

**B.Sc. Renal
Dialysis
Technology**

**Faculty of Allied
Health Sciences**

2019-20

B.Sc. Renal Dialysis Technology

Semester- 1

Paper 1- Anatomy

Total Hours 50

Unit I

Organization of the Human Body, Introduction to the human body, Definition and subdivisions of anatomy, Anatomical position and terminology, Cell - Definition of a cell, shapes and sizes of cells

- Parts of a cell - cell membranes, cytoplasm, sub cellular organelles.
- Cell Division - Definition and main events in different stages of mitosis and meiosis.
- Tissues - Tissues of the body
- Definition and types of tissues
- Characteristics, functions and locations of different types of tissues
- Epithelial tissue - definition, classification with examples
- Glands- classification with examples

Unit II

Locomotion and Support (General Anatomy)

1. Cartilage - Types with examples

2. Skeletal system, Skeleton - Definition, axial and appendicular skeleton with names and number of bones, Types of bones. Marking of bones. Functions of bones. Development (types and ossification) and growth of bone. Name, location and general features of the bones of the body.

Joints - Definition and types of joints with examples. Axes and kind of movements possible. Name, location, type, bones forming, ligaments, movements possible and the muscles producing such movements of the joints of the body.

3. Muscular system , Parts of the Skeletal muscle. Definition of origin and insertion. Classification of muscular tissue. Compartment muscles of upper limb, lower limb, sternocleidomastoid

Unit III

Maintenance of the Human Body

1. Cardio-vascular system, Types and general structure of blood vessels. Structure and types of arteries and veins. Structure of capillaries. Shape, size, location, coverings, external and internal features of heart. Structure of heart wall. Conducting system and blood supply of the heart. The systemic arteries and veins. Name, location, branches and main-distribution of major arteries and veins.

2. Lymphatic system, Lymph, lymphatic vessels, name, location and features of the lymphoid organs.

3. Respiratory system, Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura.

4. Digestive system, Names of organs of digestion. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder

Unit IV

1. Urinary system and Reproductive system, Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra, Names of male and female organs of reproduction. Location and features of scrotum, testis, epididymis, vas deferens, seminal vesicle, ejaculatory duct, prostate gland, penis and spermatic cord. Location and features of uterus, uterine tube, ovary & mammary gland.

2. Development, Gametes, period of gestation, gametogenesis, structure of sperm and ovum, growth of ovarian follicles. Derivatives of germ layers, placenta

Unit V

Control Systems of the Body

1. Nervous system, Sub-divisions of the nervous system

Brain - Sub-divisions, location external features of medulla oblongata, pons, mid-brain, cerebellum and cerebrum. Spinal cord - Location, extent, spinal segments, external features and internal structure. Location and features of thalamus and hypothalamus. Locations and subdivisions of basal ganglia. Meninges and spaces around them. Name and location of ventricles of brain and circulation of cerebrospinal fluid. Blood supply of the brain and spinal cord. Cranial nerves

2. Sense organs, Location and features of the nose, tongue, eye, ear and skin

3. Endocrine system, Names of the endocrine glands. Location and features of pituitary, thyroid, parathyroid, suprarenal, pancreas, ovaries and testes. Names of hormones produced by each gland.

Practical :

1. Demonstration of parts of microscope and its uses

2. Demonstration of skeleton and joint

3. Demonstration of deltoid and gluteus maximus, Cubital fossa

4. Demonstration of heart and its blood supply, demonstration of major arteries of upper limb and lower limb, histology of cardiac muscle and histology of vessels

5. Demonstration of location and parts of lungs, histology of trachea and lungs

Recommended Books Recent Editions:

1. Ross and Wilson: Anatomy and Physiology in Health and illness

2. Understanding Human Anatomy and Physiology, William Davis (p) MC Graw Hill

3. Essentials of Human Embryology. Bhatnagar, Orient Blackswan Pvt. Ltd.

4. Anatomy for B.Sc Nursing by Renu Chauhan. Arichal publishing company 2012

5. Hand book of Anatomy BD Chaurasia

Reference books:

1. B D Chaurasia: Regional Anatomy. Vol I, II, III 6th edition

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Semester I

Paper 2-

Physiology

Total Hours 50

Unit -I

General physiology and Blood 8 Hrs General Physiology, Organization of the cell and its function, homeostasis, Transport across cell membrane, Membrane Potentials, Resting Membrane Potential & Action Potential, Body Fluid Compartments - Normal Values

Blood, Introduction: composition and function of blood. Red blood cells: erythropoiesis, stages of differentiation, function, count, physiological variation. Structure, function, concentration, physiological variation, methods of estimation of haemoglobin. White blood cells: production, function, count. Platelets: origin, normal count, morphology & functions. Plasma proteins: types, functions, Haemostasis: definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting - Blood groups: ABO system, Rh system. Blood grouping & typing, cross matching. Rh system: Rh factor, Rh incompatibility. Blood transfusion: indication. transfusion reactions. Anticoagulants: classification, examples and uses. Anaemias: morphological and etiological classification, -Blood indices: CI, MCH, MCV, MCHC. Erythrocyte sedimentation rate (ESR) and packed cell volume, normal values.

Unit -II

Digestive system & Respiratory system

10hrs

Digestive System, Physiological anatomy of gastro intestinal tract, functions of digestive system. Salivary glands: structure and functions, deglutition: stages and regulation. Stomach: structure and functions. Gastric secretion: composition function regulation of gastric juice secretion. Pancreas : structure, function, composition of pancreatic juice. Functions of liver. Bile secretion, composition, function. jaundice: types. Functions of gall bladder. Small intestine: functions, digestion, absorption, movements. Large intestine: functions, movements defecation

Respiratory system Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles. Mechanism of normal and rigorous respiration, forces opposing and favoring expansion of the lungs. Intra pulmonary & intrapleural pressure. Surface tension, recoil tendency of the thoracic cage and lungs . Transport of respiratory gases: transport of oxygen & carbon dioxide, oxy haemoglobin dissociation curve, factors affecting it. Lung volumes and capacities - normal values Regulation of respiration: mechanisms of regulation, nervous and chemical regulation, respiratory centre. Applied physiology : hypoxia, cyanosis, dyspnoea, apnoea.

Unit III

Cardiovascular and Endocrine system

Cardiovascular system Heart: Physiological Anatomy, Nerve supply. Properties of cardiac muscle, cardiac cycle: Conducting System of Heart, Origin and Spread of Cardiac Impulse, Electrocardiogram (ECG) waves and normal duration. Recording Cardiac Cycle: Phases and Volume Changes, Normal heart sounds, areas of auscultation. Pulse: jugular, radial pulse, Cardiac output : definitions of stroke volume, cardiac index, factors Affecting It. measurement of Cardiac output. General principles

of circulation. Blood pressure: definition, normal value, clinical measurement of blood pressure, hypotension, hypertension. Factors affecting it and regulation, Physiological variations & regulation of heart rate. Coronary circulation, Shock

Endocrine System, Classification of endocrine glands & Definition of hormone. Pituitary hormones: anterior and posterior pituitary hormones, secretion, functions, Thyroid gland: physiological anatomy, hormone secreted, physiological function, regulation, secretion, disorders (hypo and hyper secretion of hormone). Adrenal cortex: physiological anatomy. cortical hormones, functions and regulation. Adrenal medulla: hormones, regulation and secretion. Functions of adrenaline and nor adrenaline. Hormones of pancreas. Insulin: secretion, regulation, function and action. Diabetes mellitus: regulation of blood glucose level. Parathyroid gland: function, action, regulation of secretion of parathyroid hormone. Calcitonin:

Unit -IV

Excretory system and Reproductive system

10 hrs

Excretory System, Functional anatomy of kidney, Juxta glomerular apparatus: structure and function. Glomerular filtration, Tubular function(reabsorption and secretion), Micturition, innervation of bladder, cystometrogram. Artificial kidney, renal function tests skin and body temperature

Reproductive system Male reproductive system: functions of testes, spermatogenesis: Endocrine functions of testes -Female reproductive system: oestrogen, progesteron, menstrual cycle: ovulation, physiological changes during pregnancy, pregnancy tests. Lactation: composition of milk, factors controlling lactation.

Muscle nerve physiology, Nervous system and Special senses, properties of neuron and neuroglia. Classification of nerve fibers Classification of muscle, structure of skeletal muscle, Neuromuscular junction. Transmission across nmj Excitation contraction coupling. muscle tone, fatigue, rigor mortis.

Nervous system, Organisation of nervous system, Synapse: structure, types, properties., Receptors: definition, classification, properties. Sensations-pain, Organization Spinal cord. Ascending tracts, descending tracts. Reflex : definition reflex arc, clinical classification of reflexes : Babinski's sign. Hypothalamus- functions Cerebral cortex lobes - functions, Cerebellum- functions, Basal ganglia functions. Cerebro Spinal Fluid (CSF): formation, circulation & reabsorption . composition and functions. Lumbar puncture. Autonomic Nervous System: Sympathetic and parasympathetic distribution

Special senses Vision: structure of eye, function of different parts. Structure of retina. visual pathway, errors of refraction, Hearing: structure and functions of ear.Taste : taste buds and taste pathway.Olfaction : receptors, pathway.

Practicals

1. Haemoglobinometry.
2. Haemocytometry
3. Total leucocyte count.
4. Total Red blood cell count.
5. Determination of blood groups.
6. Differential WBC count.

Recommended Books Recent Editions

1. A.K.Jain, Human Physiology and Biochemistry for Physical Therapy and Occupational Therapy, 1st Ed. Arya Publication.
2. Dr. Venkatesh.D and Dr. Sudhakar H.S.Basic of Medical Physiology, 2nd Ed., Wolter-Kluwer Publication.
3. Chaudhari (Sujith K) Concise Medical Physiology 6th Ed. New Central Boo

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Semester I

Paper 3-

Biochemistry

Total Hours 50

Unit I

Chemistry of Cell & Chemistry of Carbohydrates, Proteins, Lipids & Nucleotides- Cell- Structure & Function of Cell Membrane, Subcellular Organelles and their Functions. Carbohydrates- Definition, Classification & Biological importance of carbohydrates, Derivatives of Monosaccharides. Proteins- Definition & Classification of amino acids & Proteins, Biologically important peptides Plasma proteins, Immunoglobulins. Lipids- Definition, Classification & Biological importance and Functions of Lipids. Structure and functions of Cholesterol, types and functions of Lipoproteins. Nucleotides- Structure and Functions of DNA & RNA. Biologically important nucleotides.

Unit II

Enzymes & Acid base balance, Enzymes- Definition and Classification. Factors affecting enzyme activity. Coenzymes and Cofactors. Enzyme inhibition & Regulation of enzyme activity, Acid Base balance- Acids, Bases & Body Buffers, Regulation of pH, Acid base disorders.

Unit III

Vitamins & Minerals, Vitamins-Classification, Sources, RDA, Functions(in brief), deficiency manifestations and hypervitaminosis. Minerals- Classification, Sources, RDA, Functions (in Brief), deficiency manifestations of the following: calcium, phosphorous, iron, copper, iodine, zinc, fluoride, magnesium, selenium, sodium, potassium and chloride.

Unit IV

Nutrition, Blood chemistry & Urine Chemistry Nutrition- Nutrients, Calorific value of food, BMR, SDA, respiratory quotient and its applications, Balanced diet based on age, sex and activity, biological value of proteins, nitrogen balance, Protein energy malnutrition, Total parenteral nutrition, dietary fibers. Blood chemistry- Biochemical components & their reference ranges in normal & diseased states. Urine chemistry- Biochemical components & their reference ranges in normal & diseased states.

Unit V

Clinical Biochemistry-

Specimen Collection- Blood, Urine and Body fluids. Preanalytical, analytical and postanalytical errors Clinical Biochemistry- Parameters to diagnose Diabetes & Cardiovascular diseases. Diagnostic enzymology, Assessment of arterial Blood gas status and electrolyte balance, Point of Care Testing. Renal Function tests(in brief), Liver function tests(in brief), Biomedical Waste Management.

Practicals:

1. General Reactions of Carbohydrates.
2. Color reactions of Proteins.
3. Reactions of Non Protein nitrogenous substances.
4. Demonstration of pH meter, Colorimeter and spectrophotometer.
5. Demonstration of Chromatography and Electrophoresis.

Recommended books Recent edition

1. Textbook of Biochemistry -D.M.Vasudevan
2. Biochemistry -Pankaja Naik
3. Clinical Biochemistry-Principles and Practice-Praful.B.Godkar
4. Textbook of Biochemistry-Chatterjea and Shinde
5. Textbook of Clinical Chemistry-Norbert W Teitz

Semester I
Paper 4-
Communication skill and personality development

UNIT 1

Listening Comprehension, Speeches, Interviews, audio-video clippings followed by exercises, Introduction to Communication, Importance of Communication, Barriers to Communication and ways to overcome them.

UNIT 2

Conversation Skills, Greetings and Introducing oneself, Framing questions and answers, Role play, Buying: asking details etc, Word formation strategies, Vocabulary building: Antonyms, Synonyms, Affixation, Suffixation, One word substitution

UNIT 3

Reading Comprehension, Simple narration and Stories, Newspaper and articles clippings, Sentence types, Note Making, Paragraph Writing, Comprehension, Report Writing: types, characteristics.

UNIT 4

Pronunciation, Pronunciation, Syllable and Stress, Intonation and Modulation.

UNIT 5

Writing Comprehension, Letters: types, format, style, Précis Writing, Paragraph: Order, Topic sentence, consistency, coherence, Report and Proposal, Project Writing: Features, Structure.

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Semester II

Paper 1-

Pathology

Total Hours 50

Unit I

Introduction- & scope of pathology Cell injury and Cellular adaptations - Normal cell, Cell injury - types, etiology, morphology, Cell death-autolysis, necrosis, apoptosis, Cellular adaptations-atrophy, hypertrophy, hyperplasia, metaplasia. Inflammation-Introduction, acute inflammation-vascular events, cellular events, chemical mediators, chronic inflammation-general features, granulomatous inflammation, tuberculosis.

Healing and repair - Definition, different phases of healing, factors influencing wound healing, fracture healing. Haemodynamic disorders-Oedema, hypermia, congestion, haemorrhage, embolism, thrombosis, infarction. Neoplasia - definition, nomenclature, features of benign and malignant tumors, spread of tumors, dysplasia, carcinoma in situ, precancerous lesions. Environmental and nutritional pathology - smoking, radiation injury, malnutrition, obesity, vitamin deficiencies.

Unit II

Haematological Disorders, Introduction and Haematopoiesis, Anaemia - introduction and classification (morphological and etiological), iron deficiency anemia: distribution of body iron, iron absorption, causes of iron deficiency , lab findings, megaloblastic anemia: causes, labfindings, haemolytic anemias: definition. Causes, classification and labfindings.WBC disorders - quantitative disorders, leukemia - introduction and classification, acute leukemias, chronic leukemias. Bleeding disorders - introduction, physiology of hemostasis. Classification, causes of inherited and acquired bleeding disorders, thrombocytopenia, DIC, laboratory findings. Pancytopenia.

Unit- III

Basic Hematological Techniques Characteristics of good technician, Blood collection - methods (capillary blood, venipuncture, arterial puncture) complications, patient after care, anticoagulants, transport of the specimen, preservation, effects of storage, separation of serum and plasma, universal precautions, complete hemogram - CBC, peripheral smear, BT, CT, PT, APTT, ESR, disposal of the waste in the laboratory.

Unit IV

Transfusion Medicine Selection of donor, blood grouping, Rh typing, cross matching, storage, transfusion transmitted diseases, transfusion reactions, components - types, indications.

Unit V

Clinical Pathology Introduction to clinical pathology - collection, transport, preservation, and processing of various clinical specimens. Urinalysis - collection. Preservatives, physical, chemical examination and microscopy. Physical examination; volume, color, odor, appearance, specific gravity and ph, Chemical examination; strip method- protein - heat and acetic acid test, sulfosalicylic acid method, reducing sugar-benedicts test, ketone bodies - rothas test, bile pigments fouchet method, bile salt - hays method, blood - benzidine test, urobilinogen and porphobilinogen - ehrlich aldehyde and schwartz test, bence jones protein., microscopy. Examination of cerebrospinal fluid - physical examination, chemical examination, microscopic examination, examination of body fluids (pleural, pericardial and peritoneal), physical examination, chemical examination, microscopic examination, sputum examination.

Practicals:

- Laboratory organization-
- Reception of specimen, dispatch of reports, records keeping, coding of cases.
- Laboratory safety guidelines.
- SI units and conventional units in hospital laboratory.
- Haematology techniques
- Basic requirements for hematology laboratory
- Glasswares for hematology
- Equipments for haematology.
- Anticoagulant vials
- Complete blood counts.

Recommended Books :

1. Text book of Pathology Harsha Mmohan Jaypee Brothers, New Delhi.
2. Practical Pathology P. Chakraborty, Gargi Chakarboty New Central book agency, Kolkata.
3. Text book of Haematology Dr Tejinder Singh Arya Publications, Sirmour (H P)
4. Text book of Medical Laboratory Technology Praful Godkar Bhalani Publications house, Mumbai.
5. Textbook of Medical Laboratory Technology Ramanik Sood.

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Semester II

Paper 2-

Microbiology

Total Hours 50

Unit - I

General Microbiology Morphology and classification of microorganisms. Growth, nutrition and multiplication of bacteria Sterilization and Disinfection - Principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptics and disinfectants Immunology - antigen, Antibodies, Immunity, vaccines, types of vaccine and immunization schedule. Hospital acquired infection - Causative agents, transmission methods, investigation, prevention and control of hospital Acquired infections.

Unit - II

Bacteriology, Classification of bacteria, morphology, infections, lab diagnosis, treatment and prevention of common bacterial infections. Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Corynebacterium diphtheriae, Clostridia, Enterobacteriaceae - Shigella, Salmonella, Klebsiella, E.coli, Proteus, Vibrio cholerae, Pseudomonas and Spirochetes

Unit III

Mycobacteriology & Parasitology, Mycobacteria- classification, pathogenesis, lab diagnosis and prevention, Classification, infections and lab diagnosis of following parasites. Entamoeba, Giardia, Malaria, Hookworm, Roundworm and Filarial worms.

Unit IV

Mycology, Morphology, disease caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi (Aspergillus, Zygomycetes and Penicillium)

Unit V

Virology, General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Dengue, Influenza, Chikungunya, Rabies and Poliomyelitis.

Practicals:

1. Compound microscope and its application in microbiology.
2. Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters.
Demonstration of commonly used culture media, nutrient broth, nutrient agar, blood agar, chocolate agar, Mac conkey medium, LJ media, Robertson cooked meat media, MacConkey agar with LF & NLF, Nutrient agar with staph colonies. Anaerobic culture, Methods and Antibiotic susceptibility test.
3. Demonstration of common serological tests: Widal, VDRL, ASLO, CRP, RF, Rapid tests for HIV, Hbsag and HCV.

Recommended Books Recent Editions.

1. Anathanarayana & Panikar: Medical Microbiology - Revised 8th edition University Press.
2. Parasitology by Chatterjee - Interpretation to Clinical Medicine.
3. Textbook of Microbiology - Baveja, 5th edition, Arya Publications
4. Textbook for Laboratory technicians by RamnikSood. Jaypee Publishers
5. Textbook of Parasitology by Paniker. 7th edition

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Semester II

Paper 3-

Pharmacology

Total Hours 50

Unit I

General Pharmacology, ANS, PNS. Sources of Drugs Route of drug administration Pharmacokinetics (Absorption, Metabolism, Distribution, Excretion) Pharmacodynamics (Mechanisms of action) Adverse drug reactions, ANS : ADRENERGIC Drugs - Adrenaline, Noradrenaline, Ephedrine, Dopamine, Dobutamine Anti adrenergic - Phentolamine, Phenoxybenzamine, Prazocin, Tamsulosin, Propranolol, Atenolol, Carvedilol Cholinergic drugs-Acetyl choline, Pilocarpine, Neostigmine, Organophosphorous compounds Anti cholinergic agents-Atropine, Glycopyrrolate, Ipratropium Bromide, Dicyclomine

Unit II

PNS, CVS, Renal System, Skeletal muscle relaxants - D Tubocurarine, Succinyl choline, Diazepam, Dantrolene Local anaesthetics - lignocaine, la + vasoconstrictor CVS - ionotropic agents - Digoxin, Antianginal drugs - GTN, Antihypertensives - Betablockers (Propranolol, Atenolol, carvedilol), CCBs (Nifedine), Diuretics (Thiazide, Furosemide, ace inhibitors, ARBs, Clonidine Drugs used in treatment of different types of shock, Plasma expanders Renal system - Diuretics Furosemide, Thiazide, Spiranolactone Antidiuretics - Vasopressin

Unit III

CNS, Blood CNS - general Anaesthetics - nitrous oxide, Halothane, iv anaesthetics Sedative hypnotics - diazepam, barbiturates, zolpidem, Antiepileptics - Phenytoin, carbamazepine, phenobarbitone, valproate, Opioid analgesics - morphine, pethidine, codeine, NSAIDS - Aspirin, Diclofenacibuprofen, Selective COX2 inhibitors, Respiratory system-treatment of cough And Bronchial asthma, Blood - Hematinics, Anticoagulants - Warfarin, Heparin, Thrombolytics & Antiplatelet drugs - streptokinase,/ aspirin, clopidogrel

Unit IV

GIT, Chemotherapy, GIT - drugs used in peptic ulcer - ppi, H2 blockers, Antacids Antiemetics - Metaclopramide, Domperidone, Ondansetron Purgatives & Laxatives-bran, ispaghula, Lactulose, Bisacodyl & senna Drugs used in Diarrhoea- ORS, Super ORS, Antimotility drugs (loperamide, diphenoxylate), Chemotherapy - general considerations MOA, Resistance, Prophylaxis Sulfonamides, cotrimoxazoles, Quinolones Tetracyclines, chloramphenicol, Betalactam antibiotics

Unit V

Chemotherapy, Hormones. Aminoglycosides, Macrolides, other antibiotics (vancomycin, linezolid) & treatment of UTI Antifungal (clotrimazole, flucanazole), Antiviral (Acyclovir, Few drugs used in HAART), Cancer chemotherapy (names, common Adverse effects, general principles in the treatment of cancer) Hormones - Corticosteroids its uses and adverse effects, Treatment of Diabetes mellitus(insulin,

Metformin, Glibenclamide)

Practicals:

1. Dosage Forms : 15 Marks (5 X 3)

Capsules, Tablets, Syrup, Iv, Im, Sc, Ia, Intra Articular -
Advantages (1 Mark), Disadvantages (1 Mark) Examples (1 Mark)

2. Mention the name of the Device / Instruments and uses : 15 marks (5X3)

Inhalares, Rotahalers, Spacehalers, Dripsets, Vasofix, ryles tube, urinary catheter,
Endotracheal tube, Hand gloves

3. 10 Spotters : 10 marks (10X 1) 2 uses of preparation

Recommended Books Recent Editions.

1. K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, Post Box, 7193, G-16, Emca House, 23/23, Bansari Road, Daryaganj, New Delhi.
2. Padmaja Udaykumar -Pharmacology for Allied Sciences.
3. R.S. Satoskar, S.D. Bhandarkar, S.S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th edition, Single Volume, M/s Popular Prakashan,

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Semester II

Paper 4-

Fundamentals of Computer Science

Total Hours 50

Unit 1

Introduction about computers

What are Computers? Its various characteristics, applications and limitations. Functional Block Diagram of computer.

Computer Architecture: Classification of computer on basis of Purpose, signal and size and portability.

Evolution of computer from 1st generation to fourth generation. Some description about fifth generation.

Data representation in memory.

Unit 2

Hardware:

To study the various input devices used: Keyboard, mouse, OMR, OCR, MICR, BCR, Scanner etc.

To study the internal structure of CPU: Registers, ALU, Motherboard, HD, Memory, Cache, and Virtual Memory. TO study the various Secondary storage devices: Magnetic Disk, Optical Disk, Flash memory, To cover what are Monitor, Its types, Printer: Dot matrix, Daisy wheel. Line printer, Laser printer, Thermal Printer, Ink Jet printers etc.

Unit 3

To cover the types of Software, Languages and their types (High level and low level language.) To cover the definition of operating system, its types and what are the various functions and types of operating system.

Basic introduction about Interfaces: its types character user and graphical user interface (DOS and Windows)

Basic introduction about linux, Unix operating system

To study the various HTML tags (Bold tags, Italic, Underline, Marquee, Img, anchor etc.)

Unit 4

Network:

Data Communication,

Structure of Universal Resource Locator, Domains (.com, .in, .country specific, .org and rationale behind them), HTTP Practicals: TO cover the various MS Excel Formulas and preparation of spreadsheets.

Basics of E-mail, Web browsers (IE, Google Chrome, Mozilla),

LAN, LAN topologies, WAN, MAN, Internet: Introduction, Internet, extranet and Intranet. Network devices (Hub, Switches, Modems, Routers etc), DNS, Network Security and Search Engine IP address, Structure of IP Address

Backbone network, Network connecting devices

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Semester III

Paper 1-

Applied Pathology

Total Hours 50

UNIT I

Atherosclerosis-definition, risk factors, pathogenesis, morphology and complications, Ischemic heart disease: Myocardial infarction- definition, pathogenesis, morphology and complications, Hypertension- Benign and malignant hypertension: pathogenesis, pathology and complications

UNIT II

Heart failure-Right and left heart failure: causes, pathophysiology and morphology, Rheumatic heart disease and infectious endocarditis- definition, etiopathogenesis, morphology and complications, Congenital heart disease- Types and atrial septal defect; aneurysms- types and morphology; cardiomyopathies in brief.

UNIT III

Atelectasis - types, Adult respiratory distress syndrome - causes , pathogenesis and morphology; pulmonary edema- classification, causes and morphology, Chronic obstructive pulmonary disease- Chronic bronchitis, emphysema, asthma, bronchiectasis: Definition, etiopathogenesis and morphology, Restrictive pulmonary diseases- Definition, categories, pathogenesis and morphology

UNIT IV

Pneumoconiosis-types, asbestosis, coal workers pneumoconiosis-etiopathogenesis and morphology, Pulmonary embolism, infarction, pulmonary hypertension-Definition, etiopathogenesis and morphology, Pneumonia-Classification of pneumonias; Lobar pneumonia and bronchopneumonia - etiology, pathology and complications

UNIT V

Clinical manifestations of renal diseases, Glomerular lesions in systemic diseases- diabetes, amyloidosis and systemic lupus erythematosus, Pericardial and pleural effusions- causes and microscopy.

Practicals: Urine examination: physical, chemical, microscopy

1. Blood grouping & Rh typing
2. Hemoglobin estimation, packed cell volume (PCV), erythrocyte sedimentation rate(ESR)
3. Histopathology: fixatives and preservation of tissues, processing,
4. Charts:
 - 1 Nephritic syndrome
 - 2 Nephrotic syndrome
 - 3 Pyelonephritis

4 Lower urinary tract infection

5 Acute renal failure

6 Chronic renal failure

7 Diabetic nephropathy

8 Peritoneal fluid analysis

9 Neutrophilia

10 Bleeding disorders

11 Clotting disorders

5. Specimens:

1 Small contracted kidney

2 Cystic diseases

3 Pyelonephritis

4 Hydronephrosis

Reference Books (latest edition)

1 Basic Pathology Robbins Saunders an imprint of Elsevier Inc., Philadelphia, USA

2 Text book of Pathology Harsh Mohan Jaypee Brothers, New Delhi

3 Practical Pathology P. Chakraborty, Gargi Chakraborty New Central Book Agency, Kolkata

4 Text Book of Haematology Dr. Tejinder Singh Arya Publications, Sirmour (H.P)

5 Text Book of Medical Laboratory Technology Praful Godkar, Bhalani Publication House, Mumbai

6 Text Book of Medical Laboratory Technology RamanikSood

7 Practical Haematology Sir John Dacie Churchill Livingstone, Londo

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Semester III

Paper 2-

Applied Microbiology

Total Hours 50

Unit I.

Sterilization and disinfection, Sterilization and disinfection - classification, principle, methods, Central sterile supply department

Unit II.

Importance of sterilization and disinfection, Disinfection of instruments used in patient care, Disinfection of patient care unit, Infection control measures for ICUs

Unit III.

Health care associated infections, Surgical site infections, Urinary tract infections, Ventilator associated pneumonia, Catheter associated blood stream infections, Antibiotic associated diarrhea.

Unit IV.

Drug resistant bacteria, MRSA, VRE, Drug resistant Gram negative bacteria

Unit V.

Occupationally acquired infections and its prevention, Respiratory route - Tuberculosis, Varicella zoster virus, Influenza, RSV, Blood borne route - HIV, HBV, HCV, CMV, Ebola, Orofecal route - Salmonella, Hepatitis A, Direct contact - Herpes virus

Practicals ;

1. Sterilization and disinfection practices in tertiary care hospital
2. Quality control of sterilization and Interpretation of results of sterility testing
3. Collection of specimen from outpatient units, inpatient units, minor operation theatre and major operation theatre for sterility testing.
4. Preparation of materials for autoclaving - packing of materials, loading, holding time and unloading
5. Disinfection of wards, operation theatres, dialysis units and laboratory and air sampling methods
6. Sterility testing and interpretation of hemodialysis water/distilled water/deionized water

Recommended Books:

1. Textbook of Microbiology by Ananthnarayan and paniker
2. Textbook of hospital infection control by Purvamathur
3. Textbook of Microbiology by Baveja
4. Hospital infection control by Mayhall

B.Sc. Renal Dialysis Technology

Semester III

Paper 3-

Introduction to Renal Dialysis Technology

Total Hours 50

Unit I-

Epidemiology of kidney disease/ magnitude of the problem in community/
Demographics of ESRD population/ global epidemiology of RRT options

Unit II-

Applied renal anatomy and physiology, applied anatomy of neck, upper limb & lower limb vessels.

Unit III

Clinical presentation of renal disease & history taking.

Unit IV

Investigations in Nephrology- Urine examination, hemogram, serology, biochemical tests, radioimaging in nephrology, renal biopsy (indications, prerequisites, complications), Investigations required before starting of dialysis.

Unit V

Screening for chronic kidney disease and preventive nephrology.

Practicals:

Case discussion - Nephrotic syndrome, nephritic syndrome, Acute renal failure, chronic renal failure.

University practical examinations:

1. History taking -20 marks
2. General physical examination -20 marks (demonstration of pulse, BP, temperature, pallor, icterus, edema)

Recommended Books Recent edition

1. Dialysis therapy- Nissenson & Fine
2. Handbook of dialysis- Daugirdas, Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
6. Comprehensive Clinical nephrology -John Feehaly
7. Handbook of nutrition and kidney- Lippincott Williams & Wilkin

B.Sc. Perfusion Technology
Semester III
Paper 4-
Environmental Science
50

Hours

Unit 1:

The Multidisciplinary nature of environmental studies

- Definition, scope and importance.
- Need for public awareness

Natural Resources

Renewable and non-renewable resources: Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Unit 2:

Ecosystems

Concept of an ecosystem.

Structure and function of an ecosystem.

Producers, consumers and decomposers.

Energy flow in the ecosystem.
Ecological succession.
Food chains, food webs and ecological pyramids.

Biodiversity and its conservation
Hot-spots of biodiversity.
Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Unit 3:

Environmental Pollution
Definition, causes, effects and control measures of:-
a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

Fireworks, their impacts and hazards

Pollution case studies.

Disaster management: floods, earthquake, cyclone and landslides.

Unit 4 :

Social Issues and the Environment
From Unsustainable to Sustainable development
Urban problems related to energy
Water conservation, rain water harvesting, watershed management

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions.
Consumerism and waste products.
Environmental Legislation (Acts and Laws)

Issues involved in enforcement of environmental legislation
Human Population and the Environment,

Population growth, variation among nations with case studies

Population explosion – Family Welfare Programmes and Family Planning Programmes

Human Rights.

Value Education.

Women and Child Welfare.

B.Sc. Renal Dialysis Technology

Semester IV

Paper 1-

Basic Patient Care Total Hours 50

Unit I -

Introduction, Communication and Documentation

1. Introduction to Patient Care:

- a) Principles of patient care
- b) Types of patients (gender, age, diseases, severity of illness, triage)

2. Communication & Documentation:

- a) Communication with doctors, colleagues and other staffs.
- b) Non-verbal communication, Inter-personnel relationships.
- c) patient contact techniques, communication with patients and their relatives

3. Documentation:

- a. Importance of documentation,
- b. initial and follow up notes;
- c. documentation of therapy, procedures and communication

Unit II -

Universal Precautions and Infection Control

4. Universal Precautions and Infection Control:

- a) Hand washing and hygiene.
- b) Injuries and Personal protection, Insulation and safety procedures.
- c) Aseptic techniques, sterilization and disinfection.
- d) Disinfection and Sterilization of devices and equipment
- e) Central sterilization and supply department
- f) Biomedical Medical waste management

Unit III -

Medication Administration and Transport of patient

5. Medication Administration:

- a) Oral / Parenteral route
- b) Parenteral medication administration: Intra venous, intra muscular, sub-cutaneous, intra dermal routes, Intra venous Infusion
- c) Aerosol medication administration, Oxygen therapy
- d) Intravenous fluids
- e) Blood and blood component transfusion
- f) **Position and Transport of patient: Patient position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep.**

- g) Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher.
- h) Transport of ill patients (inotropes, intubated / ventilated patients)

Unit IV -

Bedside care and monitoring

6. Bedside care:

- a) Methods of giving nourishment: feeding, tube feeding, drips, transfusion.
- b) Recording of pulse, blood pressure, respiration, saturation and temperature.
- c) Bed side management: giving and taking bed pan, urine container.
- d) Observation of stools, urine, sputum, drains
- e) Use and care of catheters and rubber goods.
- f) Care of immobile/bed ridden patients, bed sore and aspiration prevention

7. Monitoring of Patient:

- a) Pulse, ECG (Cardiac Monitor), Oxygen Saturation, Blood Pressure, Respiration
- b) Multi parameter monitors, Capnography and End Tidal CO₂ (ETCO₂)
- c) Hydration, intake and output monitoring
- d) Monitoring ventilator parameters: Respiratory Rate, Volumes, Pressures, Compliance, Resistance

Unit IV -

Wound care and first aid

8. Dressing and wound care:

- a) Bandaging: basic turns, bandaging extremities, triangular bandages and their application.
- b) Surgical dressing: observation of dressing procedures.
- c) Suture materials and suturing techniques
- d) Splinting
- e) Basic care of patient with burns

9. First Aid and Basic Life Support (BLS)

Practical:

1. Demonstration of Patient care Procedures:

- a) Positioning of patient, transport of the patient, Dressing and Bandaging, Care of inter costal drain tube, Insertion of naso-gastric tube and feeding
- b) Phlebotomy and obtaining blood samples, Arterial Blood sampling for ABG
- c) Injections: intra muscular, intra venous, sub cutaneous, intra dermal
- d) Insertion of intra venous catheter and infusion of medications, blood transfusion
- e) Recording of ECG and monitoring of patient
- f) Oxygen therapy: oxygen cannula, masks. Aerosol therapy: nebulization, inhalers

- g) Suctioning and care of artificial airway
- h) Insertion of urinary bladder catheter
- 2. Uses, principles, advantages and disadvantages of instruments and Devices in patient care
- 3. First aid and Basic Life Support (BLS)

Reference Books:

- 1. Principles and practice of Nursing - Sr Nancy
- 2. Introduction to Critical Care Nursing - Mary Lou Sole
- 3. First Aid - Redcross society guidelines
- 4. Basic Life Support (BLS) - American Heart Association guidelines

B.Sc Renal Dialysis Technology
Semester IV
Paper 2-
Basic Concepts of Renal Disease Total Hours 50

Unit I:

Fluid and electrolyte disorders-
Hyponatremia, hypernatremia, hypokalemia & hyperkalemia: Etiology, clinical presentation and management

Disorders of calcium, phosphorous & magnesium ions.

Acid- base disorders : Basics of ABG

Metabolic acidosis & metabolic alkalosis: pathophysiology, etiology , clinical features and management.

Unit II:

Urinary tract infections: Definition, types of UTI, risk factors, diagnosis, treatment

Unit III:

Renal stone diseases, inherited and cystic renal diseases

Composition of kidney stones, risk factors for recurrent stones, clinical presentation, prevention of recurrent stones & treatment

Unit IV

Hypertension- normal BP control, definition, evaluation, primary & secondary HTN, complications, antihypertensive drugs

Unit V:

Nephrotic syndromes- definition, clinical features, causes(MCNS, FSGS, MGN...), Primary & secondary NS, complications, management

Acute glomerulonephritis/RPGN- definition, causes(PSGN,vasculitis, anti GBM, SLE, HSP....), clinical features, management.

PRACTICALS: Priming of dialysis apparatus Or Charts /spotters : nephrotic syndrome, nephritic, AKI, CKD, BP apparatus, stethoscope, pulse oximeter, cardiac monitor, thermometer

Recommended Books Recent edition

1. Dialysis therapy- Nissenson & Fine
2. Handbook of dialysis- Daugirdas ,Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
6. Comprehensive Clinical nephrology -John Feehaly
7. Handbook of nutrition and kidney- Lippincott Williams & Wilkins

B.Sc Renal Dialysis Technology

Semester IV

Paper 3-

Acute and chronic kidney diseases and nutrition Total Hours 50

Unit I:

AKI- definition, classification, etiology, strategies of reducing risk for AKI, complications, Non dialysis management of AKI dialysis therapy for AKI , Dialysis in ICU setting

Unit II:

Chronic kidney diseases- definition, staging , GFR calculation, causes for CKD, steps to retard progression of CKD, complications of CKD(cardiovascular, hematologic, mineral bone disorders, dermatologic, neuropsychiatric...), evaluation of CKD, management and RRT options

Unit III:

Nutritional requirements of healthy adults, RDA, effects of renal failure on nutrient metabolism, lipid abnormalities, overview of calcium phosphorous metabolism, trace elements and vitamins

Unit IV:

Sources and types of proteins, fats, carbohydrates and planning balanced diet

Unit V:

Diet in nephrotic syndrome, AKI, predialysis CKD, Nutrition in dialysis patients, foods to be avoided in CKD, fluid restriction.

Practicals

1. Priming of dialysis apparatus,
Demonstration of dialyser reuse
2. Spotters- HD catheters, dialysers, AV needle, tubings, dialysis machine, PD set, perm catheters, dialysis solutions, chemicals used in hemodialysis. 20 marks

Recommended Books Recent edition

1. Dialysis therapy- Nissenson & Fine
2. Handbook of dialysis- Daugirdas ,Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
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B.Sc. Renal Dialysis Technology

Semester IV

Paper 4-

Hemodialysis part 1

Total Hours 50

Unit I:

Treatment options of RRT, decision to start dialysis and withdrawal of dialysis, predialysis patient education, choosing the RRT option, home hemodialysis

Unit II:

Basics of hemodialysis and urea kinetic modelling. Mechanisms of solute transport, dialyser clearance, kt/v and urea reduction ratio, adequacy in hemodialysis

Unit III

Vascular access for hemodialysis- venous catheters (type, design, location of insertion and methods used, complications of CVC, maintenance of dialysis catheters)

Arteriovenous access AVF/AVG (presurgical evaluation, advantages, complications and their management, cannulation techniques, measuring access flow, general measures to reduce infection)

Unit IV:

HD apparatus- blood circuit, dialysate circuit, monitors and alarms, pumps. Dialysers -types /structure/membrane/clearance/ high flux & low flux

Unit V:

Product water and hemodialysis solution preparation- Contaminants in raw water, water and dialysis solution quality standards, dialysis solution composition, Preparation of RO water and distribution.

Practicals:

1. Demonstrate priming of dialysis apparatus-10 M
2. Demonstrate reuse of dialysers- 10 M
3. Spotters- HD catheters, dialysers, AV needle, tubings, dialysis machine, PD set, perm catheters, dialysis solutions, chemicals used in hemodialysis.

Recommended Books Recent edition

1. Dialysis therapy- Nissenson & Fine
2. Handbook of dialysis- Daugirdas, Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
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B.Sc. Renal Dialysis Technology

Semester V

Paper 1-

Hemodialysis part 2 Total Hours 50

Unit I:

Disinfection of HD machines and maintenance of RO plant- chemicals used and technique of disinfection, advantages

Unit II:

10hrs

Dialyser reuse- definition, methods, advantages and disadvantages of reuse

Unit III:

Hemodialysis for acute renal failure- indications, vascular access, HD prescription, common problems encountered, dialysis for critically ill patients.

Unit IV:

Chronic hemodialysis- indications, residual renal function, clearance targets and adequacy, chronic HD prescription, dry weight, complications, access recirculation, dialysis disequilibrium.

Unit V:

Anticoagulation- factors influencing clotting of extracorporeal circuit, signs of circuit clotting, drugs used for anticoagulation, various protocols, monitoring of anticoagulation, regional anticoagulation

Practicals:

1. Demonstrate priming of dialysis apparatus-10 marks
2. Demonstrate reuse of dialysers- 10 marks
3. Spotters- HD catheters, dialysers, AV needle, tubings, dialysis machine, PD set, perm catheters, dialysis solutions, chemicals used in hemodialysis. 20 marks

Recommended Books Recent edition

1. Dialysis therapy- Nissenson & Fine
2. Handbook of dialysis- Daugirdas, Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
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B.Sc. Renal Dialysis Technology

Semester V

Paper 2-

Hemodialysis part 3

Total Hours 50

Unit I:

Complications of HD- Hypotension(causes and management) , Headaches, Chest pain and back pain, Leg cramps, Dialyser reactions , itching, nausea, Dialysis Disequilibrium(etiology and management) , seizures, cardiac arrhythmias, air embolism.

Unit II:

Renal anemia and its management- etiology, symptoms, treatment, indications for ESA and target Hb levels, dosing of erythropoietin and its side effects.

Unit III:

Hemofiltration/ Hemodiafiltration/ SCUF

Unit IV:

SLED/SLED-f: advantages of SLED, protocols, anticoagulation.

CRRT- about CRRT machine and tubings, schematic description of circuit, advantages and disadvantages, indications for CRRT, anticoagulation, replacement fluid(dose, pre Vs post filter)

Unit V:

Plasmapheresis- rationale, methods of plasma separation, indications, common diseases for which used, protocols, complications, anticoagulation for PP.

Practicals:

1. Setting up dialysis machine for dialysis
2. AVF/ AVG cannulation
3. Packing and sterilisation of dialysis trays
4. Preparation of concentrates
5. First assistant in central line insertions, PD catheter insertion and renal biopsy
6. Performance of PD exchanges
7. Setting up of APD machine
8. Performing isolated ultrafiltration
9. Priming of dialysis apparatus
10. Reuse of dialyser

Recommended Books Recent edition

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2. Handbook of dialysis- Daugirdas ,Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
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B.Sc. Renal Dialysis Technology

Semester V

Paper 3-

Hands on training in Continuous ambulatory peritoneal dialysis

Total Hours 50

1. Setting up Acute PD- catheter insertion, connections , performing and monitoring of PD
2. Setting up CAPD, performing and monitoring of CAPD, seeing CAPD catheter insertion.
3. Technical aspects of APD machine and performing and monitoring of APD
4. Introduction to PD solutions
5. Performing PET test

B.Sc. Renal Dialysis Technology

Semester V

Paper 4-

Skill Enhancement-2 Research

Methodology and Biostatistics Total Hours 50

Unit I.

Introduction and Presentation of data

Meaning , Branches of Statistics, Uses of statistics in medicine, Basic concepts, Scales of measurement, Collection of data, Presentation of data; Tabulation, Frequency Distribution, Diagrammatic and Graphical Representation of Data.

Unit II.

Measures of central tendency and Measures of Variation

Arithmetic Mean (Mean), Median, Mode, Partition values, Range, Interquartile range , Mean Deviation, Standard Deviation, Coefficient of Variation.

Unit III.

Probability and standard distributions

Definition of some terms commonly encountered in probability, Probability distributions; Binomial distribution, Poisson distribution, Normal distribution, Divergence from normality; Skewness and kurtosis

Unit IV.

Census and Sampling Methods

Census and sample survey, Common terms used in sampling theory, Non-probability (Non random) Sampling Methods; Convenience sampling, Consecutive Sampling, Quota sampling, Snowball sampling, Judgmental sampling or Purposive sampling, Volunteer sampling, Probability (Random) Sampling methods; Simple random sampling, Systematic Sampling, Stratified Sampling, Cluster sampling, Multi-stage sampling, Sampling error, Non-sampling error.

Unit V.

Inferential statistics

Parameter and statistic, Estimation of parameters; Point estimation, Interval Estimation, Testing of hypothesis; Null and alternative hypotheses, Type-I and Type-II Errors.

B.Sc. Renal Dialysis Technology

Semester VI

Paper 1-

Peritoneal dialysis

Total Hours 50

Unit I:

Functional anatomy of peritoneum, models of peritoneal transport, physiology of peritoneal transport, PET test, peritoneal clearance and clearance targets.

Unit II:

Apparatus for PD, peritoneal Dialysis solutions, PD catheter designs and placement, catheter break in procedures, complications of PD catheters(leaks, outflow failure, catheter infections, hernias)

Unit III:

Common APD and CAPD prescriptions, advantages of cyclers, hybrid forms of PD, how to improve peritoneal kt/v, nutrition in CAPD.

Unit IV:

Causes of fluid overload in CAPD, ultrafiltration failure, preserving residual renal function, Peritonitis and exit site infections -potential routes of infection,diagnosis, common organisms, drugs used and drug delivery methods.

Unit V:

Mechanical complications (hernias, abdominal wall edema,hydrothorax,) metabolic complications (glucotoxicity, lipid abnormalities, electrolyte abnormalities, protein loss)

Practical

1. Case discussion (a patient on peritoneal dialysis)
2. Spotters- cycler device, transfer sets, adaptor, minicaps, drain bags, PD solutions, catheters. 20 marks

Text books and reference books: Recent edition

1. Dialysis therapy- Nissenson & Fine
2. Handbook of dialysis- Daugirdas ,Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
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B.Sc. Renal Dialysis Technology

Semester VI

Paper 2-

Dialysis in Special Situations Total Hours 50

Unit I:

Use of hemoperfusion and dialysis for poisoning cases- common indications for HP/HD, drugs which can be removed (acetaminophen, salicylates, digoxin, barbiturates, toxic alcohols, lithium, anticonvulsants)

Unit II:

Dialysis in children - choice between Peritoneal dialysis and Hemodialysis, problems with vascular access, HD prescription in children ,nutrition and growth related issues.

Unit III:

Dialysis in pregnancy-causes for AKI in pregnancy, dialysis regimen during pregnancy, indications for dialysis in pregnancy

Unit IV:

Dialysis in HIV/ HBsAg/ HCV positive patients - Guidelines, infection control practices in HD units, dedicated machines, vaccination for dialysis patients.

Unit V:

Dialysis in patients with congestive cardiac failure- special precautions

Practical

1. Starting / Termination of dialysis
2. AV cannulation
3. Initiating dialysis through central lines
4. Packing of dialysis trays
5. Preparation of concentrates for dialysis purpose
6. Performing PD exchanges manually/cycler
7. CPR demonstration
8. Assisting minor procedures like central line insertions, renal biopsies
9. Performing isolated ultrafiltration
10. Priming and dialyser reuse

Recommended Books Recent edition

1. Dialysis therapy- Nissenson & Fine
2. Handbook of dialysis- Daugirdas, Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
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B.Sc. Renal Dialysis Technology

Semester VI

Paper 3-

Recent Advances in Dialysis Technology Total Hours 50

Unit I

MARS dialysis/dialysis in advanced liver disease- indication, technique, anticoagulation.

Unit II

Nocturnal hemodialysis/ short daily dialysis -advantages

Unit III

Newer peritoneal dialysis solutions- advantages and disadvantages

Unit IV

Online dialysis

Unit V

Home Hemodialysis

Practical:

1. Starting and Termination of dialysis
2. AVF/AVG cannulation
3. Initiating dialysis through central lines
4. Packing of dialysis trays
5. Preparation of concentrates for dialysis purpose
6. Performing PD exchanges manually/cycler device
7. CPR demonstration
8. Assisting minor procedures like central line insertions, renal biopsies, PD catheter insertion
9. Performing isolated ultrafiltration
10. Priming and dialyser reuse

Recommended Books Recent edition

1. Dialysis Therapy- Nissenson & Fine
2. Handbook of Dialysis- Daugirdas, Blake & Todd
3. Principles and Practice of Dialysis- Heinrich
4. Primer to Kidney Disease
5. CKD, Dialysis and Transplant- A companion to Brenner & Rectors- The Kidney
6. Comprehensive Clinical Nephrology -John Feehaly
7. Handbook of Nutrition and Kidney- Lippincott Williams & Wilkins

B.Sc. Renal Dialysis Technology

Semester VI

Paper 4-

Renal Transplantation

Total Hours 50

1. Options for patient with ESRD, basics in transplant immunology, donor selection, recipient evaluation
2. Science of deceased donor and living donor renal transplant- ischemia times and its impact on kidney function, brief introduction to immunosuppression used in transplant.
3. Problems encountered in transplant recipient- rejection, infection, drug toxicity, dyslipidemias, diabetes, cosmetic changes, impaired graft function.
4. Monitoring of patient on the waiting list for transplant.
5. Watching transplant inside the operation theatre

Books recommended

- 1 Dialysis therapy- Nissenson & Fine
- 2 Handbook of dialysis- Daugirdas ,Blake & Todd
- 3 Principles and practice of dialysis- Heinrich
- 4 Primer to kidney disease
- 5 CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
- 6 Comprehensive Clinical nephrology -John Feehaly
- 7 Handbook of nutrition and kidney- Lippincott Williams & Wilkins
- 8 Handbook of kidney transplantation- Gabriel Danovitch