

**Syllabus for the Post of Technician (Dialysis) (Core Subject)**

**Advt No. I/10/9/Rectt/2026-27**

**A. Foundation 1 (Introduction to Healthcare Delivery System in India & Community orientation and clinical visit)**

Foundation 1	Introduction to Healthcare Delivery System in India Community orientation and clinical visit
<b>Introduction to healthcare delivery systems in India</b>	
<b>Course Objectives</b> - The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world.	
<b>Detailed Syllabus</b>	
1	<b>Introduction to healthcare delivery system</b> a. Healthcare delivery system in India at primary, secondary and tertiary care b. Community participation in healthcare delivery system c. Health system in developed countries. d. Private Sector e. National Health Mission f. National Health Policy g. Issues in Health Care Delivery System in India
2	<b>National Health Programme</b> Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.
3	<b>Introduction to AYUSH system of medicine</b> a. Introduction to Ayurveda. b. Yoga and Naturopathy c. Unani d. Siddha e. Homeopathy f. Need for integration of various system of medicine
4	<b>Health Scenario of India- Past, Present and Future</b>
5	<b>Demography &amp; Vital Statistics.</b> a. Demography – its concept b. Vital events of life & its impact on demography c. Significance and recording of vital statistics d. Census & its impact on health policy
6	<b>Epidemiology</b> a. Principles of Epidemiology b. Natural History of disease c. Methods of Epidemiological studies d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.
<b>Text Books</b> 1. K Park 2005, “The Text book of Preventive Medicine” 18th edition	

**B. Foundation 2 (Basic computers and information Science)**

Foundation 2	BSc.DTT-002	Basic computers and information Science
<b>Basic Computers and information Science</b>		
<b>Course Objectives</b> -The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.		
<b>Detailed Syllabus</b>		
1	<b>Introduction to computer:</b> Introduction, characteristics of computer, Block diagram of computer, Generations of computer, Computer languages.	
2	<b>Input output devices: Input devices</b> Keyboard, Point and draw devices, Data scanning devices, Digitizer, Electronic card reader, Voice recognition devices, Vision-input devices <b>Output devices</b> Monitors, pointers, plotters, screen image projector, Voice response systems.	
3	<b>Processor and memory:</b> The Central Processing Unit (CPU), Main memory	
4	<b>Storage Devices:</b> Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, Mass storage devices.	
5	<b>Introduction of Operating System:</b> Introduction, Operating system concepts, Types of operating system.	
6	<b>Computer networks:</b> Introduction, Types of network (LAN, MAN, WAN, Internet, Intranet), Network topologies (star, ring, bus, mesh, tree, hybrid), Components of network.	
7	<b>Introduction of windows:</b> History, features, Desktop, Taskbar, Icons on the desktop, Operation with folder, Creating shortcuts, Operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.)	
8	<b>Introduction to MS-Word:</b> Introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, Spell checking, printing the document file, creating and editing of table, Mail merge.	
9	<b>Introduction to Excel:</b> Introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs	
10	<b>Introduction to power-point:</b> Introduction, creating and manipulating presentation, views, formatting and enhancing text, Slide with graphs.	
11	<b>Internet and its Applications:</b> Definition, Brief history, Basic services (E-Mail, File Transfer Protocol, telnet, World Wide Web (WWW), www browsers, Use of the internet, Install different software, Data entry	
12	<b>Application of Computers in clinical settings</b>	

**Books**

1. Basic computer application: Parvez Faruki, Manoj Parmar and Nandu Fatak; Mahajan
2. P.C. Software for Windows 98 made simple: Taxali R.K.; Tata McGraw-Hill publishers
3. Computer fundamentals: Pradeep K. Sinha and Priti Sinha; BPB publication
4. Computer Basics For BMLT, Pooja Jain

**C. Foundation 3 (Introduction to Quality and patient safety)**

Foundation 3	BSc.DTT -006	Introduction to Quality and patient safety
<p><b>Course Objectives</b></p> <ul style="list-style-type: none"> <li>• The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.</li> <li>• To learn about basic emergency care including first aid and triage.</li> <li>• To learn about prevention of harm to workers, property, the environment and the general public</li> <li>• To provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections.</li> <li>• The objective of this section will be to provide knowledge on the principles of on-site disaster management.</li> </ul>		
<p><b>Detailed Syllabus</b></p>		
1	<p><b>Quality assurance and management</b></p> <ol style="list-style-type: none"> <li>a. Concepts of Quality of Care</li> <li>b. Quality Improvement Approaches</li> <li>c. Standards and Norms</li> <li>d. Quality Improvement Tools</li> <li>e. Introduction to NABH guidelines</li> </ol>	
2	<p><b>Basics of emergency care and life support skills</b></p> <ol style="list-style-type: none"> <li>a. Vital signs and primary assessment</li> <li>b. Basic emergency care – first aid and triage</li> <li>c. Ventilations including use of bag-valve-masks (BVMs)</li> <li>d. Choking, rescue breathing methods</li> <li>e. One- and Two-rescuer CPR</li> <li>f. Using an AED (Automated external defibrillator).</li> <li>g. Managing an emergency including moving a patient</li> </ol>	
3	<p><b>Bio medical waste management and environment safety</b></p> <ol style="list-style-type: none"> <li>a. Definition of Biomedical Waste</li> <li>b. Waste minimization</li> <li>c. BMW – Segregation, collection, transportation, treatment and disposal (including color coding)</li> <li>d. Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste</li> <li>e. BMW Management &amp; methods of disinfection</li> <li>f. Modern technology for handling BMW</li> <li>g. Use of Personal protective equipment (PPE)</li> <li>h. Monitoring &amp; controlling of cross infection (Protective devices)</li> </ol>	
4	<p><b>Infection prevention and control</b></p> <ol style="list-style-type: none"> <li>a. Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],</li> <li>b. Prevention &amp; control of common healthcare associated infections,</li> <li>c. Components of an effective infection control program,</li> <li>d. Guidelines (NABH and JCI) for Hospital Infection Control</li> </ol>	

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5	<p><b>Antibiotic Resistance</b></p> <ul style="list-style-type: none"> <li>a. History of Antibiotics</li> <li>b. How Resistance Happens and Spreads</li> <li>c. Types of resistance- Intrinsic, Acquired, Passive</li> <li>d. Trends in Drug Resistance</li> <li>e. Actions to Fight Resistance</li> <li>f. Bacterial persistence</li> <li>g. Antibiotic sensitivity</li> <li>h. Consequences of antibiotic resistance</li> <li>i. Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals</li> </ul>
6	<p><b>Disaster preparedness and management</b></p> <ul style="list-style-type: none"> <li>a. Fundamentals of emergency management,</li> <li>b. Psychological impact management,</li> <li>c. Resource management,</li> <li>d. Preparedness and risk reduction,</li> <li>e. Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.</li> </ul>
<p><b>Books</b></p> <ul style="list-style-type: none"> <li>1. The Essentials of Patient Safety by Charles Vincent</li> <li>2. Laboratory quality control and patient safety by De Gruyter</li> </ul>	

## D. Foundation 4 (Communication and soft skills; English & Communication skills)

Foundation 4	BSc.DTT -003	Communication and soft skills
		English
<b>Communication and soft skills</b>		
<b>Course Objectives</b>		
<ul style="list-style-type: none"> <li>1. To learn the effective communication skills, and use communication as a major tool in the clinical practice.</li> <li>2. To know the technologist and patient relationship.</li> </ul>		
<b>Detailed Syllabus</b>		
1.	<b>Basic Language Skills: Grammar and Usage.</b>	

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2.	<b>Business Communication Skills. With focus on speaking –</b> <ul style="list-style-type: none"> <li>• Conversations,</li> <li>• Discussions,</li> <li>• Dialogues,</li> <li>• Short presentations,</li> <li>• Pronunciation</li> </ul>
3.	<b>Teaching the different methods of writing like</b> <ul style="list-style-type: none"> <li>• Letters,</li> <li>• E-mails,</li> <li>• Report,</li> <li>• Case study,</li> <li>• Collecting the patient data etc.</li> <li>• Basic compositions,</li> <li>• Journals,</li> </ul> (with a focus on paragraph form and organization)
4.	Basic concepts & principles of good communication
5.	Special characteristics of health communication
6.	Types & process of communication
7.	Barriers of communication & how to overcome
<b>Books:</b> <ol style="list-style-type: none"> <li>1. Effective Communication and Soft Skills by Nitin Bhatnagar Pearson Education India, 2011</li> <li>2. Communication N Soft Skills Paperback – 2014 by Niraj Kumar, Chetan Srivastava</li> </ol>	
<b>ENGLISH AND COMMUNICATION SKILLS</b>	
<b>Course Learning Outcomes</b> - To speak and write proper English , to read and understand English, to understand and practice medical terminology	
<b>Detailed Syllabus</b>	
1	Letter writing
2	Note making
3	Essay writing
4	Report writing
<b>Books:</b> <ol style="list-style-type: none"> <li>1. Collins, English grammar</li> <li>2. Wren &amp; Martin High School English Grammar and Composition Book</li> <li>3. Letters for All Occasions by Alfred S Myers</li> <li>4. Spoken English by V Sasikumar, P V Dhamija</li> <li>5. Journalism (Made Simple Books) by David Wainwright</li> </ol>	

## E. Human Anatomy and Physiology Part-1

<b>Core 1</b>	<b>BSc.DTT -011 &amp; 012</b>	<b>Human Anatomy and Physiology Part-1</b>
<b>Course Objectives</b> - The course provide the students understanding of the structure, relationships and function of the systems and organs of the body.		
<b>Detailed Syllabus</b>		
<b>Section I (Anatomy)</b>		
1	Introduction to the body as a whole – <ul style="list-style-type: none"> <li>• Definition of anatomy and its divisions.</li> </ul> Terms of location, positions and planes	
2	The cells, tissues of the body	
3	The cell: Structure, multiplication.	

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4	Tissue: Types, structure, characteristics, functions
5	Epithelium <ul style="list-style-type: none"> <li>• Simple : Squamous, Cuboidal, columnar, ciliated</li> <li>• Compound: Stratified, transitional</li> </ul> Connective: Areolar, adipose, fibrous, elastic, Cartilage, blood and bone
6	Muscle: Striated (Voluntary), Smooth (Involuntary, Cardiac)
7	Nervous tissue
8	Fibrous tissue
9	Cell regeneration
10	Membranes: Mucous, Serous, Synovial
11	Osteology (including whole Skelton, bones and joints)
12	Development of bone (osteogenesis) : Cells involved
13	Types and functions of bone, Types of joints and various movements
14	AXIAL Skeleton: Skull : Cranium, face, air sinuses, Vertebral column: regions, movements and characteristics, Sternum, Ribs
15	Appendicular Skelton: Bones involving -Shoulder girdle and Upper limb, Pelvic girdle and lower limb
16	Healing of bones: cellular activity, Factors that delay healing, Diseases of bones and joints.
17	The Respiratory System: Organs: Position and structure, Nose and nasal cavities, Functions: respiratory, Olfactory, Pharynx, and Larynx: Functions - respiratory, vocal, Trachea, Bronchi, lungs: lobes, lobules, pleura, and respiratory functions: External and internal respiration, common terms relating to disease and conditions of the system.
<b>SECTION-2 (Physiology)</b>	
18.	<b>1. Blood</b> a. Introduction: composition and function of blood. b. Red blood cells: erythropoiesis, stages of differentiation, function, count, physiological variation. c. Structure, function, concentration, physiological variation, methods of estimation of haemoglobin. d. White blood cells: production, function, life span, count, differential count. e. Platelets: origin, normal count, morphology functions. f. Plasma proteins: production, concentration, types, functions, albumin, globulin, fibrinogen, prothrombin. g. Haemostasis: definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting factors. h. Blood bank:

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	<p>i. Blood groups: ABO system, Rh system.  j. Blood grouping &amp; typing, cross matching.  k. Rh system: Rh factor, Rh incompatibility.  l. Blood transfusion: indication, universal donor and recipient concept.  m. Selection criteria of a blood donor, transfusion reactions.  n. Anticoagulants: classification, examples and uses.  o. Anaemias: morphological and etiological classification, effects of anemia on body.  p. Blood indices: colour index, MCH, MCV, and MCHC.  q. Erythrocyte sedimentation rate (ESR) and packed cell volume, normal values, definition, determination.  r. Blood volume: normal value, determination of blood volume and regulation of blood volume.  s. Body fluid: pH, normal value, regulation and variation.  t. Lymph: lymphoid tissue formation, circulation, composition and function of lymph.</p>
19.	<p><b>Muscle nerve physiology</b>  a. Classification of muscle, structure of skeletal muscle, sarcomere contractile proteins, neuromuscular junction. Transmission across neuromuscular junction. Excitation contraction coupling. Mechanism of muscle contraction muscle tone, fatigue, rigor mortis.</p>
20.	<p><b>Respiratory system</b>  a. Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles.  b. Respiratory organs: lungs, alveoli, respiratory membrane, stages of respiration.  c. Mechanism of normal and rigorous respiration, forces opposing and favoring expansion of the lungs. Intra pulmonary pleural pressure, surface tension, recoil tendency of the wall.  d. Transportation of respiratory gases: transportation of oxygen: direction, pressure gradient, forms of transportation, oxygenation of Hb. Quantity of oxygen transported. Lung volumes and capacities  e. Regulation of respiration: mechanisms of regulation, nervous and chemical regulation, respiratory centre, Hering–Breuer reflex.  f. Applied physiology and respiration: hypoxia, cyanosis, asphyxia, dyspnea, dysbarism, artificial respiration, and apnoea.</p>
<p><b>Reference Books</b></p>	
<ol style="list-style-type: none"> <li>1. William Davis (P) understanding Human Anatomy and Physiology MC Graw Hill</li> <li>2. Chaurasia -A Text book of Anatomy</li> <li>3. T. S. Ranganathan - A text book of Human Anatomy</li> <li>4. Fattana, Human anatomy (Description and applied) Saunder's &amp; C P Prism Publishers, Bangalore – 1991</li> <li>5. ESTER . M. Grishcimer, Physiology &amp; Anatomy with Practical Considerations, J.P. Lippin Cott. Philadelphia</li> <li>6. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism publishers</li> <li>7. Chatterjee(CC) Human Physiology Latest Ed. Vol-1, Medical Allied Agency</li> <li>8. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book,</li> <li>9. Ganong (William F) Review of Medical Physiology. Latest Ed . Appleton</li> <li>10. Foundation of anatomy and physiology, Ross and Wilson, Churchill LivingstoneSurface anatomy for radiographer, Mekears and Owen, Blackwell Scientific</li> <li>11. Basics of Medical Physiology, Venkatesh</li> </ol>	

**F. (Biochemistry)**

Core 2	BSc.DTT -014	Biochemistry
<p><b>Course Objectives</b> - The course provide the students understanding of specimen collection, introduction to laboratory apparatus, instruments, chemical processes within and relating to living human body.</p>		
<p><b>Detailed Syllabus</b></p>		
1	<p><b>Specimen collection:</b>                      a. Pre-analytical variables.                      b. Collection of blood.                      c. Collection of CSF &amp; other fluids.                      d. Urine collection.                      e. Use of preservatives.                      f. Anticoagulants.</p>	
2	<p><b>Introduction to laboratory apparatus</b>                      a. Pipettes: different types (graduated, volumetric, Pasteur, automatic etc.).                      b. Calibration of glass pipettes.                      c. Burettes, beakers, petri dishes, depression plates.                      d. Flasks: different types (volumetric, round bottomed, Erlenmeyer conical etc.).                      e. Funnels: different types (conical, Buchner etc.).                      f. Bottles: reagent bottles – graduated and common, wash bottles – different type specimen bottles.</p>	
3	<p><b>Measuring cylinders, porcelain dish</b>                      a. Tubes: test tubes, centrifuge tubes, test tube draining rack.                      b. Tripod stand, wire gauze, bunsen burner.                      c. Cuvettes, significance of cuvettes in colorimeter, cuvettes for visible and UV range. Cuvette holder racks: bottle, test tube, pipette, desiccator, stop watch, timers, scissors.                      d. Dispensers: reagent and sample.                      e. Maintenance of lab glass ware and apparatus.                      f. Glass and plastic ware in laboratory.                      g. Use of glass: significance of boro silicate glass, care and cleaning of glass ware, different cleaning solutions of glass.                      h. Care and cleaning of plastic ware, different cleaning solution.</p>	
4	<p><b>Instruments (Theory and demonstration) Diagrams to be drawn</b>                      a. Use, care and maintenance of: water bath, oven &amp; incubators, water distillation plant, water deionizers, refrigerators, cold box, deep freezers, reflux condenser, centrifuge, balances, colorimeter, spectrophotometer, pH meter and electrodes.                      b. Centrifuges: definition, principles, Svedberg unit, centrifugal force, centrifugal field, RPM, conversion of G to RPM and vice versa, different types of centrifuges.                      c. Manual balances: single pan, double pan, triple balance, direct read out electrical balances.                      d. Guideline to be followed and precautions to be taken while weighing. Weighing different types of chemicals, liquids, hygroscopic compounds etc.                      e. Colorimeter, spectrophotometer, pH meter, electrodes, salt bridge solution: principles, parts, types, guidelines to be followed and precautions to be taken while using.</p>	
5	Safety of measurements	
6	Conventional and SI units	

7	<p><b>Atomic structure</b></p> <p>a. Dalton's theory, properties of electrons, protons, neutrons, and nucleus, Rutherford's model of atomic structure, Bohr's model of atomic structure, orbit and orbital quantum numbers, Heisenberg's uncertainty principle. Electronic configuration, Aufbau principle.</p> <p>b. Pauli's exclusion principle, etc.</p> <p>c. Valency and bonds: different types of strong and weak bonds in detail with examples.</p> <p>d. Theory &amp; Practical for all the following under this section: molecular weight, equivalent weight of elements and compounds, normality, molarity. Preparation of molar solutions (mole/litre solution) e.g.: 1 M NaCl, 0.15 M NaCl, 1 M NaOH, 0.1 M HCl, 0.1 M H<sub>2</sub>SO<sub>4</sub> etc.</p> <p>e. Preparation of normal solutions. e.g., 1N Na<sub>2</sub>CO<sub>3</sub>, 0.1N Oxalic acid, 0.1 N HCl, 0.1N H<sub>2</sub>SO<sub>4</sub>, 0.66 N H<sub>2</sub>SO<sub>4</sub> etc., percent solutions. Preparation of different solutions: v/v w/v</p>
	(solids, liquids and acids). Conversion of a percent solution into a molar solution.
8	<p><b>Dilutions</b></p> <p>a. Diluting solutions: e.g. preparation of 0.1 N NaCl from 1 N NaCl &amp; from 2N NaCl etc., preparing working standard from stock standard, body fluid dilutions, reagent dilution techniques, calculating the dilution of a solution, body fluid reagent etc., saturated and supersaturated solutions. Technique for preparation of standard solutions e.g.: glucose, urea, etc., significance of volumetric flask in preparing standard solutions. Volumetric flasks of different sizes, preparation of standard solutions of deliquescent compounds (CaCl<sub>2</sub>, potassium carbonate, sodium hydroxide etc.). Preparation of standards using conventional and SI unit's acids, bases, salts and indicators.</p>
9	<p><b>Acids and Bases</b></p> <p>a. Definition, physical and chemical properties with examples. Arrhenius concept of acids and bases, Lowry – Bronsted theory of acids and bases. Classification of acids and bases.</p> <p>b. Differences between bases and alkali, acidity and basicity, monoprotic and polyprotic acids and bases. Concepts of acid base reaction, hydrogen ion concentration, ionization of water, buffer, and pH value of a solution.</p> <p>c. Preparation of buffer solutions using pH meter. Salts: definition, classification, water of crystallization, definition and different types, deliquescent and hygroscopic salts.</p>
10	<p><b>Acid- base indicators: (Theory and Practical)</b></p> <ul style="list-style-type: none"> <li>• <b>Theory</b></li> </ul> <p>a. Definition, concept, mechanism of dissociation of an indicator, colour change of an indicator in acidic and basic conditions, use of standard buffer solution and indicators for pH determinations, preparation and its application, list of commonly used indicators and their pH range, suitable pH indicators used in different titrations, universal indicators.</p> <ul style="list-style-type: none"> <li>• <b>Practical</b></li> </ul> <p>a. Titration of a simple acid and a base (preparation of standard solution of oxalic acid and using this solution finding out the normality of a sodium hydroxide solution. Acid to be titrated using this base Calculation of normality of an acid or a base after titration, measurement of hydrogen ion concentration.</p>
11	<p><b>Quality control</b></p> <p>a. Accuracy, precision. Specificity, sensitivity, limits of error allowable in laboratory, percentage error.</p> <p>b. Normal values and Interpretations.</p>
12	<p><b>Special Investigations</b></p> <p>a. Serum electrophoresis, immunoglobulins, drugs: digitoxin, theophylline, regulation of acid base status, Henderson Hassel Bach equations, buffers of the fluid, pH regulation, disturbance in acid base balance, anion gap, metabolic acidosis, metabolic alkalosis, respiratory acidosis, respiratory alkalosis, basic principles and estimation of blood gases and pH, basic principles and estimation of electrolytes, water balance, sodium regulation, bicarbonate buffers, nutrition, nutritional support with special emphasis on parental nutrition, calorific value, nitrogen</p>
	balance, respiratory quotient, basal metabolic rate, dietary fibers, nutritional importance of lipids, carbohydrates and proteins, vitamins.

**Reference Books**

1. Varley - Clinical chemistry
2. TEITZ - Clinical chemistry
3. Kaplan - Clinical chemistry
4. Ramakrishna(S) Prasanna (KG), Rajna ® Text book of Medical Biochemistry Latest Ed Orient longman Bombay -1980
5. Vasudevan (DM) Sreekumari(S) Text book of Biochemistry for Medical students, Latest Ed DAS(Debajyothi) Biochemistry Latest ED Academic, Publishers, Calcutta - 1992

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## A. Medical Terminology and record keeping (including anatomical terms)

Foundation 5	BSc.DTT -004	Medical Terminology and record keeping (including anatomical terms)
<p><b>Course Objectives</b> - This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests.</p>		
<b>Detailed Syllabus</b>		
1	Derivation of medical terms.	
2	Define word roots, prefixes, and suffixes.	
3	Conventions for combined morphemes and the formation of plurals.	
4	Basic medical terms.	
5	Form medical terms utilizing roots, suffixes, prefixes, and combining roots	
6	Interpret basic medical abbreviations/symbols.	
7	Utilize diagnostic, surgical, and procedural terms and abbreviations related to the <ul style="list-style-type: none"> <li>• Integumentary system,</li> <li>• Musculoskeletal system,</li> <li>• Respiratory system,</li> <li>• Cardiovascular system,</li> <li>• Nervous system</li> <li>• Endocrine system</li> </ul>	
8	Interpret medical orders/reports.	
9	Data entry and management on electronic health record system.	
<p><b>Practical session:</b> Familiarize students with the hospital information system including data entry of case records in the system.</p>		
<b>Books</b>		
1. The Language of Medicine, 10th Edition: Davi-Ellen Chabner BA MAT		

## B. Medical Law and Ethics, Professionalism and values, Principals of Management & constitution of India.

Foundation 6	BSc.DTT -005	Medical Law and Ethics
	BSc.DTT -007	Professionalism and values
	BSc.DTT -009	Principals of Management
	BSc.DTT -021 (subsidiary)	Constitution of India

Course Title	Medical law and ethics
<p><b>Course Learning Outcomes.</b></p> <ul style="list-style-type: none"> <li>• To improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice</li> <li>• Legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.</li> </ul>	
<b>Detailed Syllabus</b>	
1	Medical ethics - Definition - Goal - Scope
2	Introduction to Code of conduct

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3	Basic principles of medical ethics – Confidentiality
4	Malpractice and negligence - Rational and irrational drug therapy
5	Autonomy and informed consent - Right of patients
6	Care of the terminally ill- Euthanasia
7	Organ transplantation
8	Medico legal aspects of medical records <ul style="list-style-type: none"> <li>• Medico legal case and type</li> <li>• Records and document related to MLC</li> <li>• Ownership of medical records</li> <li>• Confidentiality Privilege communication</li> <li>• Release of medical information</li> <li>• Unauthorized disclosure</li> <li>• Retention of medical records</li> </ul> Other various aspects.
9	Professional Indemnity insurance policy
10	Development of standardized protocol to avoid near miss or sentinel events
11	Obtaining an informed consent

**Books:**

1. Medical Law and Ethics by Bonnie F Fremgen
2. Medical Law and Ethics by Jonathan Herring

<b>Course Title</b>	<b>Professionalism and values</b>
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**Course Objectives** - The module on professionalism will deliver the concept of what it means to be a professional and how a specialized profession is different from a usual vocation. It also explains how relevant is professionalism in terms of healthcare system and how it affects the overall patient environment.

**Detailed Syllabus**

1.	<b>Professional values</b> Integrity, Objectivity, Professional competence and due care, Confidentiality
2.	<b>Personal values-</b> ethical or moral values
3.	<b>Attitude and behaviour-</b> professional behaviour, treating people equally
4.	Code of conduct, professional accountability and responsibility, misconduct
5.	Differences between professions and importance of team efforts
6.	Cultural issues in the healthcare environment

**Books**

<b>Course Title</b>	<b>Principles of management</b>
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**Course Objectives** - The course is intended to provide a knowledge about the basic principles of Management.

**Detailed Syllabus**

1	Introduction to management
2	Strategic Management
3	Foundations of Planning
4	Planning Tools and Techniques
5	Decision Making, conflict and stress management
6	Managing Change and Innovation
7	Understanding Groups and Teams
8	Leadership
9	Time Management

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10	Cost and efficiency
<b>Books</b>	
<b>Constitution of India (subsidiary subject)</b>	
<b>Course Objectives</b> - The course is intended to provide a knowledge regarding Constitution of India, rights and responsibilities.	
<b>Detailed Syllabus</b>	
1	Unit – I: Meaning of the term ‘Constitution’. Making of the Indian Constitution 1946- 1950.
2	Unit – II: The democratic institutions created by the constitution, bicameral system of Legislature at the Centre and in the States.
3	Unit – III: Fundamental rights and duties their content and significance.
4	Unit – IV: Directive principles of States, policies the need to balance fundamental rights with directive principles.
5	Unit – V: Special rights created in the Constitution for dalits, backwards, women and children and the religious and linguistic minorities.
6	Unit – VI: Doctrine of Separation of Powers, legislative, executive and judicial and their functioning in India.
7	Unit – VII: The Election Commission and State Public Service commissions.
8	Unit – VIII: Method of amending the Constitution.
9	Unit – IX: Enforcing rights through writs.
10	Unit – X: Constitution and sustainable development in India.
<b>Books</b>	

## C. Human Anatomy & Physiology (Part-2)

Core 3	BSc.DTT -011 & 012	Human Anatomy and Physiology Part-2
<b>Course Objectives</b>		
<ul style="list-style-type: none"> <li>• The course provides the students understanding of the structure and relationships of the systems and organs of the body which is essential in-patient preparation and positioning.</li> <li>• Introduction to system and cavities of the body.</li> </ul>		
<b>Detailed Syllabus</b>		
<b>Section I (Anatomy)</b>		
1	<b>Heart and blood vessels (Cardiovascular system):</b> a. Blood vessels: arteries, veins, capillaries, sinusoids, structure and functions b. Heart: Position, structure and functions c. Circulation of blood: pulmonary, systemic, portal, main blood vessels, their origins and distribution. d. Blood vessels of head, neck, upper limb and lower limb.	
2	<b>The Lymphatic system:</b> a. The parts of the lymphatic system. b. Lymph channels: Capillaries, vessels, ducts structure and functions c. Lymph nodes: position, structure and functions d. Lymphatic tissues: tonsils, adenoids, intestinal nodules e. Spleen: position, structure and functions	
3	<b>The digestive system:</b> a. Elementary tract structure: b. Mouth, pharynx, salivary glands, oesophagus, stomach, liver, gall bladder, small intestine, large intestine (Position, structure and functions of these organs. ) c. Digestion and absorption, Metabolism of carbohydrates. Proteins and fats.	

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4.	<b>Peritoneum</b> - a. Description in brief. b. Demonstration of reflections
4	<b>The Urinary System:</b> Anatomy of Kidney, ureter, urinary bladder, male and female urethra. Histology of kidney, ureter and urinary bladder.

5	<p><b>The reproductive system: Diseases of female and male reproductive system.</b></p> <p><b>a. Female reproductive system:</b></p> <ul style="list-style-type: none"> <li>• External genitalia: positions and structures and functions.</li> <li>• Perineum.</li> <li>• Internal organs: positions and structures.</li> <li>• Vagina, uterus, uterine tubes, ovaries.</li> <li>• Menstrual cycle” stages, hormone control, ovulation.</li> <li>• Breasts (Mammary glands)</li> <li>• Changes: puberty, in pregnancy, during lactation.</li> </ul> <p><b>b. Male reproductive system:</b></p> <ul style="list-style-type: none"> <li>• Scrotum, testis, epididymis: positions.</li> <li>• Spermatogenesis,</li> <li>• Spermatic Cords, seminal vesicles,</li> <li>• Ejaculatory ducts: position, structure &amp; functions</li> <li>• Prostate gland: position</li> <li>• Functions of male reproductive system, puberty</li> </ul>
6	<p><b>The Endocrine system:</b></p> <p>a. Endocrine glands:</p> <p>b. Pituitary and hypothalamus: Position &amp; structure</p> <p>c. Thyroid gland, parathyroid glands</p> <p>d. Adrenal (supra renal) glands</p> <p>e. Pancreases: Position, types of cells</p> <p>f. Hormones: secretion, function and control, pineal gland</p> <p>g. Common terms and diseases related to the system</p>
7	<p><b>The organs of sense:</b></p> <p>a. Hearing and the ear:</p> <p>b. External, middle and inner ear</p> <p>c. Physiology of hearing and diseases of ear.</p> <p>d. Sight and the eye: position, structure, sclera, cornea, choroid, ciliary body.</p> <p>e. Iris, lens, retina, optic nerves</p> <p>f. Physiology of sight and diseases of the eye.</p>
8	<p><b>Sense of smell:</b></p> <p>a. Olfactory nerves, origins, distribution</p> <p>b. Physiology of smell</p> <p>c. Sense of taste : tongue</p>
9	<p><b>The nervous system: Common diseases of the system.</b></p> <p>a. Neurons: Structure, types and properties</p> <p>b. Central nervous system: neurons, neuralgia meninges.</p> <p>c. Ventricles of brain, CSF</p> <p>d. Brain, spinal cord: structures, functions, peripheral nervous system.</p> <p>e. Spinal and cranial nerves: origin distribution and functions.</p> <p>f. Automatic nervous system</p> <p>g. Sympathetic and para sympathetic: origin distribution and function.</p>
10	<p><b>The Skin:</b></p> <p>a. Structure of skin</p> <p>b. Epidermis, dermis</p> <p>c. Functions of skin</p>
	<p>d. Hypothermia</p> <p>e. Wound healing: primary and secondary diseases of skin</p>

11	<p><b>Embryology:</b></p> <ul style="list-style-type: none"> <li>• Spermatogenesis &amp; oogenesis.</li> <li>• Ovulation, fertilization.</li> <li>• Fetal circulation.</li> <li>• Placenta.</li> <li>• <input type="checkbox"/> Demonstration of models.</li> </ul>
<b>Section II (Physiology)</b>	
12	<p><b>Cardiovascular system</b></p> <p>a. Heart: physiological anatomy, nerve supply.  b. Properties of cardiac muscle, cardiac cycle: systole, diastole. Intra-ventricular pressure curves.  c. Cardiac output (only definition).  d. Heart sounds, normal heart sounds, areas of auscultation.  e. Blood pressure: definition, normal value, clinical measurement of blood pressure.  f. Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension.  g. Pulse: jugular, radial pulse, triple response.  h. Heart sounds: normal heart sounds, causes, characteristics and significance, heart rate.  i. Electrocardiogram (ECG) significance.</p>
13.	<p><b>Digestive System</b></p> <p>a. Physiological anatomy of gastro intestinal tract, functions of digestive system.  b. Salivary glands: structure and functions, deglutition: stages and regulation.  c. Stomach: structure and functions.  d. Gastric secretion: composition function regulation of gastric juice secretion.  e. Pancreas: structure, function, composition, regulation of pancreatic juice.  f. Functions of liver. Bile secretion, composition, function, regulation of bile secretion, bilirubin metabolism, types of bilirubin, Vandenberg reaction, jaundice: types, significance.  g. Functions of gall bladder.  h. Small intestine: functions, digestion, absorption, movements.  i. Large intestine: functions, digestion and absorption of carbohydrates, proteins, fats, lipids, defecation</p>
14.	<p><b>Endocrine System</b></p> <p>a. Definition, classification of endocrine glands &amp; their hormones, properties of hormones.  b. Thyroid gland hormone: physiological anatomy, hormone secreted, physiological function, regulation of secretion, disorders: hypo and hyper secretion of hormone.  c. Adrenal cortex: physiological anatomy of adrenal gland, adrenal cortex, cortical hormones, functions and regulation.  d. Adrenal medulla: hormones, regulation and secretion. Functions of adrenaline and nor adrenaline.  e. Pituitary hormones: anterior and posterior pituitary hormones, secretion, function.  f. Hormones of pancreas.  g. Insulin: secretion, regulation, function and action.  h. Diabetes mellitus: regulation of blood glucose level.  i. Parathyroid gland: function, action, regulation of secretion of parathyroid hormone.  j. Calcitonin: function and action.</p>
15.	<p><b>Special senses</b></p> <p>a. Vision: structure of eye, function of different parts.  b. Structure of retina.  c. Hearing: structure and function of ear, mechanism of hearing.  d. Taste buds: functions.  e. Smell: physiology, receptors.</p>
16.	<b>Nervous system</b>

	<p>a. Functions of nervous system, neuron: structure, classification and properties.                  b. Neuroglia, nerve fiber, classification, conduction of impulses continuous and saltatory.                  c. Velocity of impulse transmission and factors affecting.                  d. Synapse: structure, types, properties.                  e. Receptors: definition, classification, properties.                  f. Reflex action: unconditioned properties of reflex action. Babinski's sign.                  g. Spinal cord nerve tracts. Ascending tracts, descending tracts.                  h. Pyramidal tracts</p> <ul style="list-style-type: none"> <li>• Extrapyramidal tracts, functions of medulla, pons, hypothalamic disorders.</li> <li>• Cerebral cortex lobes and functions, sensory cortex, motor cortex, cerebellum, functions of cerebellum. Basal ganglion: functions. EEG.</li> <li>• Cerebro Spinal Fluid (CSF): formation, circulation, properties, composition and functions.</li> <li>• Lumbar puncture.</li> </ul> <p>i. Autonomic Nervous System:                  J. Sympathetic and parasympathetic distribution and functions and comparison of functions.</p>
17.	<p><b>Excretory System</b></p> <p>a. Functions of kidneys, nephron, vasa recta, cortical and juxtamedullary nephrons, comparison, juxta glomerular apparatus: structure and function. Renal circulation peculiarities.                  b. Mechanism of urine formation: ultrafiltration criteria for filtration GFR, plasma fraction,                  c. GFR, factors effecting GFR. Determination of GFR selective reabsorption –sites of reabsorption, substance reabsorbed, mechanisms of reabsorption of glucose, urea, H<sup>+</sup>, Cl<sup>-</sup> amino acids etc. TMG, tubular load, renal threshold % of reabsorption of different substances, selective secretion.                  d. Properties and composition of normal urine, urine output. Abnormal constituents in urine, mechanism of urine concentration. Counter-current mechanisms: micturition, innervation of bladder, cystometrogram.                  e. Diuretics: water, diuretics, osmotic diuretics, artificial kidney, renal function tests: plasma clearance, actions of ADH, aldosterone and PTH on kidneys.                  f. Renal function tests.</p>
18.	<p><b>Reproductive system</b></p> <p>a. Function of reproductive system, puberty.                  b. Male reproductive system: functions of testes, spermatogenesis: site, stages, factors influencing, semen. Endocrine functions of testes.                  c. Androgens: testosterone structure and functions.                  d. Female reproductive system: ovulation, menstrual cycle: physiological changes during pregnancy, pregnancy test.                  e. Lactation: composition of milk, factors controlling lactation.</p>
19.	<p><b>Skin</b></p> <p>a. Structure and function, body temperature measurement, physiological variation, regulation of body temperature by physical chemical and nervous mechanisms. Role of hypothalamus, hypothermia and fever.</p>
<p><b>Books</b></p> <ol style="list-style-type: none"> <li>1. William Davis (P) understanding Human Anatomy and Physiology MC Graw Hill</li> <li>2. Chaurasia -A Text book of Anatomy</li> <li>3. T. S. Ranganathan - A text book of Human Anatomy</li> <li>4. Fattana, Human anatomy (Description and applied) Saunder's &amp; C P Prism Publishers, Bangalore – 1991</li> <li>5. ESTER . M. Grishcimer, Physiology &amp; Anatomy with Practical Considerations, J.P. Lippin Cott. Philadelphia</li> <li>6. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism publishers</li> <li>7. Chatterjee(CC) Human Physiology Latest Ed. Vol-1, Medical Allied Agency</li> <li>8. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book,</li> <li>9. Ganong (William F) Review of Medical Physiology. Latest Ed . Appleton</li> <li>10. Foundation of anatomy and physiology, Ross and Wilson, Churchill LivingstoneSurface anatomy for radiographer, Mekears and Owen, Blackwell Scientific</li> </ol> <p>Basics of Medical Physiology, Venkatesh</p>	

**D. Applied anatomy & physiology related to Dialysis Therapy Technology**

Core 4	BSc.DTT -013	Applied anatomy & physiology related to Dialysis Therapy Technology
<b>Course Objectives</b>		
<ul style="list-style-type: none"> <li>The course provides the students understanding of the structure, function and relationships kidney, ureter, bladder, peritoneum and blood vessel in relation to initiation of renal replacement therapy.</li> </ul>		
<b>Detailed Syllabus</b>		
<b>Section I (Anatomy)</b>		
1	<b>Applied anatomy</b> 1. Basic anatomy of urinary system: structural anatomy of kidney, bladder, ureter, urethra, prostate. 2. Histology of kidney. 3. Blood supply of kidney. 4. Development of kidney in brief. 5. Anatomy of peritoneum including concept of abdominal hernias. 6. Anatomy of vascular system: a. Upper limb vessels: course, distribution, branches, origin & abnormalities. b. Neck vessels: course, distribution, branches, origin & abnormalities. c. Femoral vessels: course, distribution, branches, origin & abnormalities	
2	<b>Physiology</b> 1. Mechanism of urine formation. 2. Glomerular filtration rate (GFR). 3. Clearance studies. 4. Physiological values of urea, creatinine, electrolytes, calcium, phosphorous, uric acid, magnesium, glucose; 24 hours urinary indices – urea, creatinine, electrolytes, calcium, magnesium. 5. Physiology of renal circulation a. Factors contributing & modifying renal circulation. b. Auto regulation. 6. Hormones produced by kidney & physiologic alterations in pregnancy. 7. Haemostasis: coagulation cascade, coagulation factors, auto regulation, BT, CT, PT, PTT, thrombin time. 8. Acid base balance: basic principles & common abnormalities like hypokalemia, hyponatremia, hyperkalemia, hypernatremia, hypocalcemia, hypercalcemia, pH, etc. 9. Basic nutrition in renal diseases.	

**A. General Pathology & General Microbiology**

Foundation 7	BSc.DTT -015	General Pathology
	BSc.DTT -016	General Microbiology
Pathology		Lectures
1	<b>General Pathology Adaptations, Cell Injury and Repair:</b> Hyperplasia, atrophy, metaplasia, necrosis and apoptosis - Differences between apoptosis and necrosis.	2
2	<b>Acute and Chronic inflammation:</b> Five cardinal signs of inflammation- Outcomes of <ul style="list-style-type: none"> <li>• Acute inflammation</li> <li>• Chronic inflammation</li> <li>• Granulomatous inflammation</li> <li>• □ Acute phase proteins</li> </ul>	2
3	<b>Tissue repair, regeneration and hemodynamic disorders:</b> Cutaneous wound healing Pathologic aspects of repair-Hyperaemia and congestion-Thrombosis and Virchow triad Embolism-Infarction-Shock ; Bronchial asthma, COPD - Tumors	2
4	<b>Diseases of immune system:</b> Hypersensitivity reaction-Type I, II, III, and IV hypersensitivity reactions	2
5	<b>Neoplasia:</b> <ul style="list-style-type: none"> <li>• Definition of neoplasia.</li> <li>• Differences between benign and malignant tumors</li> <li>• Metastasis</li> <li>• Carcinogenesis – Causes</li> <li>• Carcinoma of oral cavity – Causes</li> <li>• Etiology of Carcinoma cervix – type of virus implicated, high risk sero-types, Screening investigations</li> <li>• □ Breast carcinoma – Risk factors</li> </ul>	2
<b>Systemic Pathology</b>		
6	<b>RBC and Bleeding disorders:</b> <ul style="list-style-type: none"> <li>• Anaemia – Definition and classification,</li> <li>• Haemolytic anaemia,</li> <li>• Iron deficiency anemia,</li> <li>• Thrombocytopenia,</li> <li>• □ Coagulation disorders – Terminology, Uses of Bleeding Time, PT and a PTT</li> </ul>	2
7	<b>WBC disorders:</b> <ul style="list-style-type: none"> <li>• Leukocytosis,</li> <li>• Leukemia – acute and chronic,</li> <li>• □ Causes of splenomegaly</li> </ul>	2
8	<b>Disease of the GIT:</b> Causes of <ul style="list-style-type: none"> <li>• Peptic ulcer</li> <li>• Carcinoma stomach</li> </ul>	2

	<ul style="list-style-type: none"> <li>• Intestinal obstruction</li> <li>• acute appendicitis</li> <li>• <input type="checkbox"/> Colonic carcinoma</li> </ul>	
9	<p><b>Diseases of Liver, Biliary tract and Pancreas:</b></p> <ul style="list-style-type: none"> <li>• Jaundice – classification based on pathophysiology</li> <li>• Cirrhosis – Definition and causes</li> <li>• Hepatitis – Types of viral hepatitis and transmission</li> <li>• Portal hypertension – Symptoms</li> <li>• <input type="checkbox"/> Hepatic failure</li> </ul>	2
10	<p><b>Endocrine System:</b></p> <ul style="list-style-type: none"> <li>• Diagnostic criteria of diabetes mellitus,</li> <li>• Major subtypes of diabetes mellitus,</li> <li>• Differences between type I and Type II diabetes mellitus,</li> <li>• Complications of diabetes mellitus</li> </ul>	2
11	<p><b>Blood vessels:</b></p> <ul style="list-style-type: none"> <li>• Atherosclerosis Risk factors; American Heart association classification (1995) of Human atherosclerosis</li> <li>• Hypertension – diagnostic criterion, types and causes</li> <li>• Varicose veins</li> <li>• <input type="checkbox"/> Thrombophlebitis and Phlebothrombosis</li> </ul>	2
12	<p><b>The Heart:</b></p> <ul style="list-style-type: none"> <li>• Heart failure</li> <li>• congenital heart diseases causing left to right shunt and vice versa</li> <li>• Myocardial infarction – causes, laboratory changes and complications</li> <li>• Cor-pulmonale</li> <li>• <input type="checkbox"/> Rheumatic fever</li> </ul>	2
13	<p><b>Diseases of the Lung:</b></p> <ul style="list-style-type: none"> <li>• Chronic obstructive pulmonary disease; Asthma – pathogenesis</li> <li>• Pneumonia – lobar and bronchopneumonia</li> <li>• <input type="checkbox"/> Lung carcinoma – Incidence and Causes</li> </ul>	2
14	<p><b>The Kidney and Lower urinary tract:</b></p> <ul style="list-style-type: none"> <li>• Acute Renal failure – definition and causes of Prerenal, renal and post-renal ARF</li> <li>• Chronic renal failure – definition and causes</li> <li>• Acute nephritic syndrome – definition and causes</li> <li>• Nephrotic syndrome – definition and causes;</li> <li>• Acute tubular necrosis – definition and causes</li> <li>• <input type="checkbox"/> Urolithiasis – types of stones</li> </ul>	2
15	<p><b>Female genital tract:</b></p> <ul style="list-style-type: none"> <li>• Endometriosis – Definition</li> <li>• Adenomyosis – Definition</li> <li>• Leiomyoma</li> </ul> <p><b>Male genital tract:</b></p> <ul style="list-style-type: none"> <li>• Carcinoma penis – causes</li> <li>• Testicular tumors – Classification terminology</li> <li>• <input type="checkbox"/> Prostatic Hyperplasia – Causes, symptoms and PSA screening</li> </ul>	2

16	<p><b>Nervous system:</b></p> <ul style="list-style-type: none"> <li>• Intracerebral, Subarachnoid and Subdural haemorrhage</li> <li>• Meningitis and Encephalitis – Bacterial and viral causes and CSF findings;</li> <li>• Epilepsy – Causes;</li> <li>• Acute brain failure – Coma;</li> <li>• Epilepsy – Classification terminology;</li> <li>• ☐ CNS tumors – Classification terminology</li> </ul>	2
17.	<p><b>Histopathology</b></p> <ol style="list-style-type: none"> <li>a. Introduction to histopathology.</li> <li>b. Receiving of specimen in the laboratory.</li> <li>c. Grossing techniques.</li> <li>d. Mounting techniques: various mountants.</li> <li>e. Maintenance of records and filing of the slides.</li> <li>f. Use &amp; care of microscope.</li> <li>g. Various fixatives, mode of action, preparation and indication.</li> <li>h. Section cutting.</li> <li>i. Tissue processing for routine paraffin sections.</li> <li>j. Decalcification of tissues.</li> <li>k. Staining of tissues: H &amp; E Staining.</li> <li>l. Bio-medical waste management.</li> </ol>	
18.	<p><b>Clinical Pathology</b></p> <ol style="list-style-type: none"> <li>a. Introduction to clinical pathology.</li> <li>b. Collection, transport, preservation, and processing of various clinical specimens.</li> <li>c. Urine Examination: collection and preservation of urine, physical, chemical, microscopic examination.</li> <li>d. Examination of body fluids.</li> <li>e. Examination of cerebro spinal fluid (CSF).</li> <li>f. Sputum examination.</li> <li>g. Examination of faeces.</li> </ol>	
19.	<p><b>Haematology</b></p> <ol style="list-style-type: none"> <li>a. Introduction to haematology.</li> <li>b. Normal constituents of blood, their structure and function.</li> <li>c. Collection of blood samples.</li> <li>d. Anticoagulants used in haematology.</li> <li>e. Instruments and glassware used in haematology, preparation and use of glassware.</li> <li>f. Laboratory safety guidelines.</li> <li>g. SI units and conventional units in hospital laboratory.</li> <li>h. Hb, PCV.</li> <li>i. ESR.</li> <li>j. Normal haemostasis.</li> <li>k. Bleeding time, clotting time, prothrombin time, activated partial thromboplastin time.</li> </ol>	
20.	<p><b>Blood Bank</b></p> <ol style="list-style-type: none"> <li>a. Introduction.</li> <li>b. Blood grouping and Rh types.</li> <li>c. Cross matching.</li> </ol>	

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**Books:**

1. Text book on Pathology for DMLT & Paramedical Courses, Dr. I Clement
2. Textbook of Pathology for Allied Health Sciences, Ramadas Naya
3. Culling Histopathology techniques
4. Bancroft Histopathology techniques
5. Koss - cytology
6. Winifred greg - Diagnostic cytopathology
7. Orell - Cyto Pathology
8. Todd & Sanford Clinical Diagnosis by laboratory method
9. Dacie & Lewis - Practical Haematology
10. Ramanic Sood, Laboratory Technology (Methods and interpretation) 4th Ed. J.P. Bros, New Delhi - 1996)
11. Satish Gupta Short text book of Medical Laboratory for technician J.P. Bros, New Delhi - 1998
12. Sachdev K.N. Clinical Pathology and Bacteriology 8th Ed, J.P. Bros, New Delhi-1991.
13. Krishna - Text book of Pathology, Orient Longman PVT Ltd.

**Course Title - Microbiology**

1	Introduction and morphology - Introduction of microbiology, Classification of microorganisms, size, shape and structure of bacteria. Use of microscope in the study of bacteria
2	Growth and nutrition -nutrition, culture media, types of medium with example and uses of culture media in diagnostic bacteriology, antimicrobial sensitivity test
3	Culture media a. Use of culture media in diagnostic bacteriology, antimicrobial sensitivity test.
3	Sterilization and disinfection - principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, anti-septic and disinfectants.
4	Introduction to immunology, bacteriology, parasitology, mycology
5	Immunology a. Immunity, vaccines, types of vaccine and immunization schedule, principles and interpretation of common serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA. b. Rapid tests for HIV and HBsAg (excluding technical details).
6	Systematic Bacteriology a. Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria (excluding classification, antigenic structure and pathogenicity), b. Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, E. coli, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas & Spirochetes.
7	Parasitology a. Morphology, life cycle, laboratory diagnosis of following parasites: E. histolytica, Plasmodium, tape worms, Intestinal nematodes.
8.	Mycology a. Morphology, diseases caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi
9.	Virology a. General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.

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10	Hospital infection a. Causative agents, transmission methods, investigation, prevention and control of hospital infection.
11	Principles and practice Biomedical waste management

**Books:**

1. Practical Medical Microbiology by Mackie and McCartney
2. Text book of Microbiology by Ananthanarayan
3. Medical Microbiology by Panikar & Satish Gupte
4. Text book of Microbiology by Prescott

**B. Research Methodology & Biostatistics Part 1**

Foundation 8	BSc.DTT -008	Research Methodology & Biostatistics Part 1
<b>Course Title - Research Methodology and Biostatistics</b>		
<b>Course Objectives</b> - The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings		
<b>Detailed Syllabus</b>		
1.	Introduction to research methods	
2.	Identifying research problem	
3.	Ethical issues in research	
4.	Research design	
5.	Basic Concepts of Biostatistics	
6.	Types of Data	
7.	Research tools and Data collection methods	
8.	Sampling methods	
9.	Developing a research proposal	
<b>Text Books</b>		
1. Research for physiotherapist- Carolin Hicks		
2. Mahajan's Methods In Biostatistics For Medical Students And Research Workers, by Bratati Banerjee (Editor). Publisher : Jaypee Brothers Medical Publishers; 9th edition (2018)		

**C. General Pharmacology**

<b>Core 5</b>	<b>BSc.DTT -018</b>	<b>A. General Pharmacology</b>
<b>Course Title - General Pharmacology</b>		
<b>Course Objectives</b> The objective of this module is to help the students pharmacokinetics, pharmacodynamics, interaction, effect and adverse effect of drug within living human being.		
<b>Detailed Syllabus</b>		
1.	Concepts of the interactions of chemical agents with living tissues, effect of drugs on the body, drugs and alteration of disease processes, toxicity effects. New drugs testing and development prior to use for patient care.	
2.	Drug use in renal disease, drugs in special populations (the neonate and infant, the pregnant and elderly), pharmacokinetics, drug interactions, Definitions, routes of drug administration, Pharmacodynamics, adverse drug reactions, therapeutic drug monitoring, pharmacogenomics and principles of individualization of drug therapy.	
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>Essentials of Medical Pharmacology – K.D. Tripathi</li> <li>Goodman &amp; Gilman's the Pharmacological Basis of Therapeutics</li> <li>Basic and Clinical Pharmacology by Bertram G. Katzung</li> <li>Lippincott Illustrated Reviews: Pharmacology</li> </ol>		

**D. Applied pathology & microbiology related to Dialysis Therapy Technology**

<b>Core 6</b>	<b>BSc.DTT -017</b>	<b>Applied pathology &amp; microbiology related to Dialysis Therapy Technology</b>
<b>Course Title - Applied pathology &amp; microbiology related to Dialysis Therapy Technology</b>		
<b>Course Objectives</b> - The objective of this module is to help the students to understand pathology and microbiology for better understanding of kidney disease and renal replacement therapy		
<b>Detailed Syllabus</b>		
1.	<b>Applied Pathology</b> <ol style="list-style-type: none"> <li>Congenital abnormalities of urinary system.</li> <li>Classification of renal diseases.</li> <li>Glomerular diseases: causes, types &amp; pathology.</li> <li>Tubulo-interstitial diseases.</li> <li>Renal vascular disorders.</li> <li>End stage renal diseases: causes &amp; pathology.</li> <li>Pathology of kidney in hypertension, diabetes mellitus, pregnancy.</li> <li>Pathology of peritoneum, peritonitis, bacterial, tubular &amp; sclerosing peritonitis, dialysis induced changes.</li> <li>Pathology of urinary tract infections</li> <li>Pyelonephritis &amp; tuberculous pyelonephritis</li> </ol>	
2.	<b>Applied Microbiology</b> <ol style="list-style-type: none"> <li>Hepatotropic viruses in detail: mode of transfusion, universal precautions vaccinations.</li> <li>Human immunodeficiency virus (HIV), mode of transfusion, universal precautions.</li> <li>Opportunistic infections.</li> <li>Microbiology of urinary tract infections.</li> <li>Microbiology of vascular access infection (femoral, jugular, subclavian catheters).</li> <li>Sampling methodologies for culture &amp; sensitivity.</li> </ol>	

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Books

1. Handbook of Dialysis – John T. Dugridas
2. Oxford handbook of dialysis
3. Handbook of chronic kidney disease - John T. Dugridas
4. Brenner and Rector's The Kidney
5. Oxford Textbook of Clinical Nephrology
6. Comprehensive Clinical Nephrology – by John Feehally
7. ISPD guidelines
8. KDIGO guidelines
9. KDOQI Clinical Practice Guideline

**A. Research Methodology & Biostatistics Part 2**

<b>Foundation 9</b>	<b>Research Methodology part 2</b>
The objective of this module is to help the students understand how to conduct research in medical field.	
<b>Detailed Syllabus</b>	
<b>1.</b>	<b>Accessing research literature:</b> Use of databases and other sources
<b>2.</b>	<b>Understanding research design:</b> <ul style="list-style-type: none"> <li>• Qualitative and quantitative methodologies</li> <li>• Their differences and potential integration</li> <li>• Evaluating research and its potential for informing practice</li> <li>• Developing research questions and devising methods for their investigation</li> <li>• Ethical issues in research</li> </ul>
<b>3.</b>	<b>Analysis:</b> <ul style="list-style-type: none"> <li>• Analysis of qualitative and quantitative data</li> <li>• Utilization of appropriate software to assist in the retrieval of information and data analysis</li> </ul>
<b>4.</b>	<b>Clinical audit:</b> <ul style="list-style-type: none"> <li>• Distinctiveness of research and audit processes and their function</li> </ul>
<b>5.</b>	<b>Research Skills and Management:</b> <ul style="list-style-type: none"> <li>• The role of evidence based practice within health and welfare</li> </ul>
<b>Books:</b>	
1. Research for physiotherapist- Carolin Hicks	
2. Mahajan's Methods In Biostatistics For Medical Students And Research Workers, by Bratati Banerjee (Editor). Publisher : Jaypee Brothers Medical Publishers; 9th edition (2018)	

**B. Pharmacology related to dialysis technology**

<b>Core 7</b>	<b>BSc.DTT -019</b>	<b>Pharmacology related to dialysis technology</b>
<b>Course Title</b>		<b>Pharmacology related to dialysis technology</b>
<b>Course Objectives</b> - The objective of this module is to help the students to understand pharmacology related to management of kidney disease and renal replacement therapy.		
<b>Detailed Syllabus</b>		
1	IV fluid therapy with special emphasis in renal diseases.	
2	Diuretics: classification, actions, dosage, side effects & contraindications.	
3	Anti-hypertensives: classification, actions, dosage, side effects & contraindications, special reference during dialysis, vasopressors, drugs used in hypotension.	
4	Drugs & dialysis: dose & duration of administration of drugs.	
5	Dialyzable drugs: phenobarbitone, lithium, methanol etc.	
6	Vitamin D & its analogues, phosphate binders, iron, folic acid & other vitamins of therapeutic value.	
7	Erythropoietin in detail.	
8	Heparin, low molecular weight heparin and heparin-induced thrombocytopenia	
9	Protamine sulphate as antidote and indication.	
10	Alternative anticoagulants.	

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11	Formalin, citrate, sodium hypochlorite, hydrogen peroxide: role as disinfectants & adverse effects of residual particles applicable to formalin.
12	Hemodialysis concentrates: composition & dilution (acetate & bicarbonates).
13	Peritoneal dialysis fluid in particular hypertonic solutions: composition.
14	Potassium exchange resins with special emphasis on mode of administration.

**Text Books**

7. Handbook of Dialysis – John T. Dugridas
8. Oxford handbook of dialysis
9. Handbook of chronic kidney disease - John T. Dugridas
10. Brenner and Rector's The Kidney
11. Oxford Textbook of Clinical Nephrology
12. Comprehensive Clinical Nephrology – by John Feehally
13. ISPD guidelines
14. KDIGO guidelines
15. KDOQI Clinical Practice Guideline

**C. Concepts of renal disease, dialysis & nutrition**

Core 8	BSc.DTT -020	Concepts of renal disease, dialysis & nutrition
<b>Course Title - Concepts of renal disease, dialysis &amp; nutrition</b>		
<b>Course Objectives</b> - The objective of this module is to help the students to concepts of renal disease, basics renal replacement therapy & nutrition in renal patients.		
<b>Detailed Syllabus</b>		
1	<b>Basic Concepts of Renal Diseases</b> 1. Acute renal failure. 2. Nephrotic syndrome – primary & secondary. 3. Nephritic syndrome. 4. UTI (urinary tract infections.) 5. Asymptomatic urinary abnormalities. 6. Chronic renal failure. 7. Renal stone diseases. 8. Obstructive uropathies. 9. Congenital & inherited renal diseases. 10. Tumors of kidney. 11. Pregnancy associated renal diseases. 12. Renal vascular disorders & hypertension associated renal diseases.	
2	<b>Basic Concepts of Dialysis Therapy Technology</b> 1. Definition. 2. Indications of dialysis. 3. Types of dialysis. 4. Principles of dialysis. 5. Haemodialysis apparatus - types of dialyzer & membranes. 6. Types of vascular access for haemodialysis. 7. Introduction to haemodialysis machine. 8. Priming of dialysis apparatus. 9. Dialyzer reuse. 10. Common complications of haemodialysis. 11. Monitoring of patients during dialysis.	
3	<b>Basic Concepts of Nutrition</b>  1. <b>Introduction to science of nutrition.</b> a. Definition. b. Food pattern and its relation to health.	

	<p>c. Factors influencing food habits.  d. Superstitions, culture, religion, income, composition of family, age, occupation, special group etc.  e. Food selection, storage and preservation.  f. Prevention of food adulteration.</p> <p><b>2. Classification of nutrients.</b>  a. Macronutrients and micronutrients.  b. Types, sources, requirements and deficiency of proteins.  c. Sources, requirements and deficiency of carbohydrates.  d. Types, sources, requirements and deficiency of fats.  e. Sources, requirement and storage of drinking water.  f. Types, sources, requirements and deficiency of minerals.  g. Types, sources, requirements and deficiency of vitamins.</p> <p><b>3. Planning of diets.</b>  a. Need for planning of diets.  b. Concepts of balanced diet.  c. Food groups and balanced diet.  d. Influence of age, sex, occupation &amp; physiological state.  e. Recommended dietary intake.  f. Steps in planning balanced diet.  g. Concepts of balanced diet for dialysis patients.  h. Recommended dietary intake for dialysis patients.  i. Planning diet for dialysis patients.  j. Steps in planning balanced diet for dialysis patients.</p>
<b>Text Books</b>	
<ol style="list-style-type: none"> <li>1. Handbook of Dialysis – John T. Dugridas</li> <li>2. Oxford handbook of dialysis</li> <li>3. Handbook of chronic kidney disease - John T. Dugridas</li> <li>4. Brenner and Rector's The Kidney</li> <li>5. Oxford Textbook of Clinical Nephrology</li> <li>6. Comprehensive Clinical Nephrology – by John Feehally</li> <li>7. ISPD guidelines</li> <li>8. KDIGO guidelines</li> <li>9. KDOQI Clinical Practice Guideline</li> </ol>	

**D. Applied Dialysis Therapy Technology – Part I**

<b>Core 9</b>	<b>BSc.DTT -021</b>	<b>Applied Dialysis Therapy Technology – Part I</b>
<b>Course Title</b>		<b>Applied Dialysis Therapy Technology – Part I</b>
<b>Course Objectives</b>		
The objective of this module is to help the students to understand indications, types, principles and adequacy of renal replacement therapy.		
<b>Detailed Syllabus</b>		
1	Indications of dialysis.	
2	History & types of dialysis.	
3	Theory of hemodialysis: diffusion, osmosis, ultra-filtration & solvent drag.	

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4	<p>Hemodialysis apparatus: types of dialyzer &amp; membrane, dialysate.</p> <p>a. Dialysis Membrane:</p> <ul style="list-style-type: none"> <li>• Structure,</li> <li>• Characteristics [molecular weight cut off; Ultrafiltration coefficient(Kuf); Mass transfer coefficient (KoA) and efficiency; Low and high flux; Clearance(K)]</li> <li>• Biocompatibility</li> <li>• Newer membranes.</li> </ul> <p><input type="checkbox"/> High performance membranes.</p>
5	Physiology of peritoneal dialysis.
6	<p>Dialysis machines:</p> <p>a. Latest Hemodialysis machine:</p> <ul style="list-style-type: none"> <li>• Conventional and Portable Machines</li> <li>• Wearable artificial Kidney</li> <li>• The Bioartificial Kidney</li> <li>• Home dialysis machines and patient training</li> </ul> <p>b. Mechanism of functioning &amp; management:</p> <ul style="list-style-type: none"> <li>• Hemodialysis machine</li> </ul> <p>Peritoneal dialysis machine.</p>
7.	Biochemical investigations required for renal dialysis.
8.	<p>Adequacy of dialysis</p> <p>a. Hemodialysis.</p> <p>b. Peritoneal dialysis.</p> <p>c. Peritoneal equilibration test (PET).</p>
9	Anti-coagulation.
10.	<p>Withdrawal of dialysis criteria:</p> <p>a. Acute dialysis.</p> <p>b. Chronic dialysis</p>
11.	Dialyzer reuse.
12.	Water treatment system.
<p><b>Text Books</b></p> <ol style="list-style-type: none"> <li>1. Handbook of Dialysis – John T. Dugridas</li> <li>2. Oxford handbook of dialysis</li> <li>3. Handbook of chronic kidney disease - John T. Dugridas</li> <li>4. Brenner and Rector's The Kidney</li> <li>5. Oxford Textbook of Clinical Nephrology</li> <li>6. Comprehensive Clinical Nephrology – by John Feehally</li> <li>7. ISPD guidelines</li> <li>8. KDIGO guidelines</li> <li>9. KDOQI Clinical Practice Guideline</li> </ol>	

**A. Applied Dialysis Therapy Technology – Part II**

Core 10	BSc.DTT -022	Applied Dialysis Therapy Technology – Part II
<b>Objective:</b> The student learns to dialysis special situation, pregnancy, children, poisoning and advanced blood-based therapy.		
<b>Detailed Syllabus</b>		
1.	<b>1. Dialysis in special situations:</b> a. Patients with congestive cardiac failure. b. Advanced liver disease. c. Patients positive for HIV, HBsAg & HCV. d. Failed transplant. e. Poisoning cases. f. Pregnancy.	
2.	Dialysis in infants & children.	
3.	Special dialysis procedures: a. Continuous therapies in hemodialysis. b. Different modalities of peritoneal dialysis. c. Haemodiafiltration. d. Hemoperfusion. e. SLED. f. MARS.	
4.	Plasmapheresis	
5.	Special problems in dialysis patients: a. Psychology & rehabilitation. b. Diabetes c. Hypertension. d. Infections. e. Bone diseases. f. Aluminum toxicity	
6.	Renal anemia management: chronic dialysis.	
<b>Text Books</b> 1. Handbook of Dialysis – John T. Dugridas 2. Oxford handbook of dialysis 3. Handbook of chronic kidney disease - John T. Dugridas 4. Brenner and Rector's The Kidney 5. Oxford Textbook of Clinical Nephrology 6. Comprehensive Clinical Nephrology – by John Feehally 7. ISPD guidelines 8. KDIGO guidelines 9. KDOQI Clinical Practice Guideline		

**A. Applied Dialysis Therapy Technology – Part III**

Core 11	BSc.DTT -023	Applied Dialysis Therapy Technology – Part III
<b>Objective:</b> The student learns to to diagnose and management of access related and dialysis related complications.		
<b>Detailed Syllabus</b>		
1.	1. Vascular access for hemodialysis & associated complications. 2. Peritoneal access devices: types of catheter, insertion techniques & associated complications. 3. Complications of dialysis: a. Hemodialysis: acute & long term complications. b. Peritoneal dialysis: mechanical & metabolic complications. 4. Peritonitis & exit site infection. 5. Recent advances and research in hemodialysis. a. Nocturnal dialysis. b. Online dialysis. c. Daily dialysis. 6. Telemedicine in dialysis practice. 7. Introduction to kidney transplantation immunology, procedure and Immunosuppressive medications. 8. Live donor and cadaver transplantation; paired exchange transplantation and ABO incompatible transplantation; transplant in sensitized recipients.	
<b>Practical sessions:</b>	1. Setting up dialysis machine for dialysis. 2. A V cannulation. 3. A V fistula/A V graft cannulation 4. Initiation of dialysis through central venous catheters like internal jugular, femoral & subclavian vein. 5. Packing & sterilization of dialysis trays. 6. Closing of dialysis. 7. Preparation of concentrates depending on the situations. 8. Reuse of dialysis apparatus. 9. Isolated ultrafiltration. 10. Performance of peritoneal dialysis exchange manually. 11. Setting up of automated peritoneal dialysis equipment. 12. First assistant in minor procedures. 13. Skin suturing. 14. CPR demonstrations. 15. 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).	
<b>Text Books</b> 1. Handbook of Dialysis – John T. Dugridas 2. Oxford handbook of dialysis 3. Handbook of chronic kidney disease - John T. Dugridas 4. Brenner and Rector's The Kidney 5. Oxford Textbook of Clinical Nephrology 6. Comprehensive Clinical Nephrology – by John Feehally 7. ISPD guidelines 8. KDIGO guidelines 9. KDOQI Clinical Practice Guideline		

