

NOORUL ISLAM CENTRE FOR HIGHER EDUCATION
NOORUL ISLAM UNIVERSITY
B.Sc. RENAL DIALYSIS TECHNOLOGY
CURRICULUM & SYLLABI
REGULATION – 2017
SEMESTER I

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	EG2603	English	3	1	0	4
2.	BS2601	Anatomy	3	1	0	4
3.	BS2602	Physiology	3	1	0	4
4.	BS2603	Basic Biochemistry	3	1	0	4
5.	BS2604	Environmental Science	2	0	0	2
PRACTICAL						
6.	BS2671	Anatomy Laboratory	0	1	2	2
7.	BS2672	Physiology Laboratory	0	1	2	2
8.	BS2673	Basic Biochemistry Laboratory	0	1	2	2
TOTAL			14	7	6	24

UNIT - I**Introduction****a) Study Techniques - Reading Comprehension**

Exercises on reading passages and answering questions based on the passage.

b) Reading and Comprehension

1. Review of selected materials and expressing oneself in one's words
2. Book Review
3. Enlargement of Vocabulary

c) Use of the Dictionary

Tips on how to use the dictionary

1. Choose the right dictionary.
2. Read the introductions.
3. Learn the abbreviations.
4. Learn the guide to pronunciation.
5. Looking up for a word
 - a) Find the section of the dictionary with first letter of your word.
 - b) Read the guide words.
 - c) Scan down the page for your word.
 - d) Read the definition.
6. Online dictionaries
7. Thesaurus
It is a dictionary of synonyms and antonyms, such as the online Thesaurus.com.
8. Foreign Expressions - meaning and pronunciation

Enlargement of Vocabulary**Roots - A to G****UNIT- II****Applied Grammar****a) Correct Usage**

The Eight Parts of Speech

1. Noun
2. Pronoun
3. Adjective

4. Verb
5. Adverb
6. Preposition
7. Conjunction
8. Interjection

b) The Structure of Sentences

1. What is a sentence?

2. What are clauses?
3. What are phrases?

c) Sentence Combinations

1. Simple sentences
2. Compound sentences
3. Complex sentences

Enlargement of Vocabulary

Roots: H to M

UNIT- III

Written Composition

a) Précis Writing and Summarizing

1. Definition of précis:

A précis or summary is an encapsulation of someone's writing or ideas. Technically it should be one-third the length of the actual passage given.

2. Definition of summary:

Summaries may not always follow a direct line through what they're summarizing - if you want to summarize someone else's ideas in a few sentences, it might make more sense if you begin with their conclusion, and work back to the arguments they use to develop that conclusion.

Guidelines to follow while writing a summary are:

- 1) Read.
- 2) Reread.
- 3) One sentence at a time.
- 4) Write a thesis statement.
- 5) Check for accuracy.
- 6) Revise.

b) Writing of a Bibliography

I. What is a bibliography?

A bibliography is an alphabetical list of all materials consulted in the preparation of your assignment.

II. What is an annotated bibliography?

An annotated bibliography is an alphabetical list of books or articles for which you have added explanatory or critical notes.

III. Why you must do a bibliography?

- a) To acknowledge and give credit to sources of words, ideas, diagrams, illustrations and quotations borrowed, or any materials summarized or paraphrased.
- b) To show that you are respectfully borrowing other people's ideas, not stealing them, i.e. to prove that you are not plagiarizing.

IV. What must be included in a bibliography?

author

title

place of publication

publisher

date of publication

page number(s) (for articles from magazines, journals, periodicals, newspapers, encyclopaedias, or in anthologies).

V. Writing a bibliography in MLA style

1. Standard Format for a Book:

Author. Title: Subtitle. City or Town: Publisher, Year of Publication.

If a book has no author or editor stated, begin with the title. If the city or town is not commonly known, add the abbreviation for the State or Province.

- 1 Standard Format for a Magazine, Periodical, Journal, or Newspaper Article:
Author. "Title: Subtitle of Article." Title of Magazine, Journal, or
Newspaper Day, Month, Year of Publication: Page Number(s).

Enlargement of Vocabulary

Roots - N to S

UNIT - IV

Communication : Oral and Written

Nature, Process, Types and Flow of Communication

a) Organization of Effective Note-taking

Why good note-taking is important

Effective note-taking is an important practice to master at university. You have a lot of new knowledge and you need to develop reliable mechanisms for recording and retrieving it when necessary. But note-taking is also a learning process in itself, helping you to process and understand the information you receive.

b) Discussions and Summarization

Tips on taking Minutes of a Meeting

Why Meeting Minutes Matter

Meeting minutes are important. They capture the essential information of a meeting - decisions and assigned actions. The following instructions will help you take useful and concise meeting minutes.

Before the Meeting

If you are recording the minutes, make sure you are not a major participant in the meeting. You cannot perform both tasks well.

Create a template for recording your meeting minutes and make sure you leave some blank space to record your notes.

Decide how you want to record your notes. If you are not comfortable relying on your pen and notepad, try using a tape recorder or, if you are a fast typist, take a laptop to the meeting.

During the Meeting

As people enter the room, check off their names on your attendee list. Ask the meeting lead to introduce you to meeting attendees you are not familiar with. This will be helpful later when you are recording assigned tasks or decisions.

After the Meeting

Review the notes and add additional comments, or clarify what you did not understand right after the meeting.

c) Group Discussion:

1. Dos in a group discussion:

Be Confident. Introduce yourself with warm smile and get into topic soon.

Have eye-contact with all group members.

Learn to listen.

Be polite.

Be a good team player. Move with all group members and help them when needed.

2. Don'ts in a group discussion:

Don't be harsh when you are interrupted.

Don't interrupt the other person.

Don't try to push your ideas on others.

Don't argue. Everyone is free to express their ideas.

d) Oral Report

An oral report is a presentation, usually done for a student's teacher and classmates, though it can also be done for a larger segment of the school community, for parents, or for a more open group, depending on the circumstances. For example, at a science fair, a student might present a report on his or her project periodically for the class, for other visitors who pass by, and for judges.

Students should be trained to give oral reports.

Enlargement of Vocabulary

Roots - T to Z

UNIT -V

The study of various forms of Composition

a) Paragraph

The Structure of Paragraphs

1. What is a Paragraph?

Paragraphs are comprised of sentences, but not random sentences. A paragraph is a group of sentences organized around a central topic.

2. The Secrets to Good Paragraph Writing:
Four Essential Elements

The four elements essential to good paragraph writing are: unity, order, coherence, and completeness.

Exercises for students on short paragraph topics.

c) **Essay**

What is an essay?

An essay is an organised collection of your thoughts on a particular topic.

How to write an essay?

The writing of an essay has three major parts:

1. Introduction
2. Main Body
3. Conclusion

c) **Letter**

Mechanics of writing formal and business letters

Exercises on writing letters for students

d) **Writing Reports:**

Project Report

L: 45 + T: 15 = TOTAL: 60 PERIODS

BS2601

ANATOMY

3 1 0 4

OBJECTIVES

At the end of the course the student should be able to:

1. Describe the structure, composition and functions of the organ systems of human body
2. Describe how the organ systems function and interrelate.
3. Learn basic technical terminology and language associated with anatomy.

Learning Objectives: Skills

1. Use the process of prosector to investigate anatomical structure.
2. Use the microscope to learn anatomical or histological structure.
3. Learn how to study, interpret and care for anatomical specimens.

UNIT I

Organization of the Human Body

9hrs

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

9hrs

Cartilage - Types with examples. 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. 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

9hrs

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. Lymphatic system- Lymph, lymphatic vessels, name, location and features of the lymphoid organs. Respiratory system-Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura. 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

Urinary system and Reproductive system

9hrs

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 & its supports, uterine tube, ovary & mammary gland. Development - Gametes, period of gestation, gametogenesis, structure of sperm and ovum, growth of ovarian follicles, events of 1st, 2nd and 3rd weeks of development, folding of embryo. Derivatives of germ layers, placenta.

UNIT V

Control Systems of the Body

9hrs

Nervous system - Sub-divisions of the nervous system. Brain - Sub-divisions, location external features and internal structure 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. Sense organs - Location and features of the nose, tongue, eye, ear and skin. 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.

T: 15+ L: 45 = TOTAL: 60 HOURS

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
6. Basics in Human Anatomy for B.Sc. Paramedical Courses 1st edition 2008 Jaypee Publishers

Reference books:

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

BS2602

PHYSIOLOGY

3 1 0 4

OBJECTIVES

At the end of the semester students should be able to describe

1. Blood cell counts
2. Nerve and muscle functions
3. Cardiac functions
4. Pulmonary functions
5. Renal functions
6. The actions of various hormones
7. Functions of Central nervous system and special senses

UNIT -I

General physiology and Blood

9hrs

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

9hrs

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

9hrs

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

9 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.

UNIT -V

Muscle nerve physiology, Nervous system and Special senses

9hrs

Muscle nerve physiology - Classification and 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.

T: 15+ L: 45 = TOTAL: 60 HOURS

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.SudhakarH.S.Basic of Medical Physiology, 2nd Ed., Wolter-Kluwer Publication.
3. Chaudhari (Sujith K) Concise Medical Physiology 6th Ed. New Central Book.

Reference Books

1. A.K.Jain, Text book of Physiology for Medical Students, 4th Ed. Arya Publication.
2. Guyton (Arthur) Text Book of Physiology.11th Ed. Prism Publishers.
3. Ganong (William F) Review of Medical Physiology. 23rd Ed . Appleton.

BS2603

BASIC BIOCHEMISTRY

3 1 0 4

UNIT I

9hrs

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

9hrs

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

9hrs

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**9hrs****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**9hrs****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.

T: 15+ L: 45 = TOTAL: 60 HOURS**Recommended Books Recent Editions:**

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

Reference Books Recent Edition

1. Harpers Biochemistry
2. Clinical Biochemistry-Michael L.Bishop
3. Textbook of Biochemistry-Rafi M.D
4. Lippincott's Illustrated review of Biochemistry
5. Practical Clinical Biochemistry-Harold Varley

BS2604**ENVIRONMENTAL SCIENCE****2 0 0 2****Learning Objectives**

- 1) To know various Environmental factors Health
- 2) To learn the modes of disease transmission and various control measures

UNIT I**Environment, Health and Water****9 hrs**

Introduction to Environment and Health and Water- Ecological definition of Health, Population perspective of relations, Health & environment perspective of relations, Environmental factors, Environmental Sanitation, Need to study environmental health, Predominant reasons for ill-health in India. Water - Safe and wholesome water, requirements, uses, sources; sanitary well; Hand pump; water Pollution; Purification of water; large scale & small scale; slow sand filters; rapid sand filters; Purification of Water on a small scale; Household purification, Disinfection of wells; water quality criteria & standards.

UNIT II

Air, Light, Noise, Radiation

9 hrs

Air- Composition, Indices of Thermal Comfort, Air pollutants, Air Pollution - Health Effects, Environmental Effects, Green-house effect, Social & Economic Effects, Monitoring, Prevention & Control. Light, Noise, Radiation. Natural and Artificial light; Properties, sources, noise pollution and its control, types, sources, biological effects and protection.

UNIT III

Waste and Excreta Disposal

9 hrs

Disposal of Wastes - Solid Wastes, Health hazards, Methods of Disposal; Dumping, Controlled tipping/ sanitary landfill, Incineration, Composting. Excreta Disposal - Public health importance, Health hazards, sanitation barrier, Methods of excreta disposal, unsewered areas and sewerage areas, sewage, Modern Sewage Treatment.

UNIT IV

Housing and Health and Medical

9 hrs

Housing and Health - Human Settlement, Social goals of housing, Criteria for Healthful Housing by Expert Committee of the WHO, Housing standards- Environmental Hygiene Committee, Rural Housing Standards, Overcrowding, Indicators of Housing. Medical Entomology - Classification of Arthropods, Routes of Disease transmission, Control measures.

UNIT V

Insecticides and Rodents

9 hrs

Insecticides - Types, mechanism of action, dosage and application for control of insects. Rodents - Rodents and its importance in disease, along with anti-rodent measures.

TOTAL: 45 HOURS

Reference Books (latest edition)

- 1) Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: BanarsidasBhanot Publishers; 2015. p.135-141
- 2) Suryakantha. Textbook of Community Medicine with recent advances. 4th edition.
- 3) Bhalwar R. Textbook of Public Health and Community Medicine. 2nd edition. Pune: Department of Community Medicine AFMC, 2012
- 4) Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 2015.

BS2671

ANATOMY LABORATORY

0 0 2 2

- 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
- 6) Demonstration of location of stomach, small and large intestines. Location and features of pancreas, liver and gall bladder
- 7) Demonstration of location and features of kidney, ureter, urinary bladder and urethra. Histology of urinary system except urethra

- 8) Demonstration of location of male and female reproductive organs
- 9) Demonstration of brain and spinal cord
- 10) Histology of cornea and retina

Practical Examination Pattern

40 Marks

- 1) Gross Anatomy- Discussion of any one specimen 10 Marks
- 2) Discussion of specimens of Cardiovascular system, Respiratory System, Gastrointestinal system, Urinary system, Reproductive system
- 3) Spotters - Cardiovascular system, Respiratory System, Gastrointestinal system, Urinary system, Reproductive system 10x2=20 Marks
- 4) Histology discussion of any one demonstrated slide 10 Marks

BS2672

PHYSIOLOGY LABORATORY

0 0 2 2

- 1) Haemoglobinometry.
- 2) Haemocytometry
- 3) Total leucocyte count.
- 4) Total Red blood cell count.
- 5) Determination of blood groups.
- 6) Differential WBC count.
- 7) Determination of clotting time, bleeding time.
- 8) Erythrocyte sedimentation rate (ESR). Determination of packed cell Volume, Calculation of Blood indices: CI, MCH, MCV, MCHC.
- 9) Blood pressure recording.
- 10) Spirometry, Artificial Respiration

Practical Examination pattern

40 Marks

- 1) Estimation of Hemoglobin. - 10 marks
- 2) Determination of Blood Groups. - 10 marks
- 3) Determination of Bleeding and Clotting time. - 10 marks
- 4) Spotters-Haemocytometer, (Identification of cells) Differential Count, Sphygmomanometer, Spirometer. 10 marks

TOTAL HOURS: 45

BS2673

BASIC BIOCHEMISTRY LABORATORY

0 0 2 2

- 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.

Practical Examination pattern

40 Marks

- 1) Identification of Substance of physiological importance 10 Marks
- 2) Color reactions of Proteins 10 Marks
- 3) Spotters 10 Marks
- 4) Charts on Clinical biochemistry 10 Marks

TOTAL HOURS: 45

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REGULATION – 2017
SEMESTER II

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	BS2605	General Pathology	3	1	0	4
2.	BS2606	Microbiology	3	1	0	4
3.	BS2607	Pharmacology	3	1	0	4
4.	BS2608	Psychology	2	0	0	2
5.	BS2609	Introduction to Computer	2	0	0	2
PRACTICAL						
6.	BS2674	Pathology Laboratory	0	1	2	2
7.	BS2675	Microbiology Laboratory	0	1	2	2
8.	BS2676	Pharmacology Laboratory	0	1	2	2
TOTAL			13	6	6	22

OBJECTIVES

At the end of the course the student should be able to:

- 1) Describe the scope of pathology
- 2) Learn basic technical terminology of Haematological Disorders.

UNIT I**Introduction- & scope of pathology****9hrs**

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****9hrs.**

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, megaloblasticanamia: 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****9 hrs**

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****9 hrs**

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

UNIT V**Clinical Pathology****9 hrs**

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.

T: 15+ L: 45 = TOTAL: 60 HOURS

Recommended Books Recent Editions.

- 1) Basic Pathology Robbins Saunders, an imprint of Elsevier Inc., Philadelphia, USA.
- 2) Text book of Pathology HarshaMmohanJaypee Brothers, New Delhi.
- 3) Practical Pathology P. Chakraborty, GargiChakraborty 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 PrafulGodkarBhalani Publications house, Mumbai.
- 6) Textbook of Medical Laboratory Technology RamanikSood.
- 7) Practical Haematology Sir John Dacie Churchill Livingstone, London.
- 8) Todd and Sanford, Clinical Diagnosis and Management by Laboratory
- 9) Methods John Bernard Henry, All India Traveller Bookseller.
- 10) Histopathology Techniques, Culling.
- 11) Histopathology Techniques Bancroft.
- 12) Diagnostic Cytopathology Koss.
- 13) Diagnostic Cytopathology Winfred Grey.
- 14) Hand book of Medical Laboratory Technology, CMC Vellore.
- 15) Basic Haematological Techniques Manipal.

BS2606

MICROBIOLOGY

3 1 0 4

OBJECTIVES

At the end of the course the student should be able to:

- 1) Describe the different types of microorganisms
- 2) Learn basic technical terminology of Mycobacteriology & Parasitology.

UNIT - I

General Microbiology

9hrs

Morphology and classification of microorganisms. Growth, nutrition and multiplication of bacteria. Sterilization and Disinfection - Principles and use of equipment's 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

9hrs

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

9hrs

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

9hrs

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

UNIT V

Virology

9hrs

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

T: 15+ L: 45 = TOTAL: 60 HOURS

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 Ramnik Sood. Jaypee Publishers
- 5) Textbook of Parasitology by Paniker. 7th edition

BS2607

PHARMACOLOGY

3 1 0 4

OBJECTIVES

At the end of the course the student should be able to:

- 1) Describe the General Pharmacology and Blood
- 2) Learn basic technical terminology of Chemotherapy, Hormones.

UNIT I

General Pharmacology, ANS, PNS.

9hrs

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

9hrs

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

9hrs

CNS - general Anaesthetics - nitrous oxide, Halothane, iv anaesthetics. Sedative hypnotics - diazepam, barbiturates, zolpidem. Antiepileptics - Phenytoin, carbamezapine, 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

9hrs

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.

9hrs

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).

T: 15+ L: 45 = TOTAL: 60 HOURS

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) PadmajaUdaykumar -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, 350, Madan Mohan Marg, Tardeo, Bombay - 400 034.

Objective

- 1) After studying this applied paper, at the end of the semester students shall be able to demonstrate and develop the skills to understand patients better in the respective field.

UNIT –I**9 hrs**

Introduction to Psychology; Meaning and Definitions psychology. Evolution of modern psychology. Scope of Psychology. Branches of psychology. Concept of normality and abnormality.

UNIT –II**9 hrs**

Identifying psychological disorders. Anxiety disorders (panic, phobia, OCD, PTSD signs symptoms and management).

UNIT –III**9 hrs**

Stress, Hans Selye Model of stress. Lazarus and Folkman model of stress. Sources of stress. Stress, disease and health. Changing health- impairing behavior.

UNIT-IV**9 hrs**

Learning; Meaning, definition, Theories of learning .Pavlov's classical conditioning, Skinner's operant conditioning.

UNIT-V**9 hrs**

Therapeutic Techniques. Counselling-meaning and definition. Psychotherapy- meaning and definition. Relaxation-types. (Brief introduction to psychoanalytical, behavioral and cbt techniques)

TOTAL: 45 HOURS**Recommended Books Recent Editions.**

- 1) C.P. Khokhar (2003) Text book of Stress Coping and Management Shalab Publishing House.
- 2) S.M.Kosslyn and R.S.Rosenberg (2006) Psychology in Context. Pearson Education Inc.
- 3) C.R. Carson, J.N. Bitcher, S.Mineka and J.M. Hooley (2007), Abnormal Psychology 13th, Pearson Education, Inc.
- 4) D.A. Barlow and V.M. Durand (2004) Abnormal Psychology Wadsworth, Thompson Learning, 3rd edition USA.
- 5) R.J .Gerrig& P.G. Zimbardo (2006) Psychology and life, Pearson Education, Inc.
- 6) Pestonjee, D.M. (1999). Stress & Coping, The Indian Experience 2nd edn. New Delhi, Sage India Publications. University Publications, 2015.

UNIT I**9 hrs**

Functionalities of a computer, Definition, Advantages, Disadvantages. Applications - Banking, Insurance, Education, Marketing, HealthCare, Engineering Design, Military, Communication, Government. Generations - First Generation, Second Generation, Third Generation, Fourth Generation, Fifth Generation. Types of Computer - PC (Personal Computer), Workstation, Minicomputer, Mainframe, Supercomputer.

UNIT II**9 hrs**

Components - Input Unit, CPU, (Central Processing Unit) Output Unit. CPU - Central Processing Unit, Memory or Storage Unit, Control Unit, ALU (Arithmetic Logic Unit), Arithmetic Section, Section Logic. Input Devices - Keyboard, Mouse, Joystick, Light Pen, Track Ball, Scanner, Digitizer, Microphone, Magnetic Ink, Card Reader (MICR), Optical Character Reader(OCR), Bar Code Readers, Optical Mark Reader(OMR). Output Devices - Monitors, Cathode-Ray Tube (CRT) Monitor, Flat-Panel Display Monitor, Printers, Impact Printers, Character Printers, Dot Matrix Printer, Daisy Wheel, Printers Line, Printer Drum, Printer Chain, impact Non- Printers, Printers Laser, Inkjet Printers.

UNIT III**9 hrs**

Memory - Cache Memory, Primary Memory, (Main Memory) Secondary Memory. Random Access Memory - Static RAM (SRAM), Dynamic RAM (DRAM). Read Only Memory - MROM (Masked ROM), PROM (Programmable Read only Memory), EPROM (Erasable and Programmable Read Only Memory) EEPROM (Electrically Erasable and Programmable Read Only Memory) Advantages of ROM. Mother board - Features of Mother board, Popular Manufacturers, Description of Mother board.

UNIT IV**9 hrs**

Ports - Port Serial, Port Parallel, Port PS/2, Port VGA, Power Connector, Port Firmware, Port Modem, Ethernet Port, Port Game, Digital Video Interface, DVI port, Sockets. Hardware - Relationship between Hardware and Software. Software - System Software, Application Software

UNIT V**9 hrs**

Number System - Decimal Number System, Binary Number System, Octal Number, Hexadecimal Number System. Data and Information - Data Processing Cycle. Networking - Characteristics of Computer Network, Cables, Router, Network Card, Internal Network Cards, External Network Cards. Operating System - Objectives of Operating System, Characteristics of Operating System. Internet and Intranet - Similarities in Internet and Intranet, Differences in Internet and Intranet. Computer Viruses - Types of computer virus, Use of Antivirus software

TOTAL HOURS: 45**BS2674****GENERAL PATHOLOGY LABORATORY****0 0 2 2**

1. Laboratory organization.
2. Reception of specimen, dispatch of reports, records keeping, coding of cases.
3. Laboratory safety guidelines.
4. SI units and conventional units in hospital laboratory.
5. Haematology techniques
6. Basic requirements for hematology laboratory
7. Glasswares for hematology
8. Equipments for haematology.
9. Anticoagulant vials
10. Complete blood counts.

11. Determination of haemoglobin.
12. RBC count and TLC by hemocytometer.
13. Differential leukocyte count.
14. Determination of platelet count
15. Determination of ESR and PCV.
16. Erythrocyte Indices - MCV, MCH, MCHC.
17. Reticulocyte count
18. Absolute eosinophilic count
19. Morphology of blood cells
20. Urinalysis
21. Examination of cerebrospinal fluid
22. Examination of body fluids (pleural, pericardial, peritoneal)
23. Sputum examination.

Practical Examination Pattern

40 marks.

- | | |
|--|-----------|
| 1) Spotters | 10 marks. |
| 2) Estimation of Haemoglobin or blood grouping | 10 marks. |
| 3) Urine analysis | 10 marks. |
| 4) Determination of ESR and PCV | 10 marks. |

TOTAL HOURS: 45

BS2675

MICROBIOLOGY LABORATORY

0 0 2 2

- 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, L J 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.
- 4) Grams staining.
- 5) Acid fast staining.
- 6) Principles and practice of Biomedical waste management.
- 7) Stool Microscopy.

Practical Examination Pattern

40 marks.

- | | | |
|--------------------------|-------------------------------------|----------|
| 1) Spotters | (10 spotters carrying 2 marks each) | 20 marks |
| 2) Culture media - | | 6 |
| 3) Equipment's - | | 2 |
| 4) Slides - | | 2 |
| 5) Discussion: | | |
| a) Gram stain | | 10 marks |
| b) Ziehl – Neelsen Stain | | 10 marks |

TOTAL HOURS: 45

1. Dosage forms
2. Solid Dosage forms
3. Liquid Dosage forms
4. Gaseous Dosage forms
5. Oral route
6. Parenteral routes
7. Novel routes
8. Fixed dose combination - Amoxicillin + clavulanic acid - cotrimoxazole, Lignocaine + Adrenaline
9. Drug stations - Adrenaline, dopamine, Dobutamine)
10. Drug stations - Corticosteroids (hydrocortisone, prednisalone, inhalational steroids)
Drug stations - common antibiotics (amoxicillin, ciprofloxacin, Azithromycin, Metronidazole, Cephalosporins)
11. Drug stations - Insulin preparations
12. Instrument & devices (Nasogastric tube, laryngoscope, Different Catheters, nebulizers, Inhalers, Rotahalers)

Practical Examination Pattern**40 marks.**

- 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

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DEPARTMENT OF BIOMEDICAL SCIENCE & TECHNOLOGY
B.SC. RENAL DIALYSIS TECHNOLOGY
CURRICULUM & SYLLABUS
REGULATION - 2017
SEMESTER III

Sl. No.	Course Code	Course Title	L	T	P	C
Theory						
1	DT2601	Applied Pathology for Renal Dialysis Technology	3	1	0	4
2	DT2602	Applied Microbiology for Renal Dialysis Technology	3	1	0	4
3	DT2603	Introduction to Renal Dialysis Technology	3	1	0	4
4	BS26S3	Introduction Biomedical Instrumentation	2	0	0	2
5	BS26S4	Health care	3	0	0	3
Practicals						
6	DT2672	Applied Pathology Lab for Renal Dialysis Technology	0	1	2	2
7	DT2673	Applied Microbiology Lab for Renal Dialysis Technology	0	1	2	2
8	DT2671	Introduction to Renal Dialysis Technology Laboratory	0	1	2	2
Total			14	6	6	23

UNIT I**9hrs**

- * Congenital and cystic diseases of kidney
- * Introduction and clinical manifestations of glomerular diseases
- * Pathogenesis of glomerular diseases -brief

UNIT II**9hrs**

- * Nephritic syndrome - Acute post infectious glomerulonephritis, Rapidly progressive glomerulonephritis
- * Nephrotic syndrome - Membranous glomerulonephritis, Minimal change disease, Focal segmental glomerulosclerosis, Membranoproliferative glomerulonephritis

UNIT III**9hrs**

- * IgA nephropathy and chronic glomerulonephritis
- * Glomerular lesions in systemic diseases - diabetes, amyloidosis, systemic lupus erythematosus
- * Vascular diseases - benign hypertension, malignant hypertension, renal artery stenosis, thrombotic microangiopathy

UNIT IV**9hrs**

- * Tubulo-interstitial diseases:
 - a. Acute tubular injury
 - b. Pyelonephritis - acute and chronic
 - c. Tubulointerstitial nephritis due to drugs and toxins, others mention briefly
- * Obstructive uropathy

UNIT V**9hrs**

- * Urolithiasis and lower urinary tract infections
- * Pathology of peritoneum, peritonitis, bacterial, tubular & sclerosing peritonitis, dialysis induced changes

L: 45 + T: 15 = TOTAL: 60 HOURS**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, GargiChakraborty 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 PrafulGodkar, Bhalani Publication House, Mumbai
- 6 Text Book of Medical Laboratory Technology RamanikSood
- 7 Practical Haematology Sir John Dacie Churchill Livingstone, London.
- 8 Todd & Sanford, Clinical Diagnosis & Management by Laboratory Methods John Bernard Henry All India TravellarBooksellar
- 9 Histopathology Techniques. Culling
- 10 Histopathology Techniques Bancroft
- 11 Diagnostic Cytopathology Koss

- 12 Diagnostic Cytopathology Winifred grey
 13 Hand-Book of Medical Laboratory Technology CMC Vellore
 14 Basic Haematological Techniques Manipal Manual

DT2602 APPLIED MICROBIOLOGY FOR RENAL DIALYSIS TECHNOLOGY

3 1 0 4

Unit I

Sterilization and disinfection 9hrs

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

Unit II

Importance of sterilization and disinfection 9hrs

- Disinfection of instruments used in patient care
- Disinfection of patient care unit
- Infection control measures for ICUs

Unit III

Health care associated infections 9hrs

- Surgical site infections
- Ventilator associated pneumonia
- Catheter associated blood stream infections
- Antibiotic associated diarrhea

Unit IV

Urinary tract infections 9hrs

- Anatomy
- Types of infections
- Etiology
- Pathogenesis
- Laboratory diagnosis - Specimen collection, processing, interpretation

Unit V

Blood borne viral infections 9hrs

Morphology, pathogenesis, clinical features, laboratory diagnosis and prophylaxis of following viral infections

Hepatitis B, D and C virus

Human immunodeficiency virus

L: 45 + T: 15 = TOTAL: 60 HOURS

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 manual by Mayhall
5. Guidelines for maintenance hemodialysis in India

DT2603 INTRODUCTION TO RENAL DIALYSIS TECHNOLOGY 3 1 0 4

Unit I- **9hrs**
Epidemiology of kidney disease/ magnitude of the problem in community/
Demographics of ESRD population/ global epidemiology of RRT options

Unit II- **9hrs**
Applied renal anatomy and physiology, applied anatomy of neck, upper limb & lower limb vessels.

Unit III **9hrs**
Clinical presentation of renal disease & history taking.

Unit IV **9hrs**
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 **9hrs**
Screening for chronic kidney disease and preventive nephrology.

L: 45 + T: 15 = TOTAL: 60 HOURS

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

BS26S3 INTRODUCTION TO BIOMEDICAL INSTRUMENTATION 2 0 0 2

Unit I **9hrs**

Fundamentals of Medical Instrumentation: What is Biomedical Engineering? Anatomy and Physiological systems of the body, Sources of biomedical signals, Basic Medical Instrumentation System, Performance Requirement of Medical Instrumentation System, Intelligent Medical Instrumentation System, General Constraints in design of Medical Instrumentation System, Types of Biomedical Instrumentation Systems.

Unit II **9hrs**

Bioelectric Signals and Electrodes: Origin of Bioelectric Signals, Bioelectric Signals – Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyogram (EMG), Electroretinogram (ERG), Electrooculogram (EOG). Purpose of Electrode paste, Electrodes for ECG, EEG and EMG.

Unit III**9hrs**

Modern Imaging Systems: basic concepts and fundamentals of – X-ray machines, Computed Tomography, Nuclear Medical Imaging system, Magnetic Resonance Imaging system, ultrasonic Imaging system, Thermal Imaging system.

Unit IV**9hrs**

Therapeutic Equipment: basic concepts and fundamentals of – Cardiac Pacemaker, Cardiac Defibrillators, Physiotherapy and Electrotherapy Equipment, Haemodialysis Machines, Lithotriptors, Anaesthesia Machine, Ventilators, Radiotherapy Equipment, Automated Drug delivery systems.

Unit V**9hrs**

Recent Trends in Biomedical: Basic concepts and Applications in Biomedical- LASER, BIOMEMS and Nano Technology, Biomaterials and Implants, Artificial Organs, Rehabilitation Engineering.

TOTAL: 30 HOURS**TEXT BOOKS:**

1. Leslie Cromwell, “Biomedical Instrumentation and measurement”, Prentice hall of India, New Delhi, 1997.
2. Khandpur R.S, “Handbook of Biomedical Instrumentation”, Tata McGraw-Hill, New Delhi, 1997.

REFERENCES:

1. John G. Webster, “Medical Instrumentation Application and Design”, John Wiley and sons, New York, 1998.
2. Joseph J.carr and John M. Brown, “Introduction to Biomedical equipment technology”, John Wiley and sons, New York, 1997.

BS26S4**HEALTH CARE****3 0 0 3****Unit I****9hrs****1a Concepts of Health**

Definition of health; evolution in concepts of public health; public health events- sanitary awakening, germ theory of disease, rise of public health in various countries, changing concepts of health- biomedical concept, ecological concept, psycho-social concept and holistic concept.

1b. Dimensions of Health

Physical dimension, mental dimension, Social dimension etc; Common health problems in India - Communicable diseases, Non communicable diseases, MCH problems, Nutritional problems, Environmental sanitation, Glance over National Health profile.

- Unit II** **9hrs**
- 2a Evolution of health care delivery systems**
History of health care delivery services; Genesis of primary health care; National health policy; MDGs.
- 2b Levels of health care**
Primary health care, secondary health care, tertiary health care.
Primary health care-principles of primary health care, elements of primary health care.

- Unit III** **9hrs**
- 3a Primary health care: Delivery of services**
Introduction; Structure of health care delivery system; Delivery of primary health care services at village level; Village health guide, ASHA, ICDS: Subcentre: Primary health centre.
- 3b Secondary and tertiary health care: Delivery of services**
Community Health centre; First referral unit; District hospital.

- Unit IV** **9hrs**
- 4a Primary health care - Current status in India**
Status of health care infrastructure; Health team concept; Health insurance; Social security and social assistance in health; AYUSH.
- 4b National Health Programmes**
Introduction; National Vector Borne Disease Control Programme; National Leprosy Eradication Programme; Revised National Tuberculosis Control Programme; National AIDS Control Programme; Universal Immunization Programme; National Rural Health Mission.

- Unit V** **9hrs**
- 5a National Health Programmes**
Reproductive and Child Health Programme; Integrated Management of Neonatal and Childhood Illnesses; National Nutritional Anemia Prophylaxis Programme; National Programme for Control of Blindness; National Cancer Control Programme; National Mental Health Programme.
- 5b First aid**
Basic terminologies; general guidelines; first aid in specific situations; Wound, bleeding, fracture, choking, burns, epistaxis, strains and sprain, animal bites (classification, causes and first aid), Cardio-pulmonary resuscitation

TOTAL: 45 HOURS

Recommended Books Recent Editions.

1. Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: BanarsidasBhanot Publishers, 2015. p.135-141
2. Suryakantha. Textbook of Community Medicine with recent advances. 4th edition
3. Bhalwar R editor. Textbook of Public Health and Community Medicine. 2nd Pune, Department of Community medicine AFMC; 2012
4. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 2015

DT2672

**APPLIED PATHOLOGY LAB FOR RENAL
DIALYSIS TECHNOLOGY**

0 1 2 2

Practicals:

1. Urine examination: physical, chemical, microscopy
2. Blood grouping & Rh typing
3. Hemoglobinstimation, packed cell volume (PCV), erythrocyte sedimentation rate(ESR)
4. Histopathology: fixatives and preservation of tissues, processing, hematoxylin and eosin staining, special stains - PAS, MTS and Jones methanaminesilver, direct immunofluorescence staining

5. 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

- 1 Small contracted kidney
- 2 Cystic diseases
- 3 Pyelonephritis
- 4 Hydronephrosis

TOTAL: 45 HOURS

DT2673

**APPLIED MICROBIOLOGY LAB FOR RENAL DIALYSIS
TECHNOLOGY**

0 1 2 2

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 and laboratory and air sampling methods

Practical Examination Pattern

1. Sterilization and disinfection practices in tertiary care hospital and quality control of sterilization and Interpretation of results of sterility testing. 20 Marks

2. Preparation of materials for autoclaving - packing of materials, loading, holding time and unloading. 10Marks
3. Disinfection of wards, operation theatres, dialysis units and laboratory and air sampling methods. Collection of specimen from outpatient units, inpatient units, minor operation theatre and major operation theatre for sterility testing. 10Marks

**DT2671 INTRODUCTION TO RENAL DIALYSIS TECHNOLOGY
LABORATORY**

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

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B.SC. RENAL DIALYSIS TECHNOLOGY
CURRICULUM & SYLLABUS
REGULATION - 2017
SEMESTER IV

Sl. No.	Course Code	Course Title	L	T	P	C
Theory						
1	BS26S5	Patient care and Basic Nursing	3	1	0	4
2	DT2604	Basic Concepts of Renal disease	3	1	0	4
3	DT2605	Acute & Chronic kidney diseases & Nutrition	3	1	0	4
4	BS26S6	Biostatistics and Research Methodology	2	0	0	2
5	BS26S7	Constitution of India	3	0	0	3
Modality Posting + Practicals						
6	BS2679	Patient care and Basic Nursing Laboratory	0	1	2	2
7	DT2674	Basic concepts of Renal disease Laboratory	0	1	2	2
8	DT2675	Acute & Chronic Kidney Diseases & Nutrition Technology Laboratory	0	1	2	2
Total			14	6	6	23

Objectives:

To learn about patient care and basics of nursing activities, communication and documentation, infection control, medication administration and wound care.

Unit I -**9**

Introduction, Communication and Documentation - 12 hours

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 -**9**

Universal Precautions and Infection Control - 10 hours

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 -**9**

Medication Administration and Transport of patient - 14 hours

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

6. Position and Transport of patient:

- a) Patient position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep.
- b) Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher.
- c) Transport of ill patients (inotropes, intubated / ventilated patients)

Unit IV - 9

Bedside care and monitoring - 14 hours

7. 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

8. 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 V - 9

Wound care and first aid - 10 hours

9. 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

10. First Aid and Basic Life Support (BLS)

Reference Books (latest edition)

- 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

L: 45 + T: 15 = TOTAL: 60 HOURS

DT2604 BASIC CONCEPTS OF RENAL DISEASE 3 1 0 4

Unit I: 9hrs

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: **9hrs**
Urinary tract infections: Definition, types of UTI, risk factors, diagnosis, treatment

Unit III: **9hrs**
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 **9hrs.**
Hypertension- normal BP control, definition, evaluation, primary & secondary HTN, complications, antihypertensive drugs

Unit V: **9hrs**
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.

L: 45 + T: 15 = TOTAL: 60 HOURS

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

DT2605 ACUTE AND CHRONIC KIDNEY DISEASES AND NUTRITION

3 1 0 4

Unit I: **9hrs**
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: **9hrs**
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: **9hrs**
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: **9hrs**
Sources and types of proteins, fats, carbohydrates and planning balanced diet

Unit V:**9hrs**

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

L: 45 + T: 15 = TOTAL: 60 HOURS**Recommended Books Recent edition**

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

BS26S6 BIostatistics AND RESEARCH METHODOLOGY 2 0 0 2**Learning Objectives**

1. To have a basic knowledge of biostatistics and its applications in medicine
2. To know various types of data presentation and data summarization in Medical field
3. To have overview of data analysis and sampling techniques
4. To understand various study designs in Medical field
5. To know applications of various study designs in Medical Research

Unit I-**Introduction and Presentation of data****6hrs**

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.

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 II**6hrs****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

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 III**6hrs****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.

Unit IV **6hrs**

Introduction to research methodology

Types of research; Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical.

Study Designs-Observational Studies

Epidemiological study designs; Observational studies, Descriptive studies; Case reports, Case series, Analytical studies; Case control studies, Cohort studies, Cross sectional

Unit V **6hrs**

Experimental Studies

Experimental studies (Interventional studies); Randomized control Trials (Clinical trials), Field trials, Community trials, Non-Randomized Trials

Uses of Epidemiology, Application of study Designs in Medical Research

TOTAL: 30 HOURS

References

1. K.R.Sundaram, S.N.Dwivedi and V Sreenivas (2010), Medical statistics, Principles and Methods, BI Publications Pvt Ltd, New Delhi
2. NSN Rao and NS Murthy (2008), Applied Statistics in Health Sciences, Second Edition, Jaypee Brothers Medical Publishers (P) Ltd.
3. J.V.Dixit and L.B.Suryavanshi (1996), Principles and Practice of Biostatistics, First Edition, M/S BanarsidasBhanot Publishers.
4. GetuDegu and FasilTessema (2005), Biostatistics, Ethiopia Public Health Training Initiative.
5. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 20.

BS26S7

CONSTITUTION OF INDIA

3 0 0 3

Unit – I **9hrs**

Meaning of the term 'Constitution', Making of the Indian Constitution 1946-1950, The democratic institutions created by the constitution, Bicameral system of Legislature at the Centre and in the States.

Unit - II **9hrs**

Fundamental rights and duties their content and significance, Directive principles of States, policies the need to balance fundamental rights with directive principles Special rights created in the Constitution for dalits, backwards, women and children and the religious and linguistic minorities.

Unit – III **9hrs**

Doctrine of Separation of Powers, legislative, executive and judicial and their functioning in India, The Election Commission and State Public Service commissions.

Unit – IV **9hrs**

Method of amending the Constitution, Enforcing rights through writs

Unit – V **9hrs**

Constitution and sustainable development in India.

TOTAL: 45 HOURS

BS2679 PATIENT CARE AND BASIC NURSING LABORATORY 0 1 2 2

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)

Practical Exam Pattern:

Spotters, Drugs, Instruments and devices - identification and usage, demonstration of patient care procedures.

TOTAL: 45 HOURS

DT2674 BASIC CONCEPTS OF RENAL DISEASE LABORATORY 0 1 2 2

Practicals

1. Priming of dialysis apparatus Or Demonstration of dialyser reuse
2. Charts /spotters :nephrotic syndrome, nephritic, AKI, CKD, BP apparatus, stethoscope, pulse oximeter, cardiac monitor, thermometer.20 marks

TOTAL: 45 HOURS

**DT2675 ACUTE & CHRONIC KIDNEY DISEASES & NUTRITION
TECHNOLOGY LABORATORY 0 1 2 2**

Practicals

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

TOTAL: 45 HOURS

NOORUL ISLAM CENTRE FOR HIGHER EDUCATION, KUMARACOIL
B.Sc. RENAL DIALYSIS TECHNOLOGY
CURRICULUM & SYLLABUS
REGULATION – 2017
SEMESTER V

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	DT2606	Hemodialysis - I	3	1	0	4
2.	DT2607	Hemodialysis - II	3	1	0	4
3.	DT2608	Hemodialysis - III	3	1	0	4
4.	DT2609	Biomedical Engineering Devices for Renal Dialysis Technology	3	0	0	3
5.	BS26S9	Medical Ethics	2	0	0	2
PRACTICAL						
6.	DT2676	Hemodialysis Laboratory - I	0	1	2	2
7.	DT2677	Hemodialysis Laboratory - II	0	1	2	2
8.	DT2678	Hemodialysis Laboratory - III	0	1	2	2
TOTAL			14	6	6	23

NOORUL ISLAM CENTRE FOR HIGHER EDUCATION, KUMARACOIL

B.Sc. RENAL DIALYSIS TECHNOLOGY

CURRICULUM & SYLLABUS

REGULATION – 2017

SEMESTER VI

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	DT2610	Peritoneal Dialysis	3	1	0	4
2.	DT2611	Dialysis in Special Situations	3	1	0	4
3.	DT2612	Renal Disorders	3	1	0	4
4.	DT2613	Renal Transplantation	3	0	0	3
5.	BS26S0	Hospital Management	2	0	0	2
PRACTICAL						
6.	DT2679	Peritoneal Dialysis Laboratory	0	1	2	2
7.	DT2680	Dialysis in Special Situations Laboratory	0	1	2	2
8.	DT2681	Renal Disorders Laboratory	0	1	2	2
TOTAL			14	6	6	23

SEMESTER V

THEORY

5.1 DT2606

HEMODIALYSIS - I

3 1 0 4

AIM:

The main aim of this objective is to introduce the students the vast scenario of dialysis with its objectives complications care etc It aims at enhancing the basics of hd apparatus dialysers preparation of ro water.

OBJECTIVE:

It deals with the basic concepts of dialysis, procedure various surgical techniques , complications its compositions and preparations of chemicals used.

OUTCOMES:

- Enable s the students the adequacy of dialysis team rights and responsibilities
- Helps to decide about the treatment options of RRT
- Enhances the basic knowledge of hemodialysis and urea kinetic modeling
- Helps the students for understanding the basics of vascular assess and cannulation techniques
- Makes the student aware of different HD apparatus, preparation of RO water and distribution

UNIT - I

9

History, Types of Dialysis, principles of dialysis, Quantification of adequacy Dialysis Team - Rights - Responsibilities - Lab data analysis - medication in dialysis patients.

UNIT - II

9

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

UNIT - III

9

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

UNIT - IV

9

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 - V

9

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

TEXT BOOK:

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd,”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly,”Comprehensive Clinical Nephrology”.

REFERENCES:

1. Lippincott Williams and Wilkins,”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

5.2 DT2607

HEMODIALYSIS - II

3 1 0 4

AIM:

The main aim of the subject is to introduce the students the knowledge of disinfection, dialyser reuse and anti - coagulation.

OBJECTIVE:

It deals with the basic concepts of anti coagulation along with hemodialysis for acute and chronic renal failure.

OUTCOMES:

- It enables the students for knowing adequate methods of disinfection and maintenance of RO plant
- Student will acquire knowledge about dialyser reuse, its advantages and disadvantages
- Deals with indications and procedure involved in ARF
- Deals with indications, complications and various aspects of heamodialysis
- Student will be able to acquire basic knowledge of anti coagulation

UNIT - I

9

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

UNIT - II

9

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

UNIT - III

9

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

UNIT - IV **9**

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

UNIT - V **9**

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

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd, ”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly, ”Comprehensive Clinical Nephrology”.

REFERENCES:

1. Lippincott Williams and Wilkins, ”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

5.3 DT2608 **HEMODIALYSIS - III** **3 1 0 4**

AIM:

The main aim of this subject is to introduce the students the complications and management of hypotension and renal anemia. It also deals with plasma pheresis and heamo filtration.

OBJECTIVE:

It deals with the basic concepts of dialysis, procedure various surgical techniques ,complications its compositions and preparations of chemicals used.

OUTCOMES:

- It deals with the causes, complications and management of hypotension
- It deals with the etiology and management of renal anaemia
- It deals with the concepts of heamofiltration and scuf
- It deals with the concepts of SLED
- It deals with the concepts of plasma pheresis

UNIT - I **9**

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	9
Renal anemia and its management - etiology, symptoms, treatment, indications for ESA and target Hb levels - dosing of erythropoietin and its side effects.	
UNIT - III	9
Hemofiltration/ Hemodiafiltration/ SCUF.	
UNIT - IV	9
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	9
Plasmapheresis - rationale - methods of plasma separation - indications, common diseases for which used protocols complications - anticoagulation for PP.	

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd,”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly,”Comprehensive Clinical Nephrology”.

REFERENCES:

1. Lippincott Williams and Wilkins,”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

5.4 DT2609 BIOMEDICAL ENGINEERING DEVICES FOR RENAL DIALYSIS TECHNOLOGY 3 0 0 3

AIM:

To learn about the basics of principles, practice and applications of various biomedical devices. Setting up, placement, assessment and monitoring, documentation, maintenance and trouble shooting.

OBJECTIVE:

The course will introduce the student to principles, practice, trouble shooting and applications of various biomedical devices.

REFERENCES:

1. Joseph J. Carr and John M. Brown, "Introduction to Biomedical Equipment Technology", John Wiley and Sons, New York.

5.5 BS26S9

MEDICAL ETHICS

2002

AIM:

To provide the code of medical ethics. To provide the details about the medical jurisprudence. To provide the legal framework for hospitals.

OBJECTIVE:

The course will assist the students in understanding basic laws and ethics related to the field of health care.

OUTCOMES:

- The students should learn about code of medical ethics
- Study about advanced ethical decisions and major laws
- Learn about organizational and procedural laws
- Know about Medical jurisprudence
- Know about Legal framework for hospitals

UNIT - I

Code of Medical Ethics

9

Principle of medical ethics, confidentiality, informed consent, decisions of life sustaining therapy, communication, communication barriers, doctor patient relationship, list of offences and professional misconduct of doctors, bioethics, role of ethics committees, quality assurance programs, medical etiquette.

UNIT - II

Advanced Ethical Decisions and Major Laws

9

Advance decisions to refuse treatment, doctor and criminal abortion, ethical issues in stroke management, ethical issues in dementia, quality of life in health care decisions, prenatal diagnostic techniques, regulations and prevention of misuse act 1994 (PNDT act), transplantation of human organs act 1994, medical termination of pregnancy act, labour laws applicable to a hospital, Indian trade union act 1926, industrial dispute act 1947, payment of wages act, employee provident fund act, maternity benefit act.

UNIT - III

Organizational and Procedural Laws

9

Indian contract act, nursing home registration act, birth death registration act, regulation of genetic counselling center, regulation of prenatal diagnostic technique, determination of sex prohibited Dying declaration - definition, precautions, procedure of recording, special circumstances Death certificate - precautions while issuing death certificate, contents of death certificate, importance of death certificate.

UNIT - IV

Medical Jurisprudence

9

Introduction and legal procedure, medico legal aspects of death injuries, medical ethics, consumer protection act, quality of life in health care decisions, ethical issues in health and social care.

UNIT - V**Legal Framework for Hospitals****9**

Introduction to legal framework, patients rights and providers responsibility, medical malpractice, medico legal aspects - impotence, sterility, sterilization and artificial insemination; medico legal aspects of psychiatric and mental health, toxicology, laws related to toxicology, organ transplantation act.

TOTAL: 30 HOURS**TEXT BOOK:**

1. Parikh C.K, "Parikhs Textbook of medical jurisprudence and toxicology"., CBS Publications.
2. Jagdish Singh and Bharath Law, "Medical negligence and compensation".
3. Gurucharan S. Sai. "Medical ethics and elderly", 3rd Edition, Radcliffe publishing Ltd.

PRACTICAL

5.1 DT2676

HEMODIALYSIS LABORATORY - I

0 1 2 2

AIM:

The main aim of this objective is to introduce the students the vast scenario of dialysis with its objectives complications care etc It aims at enhancing the basics of hd apparatus dialysers preparation of ro water.

OBJECTIVE:

It deals with the basic concepts of dialysis, procedure various surgical techniques , complications its compositions and preparations of chemicals used.

OUTCOMES:

- Enable s the students the adequacy of dialysis team rights and responsibilities
- Helps to decide about the treatment options of RRT
- Enhances the basic knowledge of hemodialysis and urea kinetic modeling
- Helps the students for understanding the basics of vascular assess and cannulation techniques
- Makes the student aware of different HD apparatus, preparation of RO water and distribution

LIST OF EXPERIMENTS:

1. Types of dialysis
2. Medication in dialysis patients
3. Renal replacement therapy
4. Predialysis patient education
5. Home hemodialysis
6. Vascular access
7. Arteriovenous access
8. Cannulation techniques
9. Hemodialysis blood circuit
10. Dialysers

TOTAL: 45 HOURS

AIM:

The main aim of the subject is to introduce the students the knowledge of disinfection, dialyser reuse and anti - coagulation.

OBJECTIVE:

It deals with the basic concepts of anti coagulation along with hemodialysis for acute and chronic renal failure.

OUTCOMES:

- It enables the students for knowing adequate methods of disinfection and maintenance of RO plant
- Student will acquire knowledge about dialyser reuse, its advantages and disadvantages
- Deals with indications and procedure involved in ARF
- Deals with indications, complications and various aspects of heamodialysis
- Student will be able to acquire basic knowledge of anti coagulation

LIST OF EXPERIMENTS:

1. Disinfection of hemodialysis patients
2. RO treatment
3. Dialyser
4. Anticoagulation during hemodialysis
5. Citrate dialysate
6. Chemicals used in hemodialysis
7. Dialysis solutions
8. Vascular access

TOTAL: 45 HOURS

AIM:

The main aim of this subject is to introduce the students the complications and management of hypotension and renal anemia. It also deals with plasma pheresis and heamo filtration.

OBJECTIVE:

It deals with the basic concepts of dialysis, procedure various surgical techniques ,complications its compositions and preparations of chemicals used.

OUTCOMES:

- It deals with the causes, complications and management of hypotension
- It deals with the etiology and management of renal anaemia
- It deals with the concepts of haemofiltration and scuf
- It deals with the concepts of SLED
- It deals with the concepts of plasma pheresis

LIST OF EXPERIMENTS:

1. Sustained low efficiency dialysis
2. Slow continuous ultrafiltration
3. Renal replacement therapy
4. Renal transplantation
5. Renal biopsy
6. Renal function tests
7. Arteriovenous fistula
8. Priming of dialysis apparatus

TOTAL: 45 HOURS

SEMESTER VI

THEORY

6.1 DT2610

PERITONEAL DIALYSIS

3 1 0 4

AIM:

This subject aims at the study of basic concepts, mechanical and metabolic complications of peritoneal dialysis.

OBJECTIVE:

The main objective is to make the student aware of various aspects of peritoneal dialysis, the common causes of fluid overload and its complications.

OUTCOMES:

- Deals with functional anatomy, physiology of peritoneum
- Deals with apparatus for PD, catheter designs, procedure and its complications
- It deals with hybrid forms of PD and nutrition
- It deals with causes of fluid overload and concepts of peritonitis
- Deals with metabolic and mechanical concepts of PD

UNIT - I

9

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

UNIT - II

9

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

9

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

UNIT - IV

9

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

9

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

TEXT BOOK:

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd,”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly,”Comprehensive Clinical Nephrology”.

REFERENCES:

1. Lippincott Williams and Wilkins,”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

6.2 DT2611

DIALYSIS IN SPECIAL SITUATIONS

3 1 0 4

AIM:

The aim of the subject is to know the dialysis done for poisoning, pregnancy HIV positive and CCF patients.

OBJECTIVE:

It enhances the student for the dialysis done for poisoning, pregnancy HIV positive and CCF patients.

OUTCOMES:

- Deals with concepts of hemoperfusion and dialysis for poisoning
- Deals with dialysis done for children
- Deals with dialysis done for children
- Deals with dialysis done for HIV positive patients
- Deals with recent advances in dialysis technology

UNIT - I Dialysis for Congestive Cardiac Failure and Poisoning Patients 9

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) congestive cardiac failure.

UNIT - II Dialysis in Children 9

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 9

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** **9**

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

UNIT - V **Recent Advances in Dialysis Technology** **9**

MARS dialysis dialysis in advanced liver disease nocturnal hemodialysis Newer peritoneal dialysis solutions home hemodialysis.

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd, ”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly, ”Comprehensive Clinical Nephrology”.

REFERENCES:

1. Lippincott Williams and Wilkins, ”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

6.3 DT2612

RENAL DISORDERS

3 1 0 4

AIM:

Subject aims at enhancing student knowledge about various renal disorders and their management.

OBJECTIVE:

It deals with increasing exposure of students to various renal diseases.

OUTCOMES:

- Deals with basic clinical examination and associated test for renal patients
- Deals with basic concepts of fluid and electrolyte balance
- Deals with different glomerular diseases
- Deals with changes of renal system with respective to various diseases
- Deals with injuries of kidney and their management

UNIT - I

Assessment of Renal Disease

9

History and clinical examination of patients with renal disease - Urinalysis and microscopy - Clinical assessment of renal function - Renal function in the newborn infant - The aging kidney - Imaging in renal disease - Renal biopsy - Immunological investigation of renal disease.

UNIT - II	Fluid and Electrolyte Disorders	9
Hypo/hyponatremia - disorders of water balance - Hypo/hyperkalemia - Hypo/hypercalcemia Hypo/hyperphosphatemia - Hypo/hypomagnesaemia - Clinical acidbase disorders		
UNIT - III	Glomerular Diseases	9
Proteinuria - Nephrotic syndrome - Minimal change disease - Focal segmental glomerulosclerosis - Immunoglobulin A nephropathy - Membranous nephropathy - glomerulonephritis.		
UNIT - IV	Kidney in Various Diseases	9
Diabetes mellitus Amyloidosis - Plasma cell dyscrasias Sarcoidosis - Systemic vasculitis - Sysemic lupus erythematosus - Rheumatoid arthritis - sjgrens syndrome UTI - renal stone.		
UNIT - V	Kidney Injuries and its Management	9
AKI CKD Hemodialysis - hemofiltration and hemodiafiltration - peritoneal dialysis - Psychological aspects of treatment for renal failure.		

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. John L. Hennessey and David A. Patterson, Computer Architecture A Quantitative Approach”, Morgan Kaufmann / Elsevier, 5th edition, 2012.

REFERENCES:

1. John L. Hennessey and David A. Patterson, Computer Architecture A Quantitative Approach”, Morgan Kaufmann / Elsevier, 5th edition, 2012.

6.4 DT2613 RENAL TRANSPLANTATION 3 0 0 3

AIM:

It aims at the different considerations of transplantation and operative techniques.

OBJECTIVE:

It deals with the operative procedures, immunology and pharmacology associated with renal transplantation.

OUTCOMES:

- Deals with diagnostic categories for kidney transplantation
- Deals with pre and post transplant medical considerations
- Deals with transplant immunology, anesthesia and pharmacology
- Deals with operative techniques and implantation
- Deals with post transplant considerations

UNIT - I 9

Overview of kidney transplantation - diagnosis and diagnostic categories for kidney transplantation - recipient evaluation.

UNIT - II **9**

Pre and post transplant medical considerations fluids and electrolytes, cardiac evaluation - pulmonary evaluation - hematologic evaluation - gastroenterology and hepatology evaluation - nutritional care infections - Donor evaluation deceased donor management - donor kidney scoring systems - deceased donor considerations - infectious risks associated with donors - live donor evaluation - psychiatric evaluation of live donors.

UNIT - III **9**

Immunology and pharmacology - Transplant immunology - immune risk profiling - HLA and ABO desensitization - kidney paired donation pharmacology - anesthesia.

UNIT - IV **9**

Operative techniques - Live donor nephrectomy - deceased donor procurement implantation - minimally invasive kidney transplantation - implantation techniques - complications.

UNIT - V **9**

Post transplant considerations - Postoperative guidelines, allograft function rejection - recurrent glomerular diseases after kidney transplantation - vascular complications - allograft nephrectomy - urologic complications and fluid collections - post transplant malignancies.

TOTAL: 45 HOURS

TEXT BOOK:

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd,”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly,”Comprehensive Clinical Nephrology”.

REFERENCES:

1. Lippincott Williams and Wilkins,”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney
4. Stuart J.Knechtle,” Kidney Transplantation Principles and Practice”, Elsevier Publications.

6.5 BS26S0

HOSPITAL MANAGEMENT

2 0 0 2

AIM:

To learn about the basics of coronary angiography.

OBJECTIVE:

The course enhance students learning in hemodynamics, various angiogram and echo techniques and diagnosis.

OUTCOMES:

- The students should learn about quality management
- Study about hospital information system
- Learn about inventory control
- Know about occupational health and safety measures
- Know about biomedical waste management methods

UNIT - I **Quality Management** **9**

Quality Concepts: Definition of Quality, Dimensions of Quality, Basic concepts of Total Quality Management, Quality Awards - Accreditations for hospitals: Understanding the process of getting started on the road to accreditation, National and International Accreditation bodies, overview of standards - ISO (9000 & 14000 environmental standards), NABH, NABL, JCI, JACHO.

UNIT - II **Hospital Information System** **9**

Hospital Information System: Hospital Information System Management and software applications in registration, billing, investigations, reporting, ward management and bed distribution, medical records management, materials management and inventory control, pharmacy management, dietary services, management, information processing. Security and ethical challenges.

UNIT - III **Inventory Control** **9**

Inventory Control: Concept, various costs of inventory, Inventory techniques - ABC, SDE / VED Analysis, EOQ models - Storage: Importance and functions of storage - Location and layout of stores - Management of receipts and issue of materials from stores, Warehousing costs, Stock verification.

UNIT - IV **Occupational Health and Safety** **9**

Occupational health, occupational safety, aims and objectives, common occupational hazards in hospitals, occupational hazards in emergency unit, general methods of prevention of occupational diseases, personal protective equipments, role of health care professionals in prevention of occupational hazards or diseases.

UNIT - V **Biomedical Waste Management** **9**

Biomedical Waste Management: Meaning, Categories of Biomedical Wastes, Colour code practices, Segregation, Treatment of biomedical waste - Incineration and its importance - Standards for waste autoclaving, Microwaving - Packaging, Transportation & Disposal of Biomedical wastes.

TOTAL: 30 HOURS**TEXT BOOK:**

1. Goel S L & Kumar R. 2004. Hospital Core Services: Hospital Administration of the 21st Century. Deep Deep Publications Pvt Ltd: New Delhi
2. Gupta S & Kant S. 1998. Hospital & Health Care Administration: Appraisal and Referral Treatise. Jaypee: New Delhi

3. Harris M G & Assoc. 2003. Managing Health Service: Concepts & Practices. MacLennan + Petty: Sydney
4. Kelly D L. 2006. Encyclopaedia of Quality Management in Hospitals & Health Care Administration. Vol 1 - 6. Pentagon Press: Chicago

REFERENCES:

1. Kilpatrick A O & Johnson J A. 1999. Handbook of Health Administration & Policy. Marcel DekkesInc: New York
2. Kumar A. 2000. Encyclopaedia of Hospital Administration & Development: Volume I. Anmol Publications Ltd: New Delhi.
3. Ransom S B. Joshi M S & Nash D B. 2006. The Health Care Quality Book: Vision, Strategy & Tools. Standard Publishers Distributors: Delhi
4. Reddy N K S. 2000. Medical Jurisprudence & Toxicology. ALT Publications: Hyderabad

PRACTICAL

6.1 DT2679

PERITONEAL DIALYSIS LABORATORY

0 1 2 2

AIM:

This subject aims at the study of basic concepts, mechanical and metabolic complications of peritoneal dialysis.

OBJECTIVE:

The main objective is to make the student aware of various aspects of peritoneal dialysis, the common causes of fluid overload and its complications.

OUTCOMES:

- Deals with functional anatomy, physiology of peritoneum
- Deals with apparatus for PD, catheter designs, procedure and its complications
- It deals with hybrid forms of PD and nutrition
- It deals with causes of fluid overload and concepts of peritonitis
- Deals with metabolic and mechanical concepts of PD

LIST OF EXPERIMENTS:

1. Anatomy of peritoneum
2. Physiology of peritoneum transport
3. Peritoneal equilibration test
4. Peritoneal dialysis solutions
5. Automated peritoneal dialysis
6. Continuous ambulatory peritoneal dialysis
7. Nutrition in CAPD
8. Complications of peritoneal dialysis

TOTAL: 45 HOURS

6.2 DT2680

DIALYSIS IN SPECIAL SITUATIONS LABORATORY

0 1 2 2

AIM:

The aim of the subject is to know the dialysis done for poisoning, pregnancy HIV positive and CCF patients.

OBJECTIVE:

It enhances the student for the dialysis done for poisoning, pregnancy HIV positive and CCF patients.

OUTCOMES:

- Deals with concepts of hemoperfusion and dialysis for poisoning
- Deals with dialysis done for children
- Deals with dialysis done for children
- Deals with dialysis done for HIV positive patients
- Deals with recent advances in dialysis technology

LIST OF EXPERIMENTS:

1. Hemodialysis
2. Peritoneal dialysis
3. Vascular access
4. Renal replacement therapy
5. Renal biopsy
6. Renal transplantation
7. AV cannulation
8. MARS dialysis

TOTAL: 45 HOURS

6.3 DT2681**RENAL DISORDERS LABORATORY****0 1 2 2****AIM:**

Subject aims at enhancing student knowledge about various renal disorders and their management.

OBJECTIVE:

It deals with increasing exposure of students to various renal diseases.

OUTCOMES:

- Deals with basic clinical examination and associated test for renal patients
- Deals with basic concepts of fluid and electrolyte balance
- Deals with different glomerular diseases
- Deals with changes of renal system with respect to various diseases
- Deals with injuries of kidney and their management

LIST OF EXPERIMENTS:

1. Renal circulation
2. Renal function test
3. Acid base balance
4. Oxygen administration
5. CPR
6. Total parenteral nutrition
7. Abdominal paracentesis
8. Renal diet
9. Fluid and electrolyte balance
10. Intravenous pyelogram

TOTAL: 45 HOURS