; Manpower Planning; Nature and Scope of Manpower Planning: Need for Manpower Planning, Benefits of Manpower Planning, Objectives of Manpower Planning; Manpower Planning Steps: Scrutiny of the Present Strength of Personnel, Anticipation of Manpower Needs, Investigation of Turnover of Personnel, Planning Job Requirements and Job Descriptions

### **Training and Management Development**

Marks: 13

Introduction; Training and Development: The Need for Training and Development Programmes, Symptoms Requiring Training and Development, Advantages, Techniques used to Determine Training Needs; Training Principles; Phases in Training Process; Training and Development Techniques: Simulation Methods, On-the-Job Training Methods, Orientation Training; Management Development Programmes; Principles of Management Development; Grooming Leaders; Management Development Methods; Line and Staff Responsibilities in Management Development

### **Wages and Salary in Hospital Administration**

Marks: 12

Introduction; Purposes of Wage and Salary Administration Programme; Wages Versus Salaries; Wage and Salary Programme: Developing Fundamental Policies, Building the Wage and Salary Structure

### **Human Relations and Public Relations in Hospitals**

Marks: 14

Introduction; Importance; Motivation: Motivated Workforce: The Only Survival Game, Types of Motives, Objective of Motivation for Human Resource Manager; Theories of Motivation: Maslow's Theory of Hierarchy of Needs, Vroom's Expectancy Theory of Motivation, Alderfer's ERG Theory, Equity Theory; Public Relation; The Publics

**Teamwork and Appraisal in Hospitals**

Marks: 11

Introduction; Teamwork; McGregor's X and Y Theories; Team-Building; Test of Good Teamwork; Appraisal in Performance; Process of Performance Appraisal; Behaviourally Anchored Rating Scales; Executive Appraisal

**Consumer Protection Act and Medical Profession**

Marks: 12

Introduction; Consumer Disputes Redressal Agencies; Consumer Protection Councils; Doctor - Patient Relationship; Duties and Obligations of a Doctor; Doctor - Patient Contract; Degree of Control of Doctor on his Patient; Do's and Don'ts for a Doctor

**Reference Books:**

1. Lewton, K. L., 1995. Public Relations in Health Care: A Guide for Professionals, 2nd ed., Jossey-Bass.
2. McConnell, C. R., 2012. The Health Care Manager's Human Resources Handbook, 2nd ed., Jones & Bartlett Learning.
3. McGowan, R. A. & Merrill, M. J., 1982. Shared Training and Development Services for Hospitals, Health Forum.
4. Mills, A. B., 1939. Hospital public relations, Physicians' Record Company.
5. Myres, S. A., 2011. Patient Safety and Hospital Accreditation: A Model for Ensuring Success, Springer Publishing Company.
6. Niles, N. J., 2012. Basic Concepts of Health Care Human Resource Management, Jones & Bartlett Learning.

**0201251: HOSPITAL OPERATIONS MANAGEMENT**

Full Marks: 100

**Overview of Hospital Operations Management**

Marks: 10

Introduction; Role; Introduction to Hospital Operation Management; Different Functional Department of Hospital: Hospital Finance System, Hospital Accounting System, Hospital Operations Management; Operational Management of the Hospital; Health Scene in India; Harmony in Medical Teams; Hospital Communications; Cleanliness and Hospital Waste Management; Medical Ethics and Hospital Operations Management; Managing Hospital Staff ; Benefits of Managing Staff; Importance of OM

**Hospital Operation Strategy**

Marks: 15

Introduction; Operations Strategy Means Adding; Trends Affecting Operations Strategy Decisions: Globalisation, Technology; Competitive Priorities: Cost, Quality, Delivery, Flexibility; Developing Operations Strategy - Facility Location and Layout; Site Selection; Location Analysis; Site Analysis; Hospital Urban/Rural location, Strategy, and Technology; Hospital Urban and Rural Location; Hospital Strategy; Hospital Technology; Hospital Performance; Hospital Layout and Design; Building Attributes; Flexibility and Expandability for Hospital; Therapeutic Environment of Hospital; Cleanliness and Sanitation for Hospital; Accessibility in Hospital; Controlled Circulation; Aesthetics for Hospitals; Security and Safety of Hospital; Emerging Issues in Hospitals Design; Relevant Codes and Standards for Layout of Hospitals

**Hospital Maintenance Management**

Marks: 12

Introduction; Hospital Departments: The Main, and Most Common, Hospital Departments; System Maintenance; Overview of Maintenance Management of Hospital; Hospital Equipment Preventive Maintenance Manual; Hospital

Equipment Categories; Provision for Maintenance in Hospital; Effective Maintenance Strategy; Levels of Maintenance; Planned Maintenance of Medical Equipment: Setting up a Complete System; Disposal of Equipment; User Responsibilities in Equipment Disposal; Basics of Electrical Safety: Socket Outlets and Plugs, Wiring of Sockets and Plugs, Neutral Black, Notes on Earthing, Sizes and Types of Sockets and Plug, Mains Cables Electricity, Fuses; Troubleshooting Electrical Safety; Electrical Safety Issues in Hospital

### **Meaning and Scope of Patient Care Services**

Marks: 10

Introduction; Provision of Patient Care Services; Hospital Departments: Scope of Services: Anaesthesia Services, Cardiac Catheterisation Laboratory, Cardiac Rehabilitation, Chaplaincy Services, Dietary Services, Imaging Services, Emergency Department; Nursing: Definition of Nursing; Pharmacy; Radiation Oncology; Physical Therapy; Occupational Therapy; Speech and Language Pathology Services; Best Practices for Hospital for Patient Care, Support for Patient Care: Human Resources, Information Systems, Materials Management; Medical Records; Patient Representative; Volunteer Services

### **Facility and Bio-Chemical Engineering in Hospital**

Marks: 12

Introduction; Assurance of Quality of Engineering Services; Quality of Outcome; Location, Space, Layout for Engineering Department in Hospital: Quality of Manpower, Quality of Equipment, Quality and Availability of Materials and Spare Parts; Quality of Process for Hospital; Structural Survey of a Hospital; Energy Management Policy: Getting Started: Step-by-Step; General Remarks and Recommendations for Hospital; Important Points Related with Layout for Hospital; Biomedical Engineering; Roles of a Biomedical Engineer in a Hospital; Bionics and Biomedical Engineer; Bio Medical Engineering-Support Services; Biomedical Engineering: Curing Life on Canvas of Engineering

### **Intensive or Critical Care Services**

Marks: 14

Introduction; Coding Requirements for Hospital; Definition of Levels of Care; Hospital Resources for Level I, II, and III Critical Care Centres: Medical Staff Organisation, Organisation of ICUs, Physician Availability, Nursing Availability, Respiratory Care Personnel Requirements, Pharmacy Services Requirements, Laboratory Services, Radiology and Imaging Services, Services Provided in Unit, ICU Policies and Procedures; Level II Critical Care Centres; Level III Critical Care Centres; Academic Vs. Non Academic Critical Care Centres; Open Vs. Closed ICUs; Operating Rooms(OR); Streamlining OT; Operating Room Equipment; Equipment Requirements as Per Standardisation Norms; Newer Trends Used in Hospitals; Time, Cost and Technique Required; Challenging Path

### **Bio-Medical Waste: Affecting Hospital Operations**

Marks: 12

Introduction; Present Scenario; Bio Medical Waste Management; Hospital Waste Management; Responsibilities of Hospitals; Hazards of Biomedical/Health Care Waste : Types of Hazards, Infection, Genotoxicity and Cytotoxicity, Chemical Toxicity, Radioactivity Hazards, Physical Injuries, Public Sensitivity; Segregation of Biomedical Waste; Biomedical Waste Disposal; Transportation of BMW; Personnel Safety Device; Biomedical Waste Treatment System; Need of Biomedical Waste Management in Hospitals; Operation Management Aspects for Managing BMW; Administration and Managerial Aspects

### **Emergency Services for Hospital**

Marks: 15

Introduction; Risk: Preparedness, Mitigation; Role of a Hospital in Disaster/Mass Causality Index: Based on the Number of Casualties; Hospital Emergency Plan; Organisation of Health Delivery System in Disaster / Emergency Solution; Objective of a Hospital Emergency Plan; Principles of Hospital Disaster Plan; How to Proceed for making Emergency plan for your Hospital?: Pre Disaster Phase, Disaster Phase, Post Disaster Phase; Central Command Structure for Hospital; Plan Activation of different Areas of Hospital; How to Increase Bed Capacity in Emergencies?; Planning for Security of Hospital in Emergency Situation; Hospital Emergency Plan Manual; Triage: Triage Guideline, Incident Commander, Triage Officer, RED: High Priority, YELLOW: Medium Priority, GREEN: Low Priority, BLACK: Lowest

Priority, Transportation Officer, First Aiders; Code Blue: Purpose of Code Blue, Supporting Information about Code Blue, Code Blue Response Team

**Reference Books:**

1. Agarwal, K.A., 2007. Standard Operating Procedures (sop) For Hospitals in India. Atlantic Publishers & Dist.
2. Blum, C. S., 2003. Hotel Operations: Theories and Applications, 2nd ed, Kendall/Hunt Pub.
3. Borton, C. D., 1991. Factors affecting utilisation of hospital emergency services, University of Michigan-Flint.
4. Dyro, F. J., 2004. Clinical Engineering Handbook, Academic Press.
5. Farmer, C. J., 2006. Are You Prepared?: Hospital Emergency Management Guidebook, Joint Commission Resources, Inc.
6. Gupta, K. and Gupta, K. S., 2007. Modern Trends in Planning and Designing of Hospitals: Principles and Practice, Jaypee Brothers Publishers.

**0201252: HOSPITAL SUPPORT SERVICES AND MANAGEMENT OF HAZARDS**

Full Marks: 100

**Mortuary Services**

Marks: 8

Introduction; Organisation of Mortuary; Role and Functions: Planning Considerations; Services Offered; Physical Facilities; Staffing; Equipments; Administration; Policies and Procedures; Monitoring; Record Keeping; Procedure for Preservation and Disposal of Dead Bodies in Hospital, Preservation of Dead Body, Documentation in Mortuary, Cold Storage Room, Disposal of Dead Body

**Pharmacy Services**

Marks: 10

Introduction; Institutional Goals for the Hospital Pharmacy Service; Hospital Pharmacy; Pharmaceutical Services; Functions of a Hospital Pharmacist; Set Up of Hospital Pharmacy; Organisation of the Pharmacy; Personnel; Staffing Pattern; Relationship; Plants, Facilities, Equipment and Other Materials

**Integrated Hospital and Patient Care**

Marks: 14

Overview of Hospital Information Systems(HIS); Functional Model of a Hospital Information System; Computer-based Patient Record (CPR); Benefits of Hospital Management System; Functional Requirements: Patient, IPD Admission and Ward Allocation, Patient Transfer, Deposits, Advances, Refunds, Discounts and Concessions, Operation Theatre Scheduling, Reports, Equipment Operation and Maintenance, Blood Bank, Financial Accounting, Payroll and Administration; Hospital Information System; A Conceptual Approach to an Open Hospital Information System; Patient Care Information Systems; Efficiency of Care Providers

**Global Health Service Systems**

Marks: 10

Introduction to the Global Health Scenario; Health Care Models: Funding Model, The NHS Model, Social Health Insurance Model, Market Imperfections in the Markets for Health Care

**Fire Hazards and Fire Manual Guideline**

Marks: 15

Introduction; Basic Elements of a Fire Organisation; Elements of Fire; Fire Fighting: Fire Hose, Fittings, Foam Production Equipment, Extinguishing Agents, Flame Safety Lamp, Flame Indicator, OBA (Oxygen Breathing Apparatus); Causes of Fire in Hospitals; Classes of Fire; Fire Protection; Escape Routes: The Type and Number of People using the Premises, Escape Time, The Age and Construction of the Premises, The Number of Escape Routes and Exits,

Management of Escape Routes, Emergency Evacuation of Persons with Mobility Impairment; Risk Evaluation; Fire Manual; Fire Safety Training; Fire Safety Equipment: Fire Alarm Activation Procedure, Evacuation, Fire Drills, Electrical Fire Prevention; Hazards of Electricity; Do's and Don'ts for Electrical Fire Prevention; Actions to be taken in case of Fire in a Hospital: General, Evacuation Procedures

### **Disaster Management**

Marks: 14

Introduction; Types of Disasters; Disaster Management; Phases of Disaster Management: Mitigation, Preparedness, Response, Recovery; Disaster Planning: Aim of Disaster Planning, Objectives and Goals of a Disaster Plan, Principles of a Hospital Disaster Plan; Disaster Recovery Plan; Disaster Operating Procedure; Disaster Manual; Lessons from Japan; Recent Trends: Hospital Evacuation Plans and Guidelines, Communication of Evacuation, Hospital Emergency Incident Command Structure

### **Biomedical Waste Management and Hazards in Hospital**

Marks: 14

Introduction; Composition of Biomedical Waste; Process of Biomedical Waste; Biomedical Waste- Segregation, Collection, Transportation, Disposal: Segregation, Collection, Storage, Transportation; Containment and Packaging: Biomedical Waste Containers (Non Sharps Waste), Biomedical Waste Containers (Sharps Waste); Standard for Liquid Waste; Radioactive Waste from Medical Establishments; Treatment of Bio-Medical Waste Management; Selection of Suitable Treatment Technology; Methods of Disinfection: Chemical Disinfectants, Physical Disinfectants, Guidelines for the Use of Instrument Disinfectants; Monitoring and Controlling of Cross-infection (Preventive Devices): Personnel Safety Devices, Cleaning Devices, Handling Devices; Health Hazards

### **Radiation Hazards**

Marks: 15

Introduction; Hazards of Radiation: Acute Effect, Delayed Effect; Diagnostic Imaging; Radiator Protection and Safety; Radiation Safety Monitoring; Principles in the Layout of a Diagnostic Xray Room; Medical Imaging Modalities; Contrast Media: Oral Contrast, Intravenous Contrast, Allergies, Creatinine; Magnetic Resonance Imaging; Preventive Measures against Magnetic field Hazards: Magnetic Objects, Posting and Sign Requirements, Cryogenic Safety; Nuclear Medicine Department; Radioactive Wastes; Radioactive Waste Management in a Hospital; Radioactive Waste Disposal; Radiation Therapy: What is Radiation Therapy?, How is Radiation Given?, What Happens during External Radiation Therapy?, Common Side Effects of Radiation Therapy, What happens after Radiation Treatment?

### **Reference Books:**

1. Alexander, D. & Alexander, 2002. Principles of Emergency Planning and Management
2. Austin, C. & Boxerman, S. Information Systems for Healthcare Management, 6th ed.
3. Ball, M., Weaver C. & Kiel J., Healthcare Information Management Systems, 3rd ed., Health Informatics Series.
4. Barker, K., Thomas, R. & Brown T., 2006. Handbook of Institutional Pharmacy Practice, 4th ed.
5. Carr, J., 1991. *Biomedical Equipment: Use, Maintenance and Management*.
6. Diffey L.B. & Langley C.F., 1986. Evaluation of Ultraviolet Radiation Hazards in Hospitals.