Department of Paramedical Sciences

Faculty of Allied Health Sciences

SGT UNIVERSITY

Shree Guru Gobind Singh Tricentenary University

Gurgaon-122505

Syllabus

B.Sc. RENAL DIALYSIS TECHNOLOGY

Duration: 3 years (6 Semester)
1 year Compulsory Internship

W.e.f. Academic Session 2022-23

Program Introduction

B.Sc. Renal Dialysis Technology is a 3+1-year degree program that deals with techniques used for treatment of end stage renal disease and acute kidney disease.

Renal Dialysis Technology is a branch of paramedical science that deals with the study of the process of treating and removing excess water, solutes, and toxins from the blood of patients whose kidneys can no longer perform normal functions clearly.

The course prepares students to administer haemodialysis treatments for patients with renal failure, under the governance of a nurse or physician.

The B.Sc. Renal Dialysis Technology syllabus includes subjects such as Human Anatomy, Excretory System, Physiology, Pathology, Pharmacology, Hemodialysis, Peritoneal dialysis and others dialysis modalities. To be considered eligible to apply to this course, students must have passed Class 12 or equivalent from a recognized board with an aggregate of at least 50% marks.

B.Sc. Renal Dialysis Technology degree holders will be able to find work in various sectors such as Hospitals, Universities, Health organizations etc.

Program Objectives/Outcomes

Students learn about Human Anatomy, Human Physiology, Pathology of disease, Microbiology of causing pathogens, Pharmacology of drugs used in Human being.

Students learn about different kinds of renal disease and there therapeutic and surgical treatment.

Students learn about Hemodialysis. Components of hemodialysis, indication, contraindication and complications

Students learn about Peritoneal dialysis its components, indication , contraindication and complications.

Students learn about Continouos renal replacement therapy its component, indication, contraindication and mechanism.

Students learn about hemoperfusion dialysis its components, indication , contraindication and complications.

Students learn about plasmapheresis dialysis its components, indication , contraindication and complications.

SCHEME OF EXAMINATION

SEMESTER – 1

PAPER	SUBJECT	PAPER CODE	THEORY EXAMINATION		PRACTICAL EXAMINATION		TOTAL	CREDIT
			UNIV.EXAM	INT.EXAM	UNIV.EXAM	INT. EXAM		
1	HUMAN ANATOMY-I		60	40	30	20	150	4+1
2	HUMAN PHYSIOLOGY-I		60	40	30	20	150	4+1
3	BASIC BIOCHEMISTRY		60	40	30	20	150	4+1
4	GENERAL MICROBIOLOGY		60	40	30	20	150	4+1
5	COMMUNICATION SKILLS & PERSONALITY DEPARTMENT		60	40			100	4
	TOTAL		300	200	120	80	700	24

SEMESTER – 2

PAPER	SUBJECT	PAPER CODE	THEORY EXAMINATION		PRACTICAL EXAMINATION		TOTAL	CREDITS
1	HUMAN ANATOMY-II		60	40	-	-	100	4
2	HUMAN PHYSIOLOGY-II		60	40	-	-	100	4
3	APPLIED BIOCHEMISTRY		60	40	30	20	150	4+2
4	PATHOLOGY		60	40	30	20	150	4+2
5	PHARMACOLOGY-I		60	40	-	-	100	4
5	FUNDAMENTALS OF COMPUTER SCIENCE		60	40			100	4
	TOTAL		360	240	60	40	700	28

SEMESTER -3

PAPER	SUBJECT	PAPER CODE	THEORY EXAMINATION		PRACTICAL EXAMINATION		TOTAL	CREDITS
1	Applied PATHOLOGY		60	40	30	20	150	4+2
2	PHAMACOLOGY-II		60	40	-	-	100	4
3	INTRODUCTION TO RENAL DIALYSIS		60	40	30	20	150	4+2
4	MEDICAL EMERGENCIES & PATIENT CARE		60	40	-	-	100	4
5	ENVIRONMENTAL SCIENCE		60	40	-	-	100	4

	TOTAL		300	120	60	40	600	24

SEMESTER – 4

PAPER	SUBJECT	PAPER CODE	THEORY EXAMINATION		PRACTICAL EXAMINATION		TOTAL	CREDITS
1	Hemodialysis- I		60	40	30	20	100	4
2	PERITONEAL DIALYSIS		60	40	30	20	150	4+2
3	MEDICAL DISORDERS & INTENSIVE CARE		60	40	30	20	150	4+2
	TOTAL		180	120	90	60	450	18

SEMESTER – 5

PAPER	SUBJECT	PAPER CODE	THEORY EXAMINATION		PRACTICAL EXAMINATION		TOTAL	CREDITS
1	Hemodialysis- II		60	40	30	20	150	4+2
2	Dialysis in Special Situations		60	40	30	20	150	4+2
3	Recent advances in dialysis technology		60	40	30	20	150	4+2
4	RESEARCH METHODOLOGY & BIOSTATISTICS		60	40			100	4
5	HOSPITAL MANAGEMENT & MEDICAL ETHICS		60	40			100	4
	TOTAL		300	200	90	60	650	26

SEMESTER – 6

PAPER	SUBJECT	PAPER CODE	THEORY EXAMINATION		PRACTICAL EXAMINATION		TOTAL	CREDITS
1	EVALUATIVE CLINCAL TRAINING & INTERNSHIP				160	240	400	16
2	Technical writing				40	60	100	04
	TOTAL				200	300	500	20

SEMESTER

1st

HUMAN ANATOMY-I

Course Objective: The course focuses on anatomical terminology, anatomical identification, and physiological processes of human body systems. After learning this subjects students are able to understand the anatomical position, histology and structure of different of the human body.

PAPER – 1
PAPER CODE
Semester I

L	T	P	Credits		
3	1		4	**Examination:**	**60 Marks**
				Internal Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I 08 Hours

Introduction: human body as a whole

Definition of anatomy and its subdivisions

Anatomical nomenclature and terminology (planes &positions)

Surface Anatomy of main structures and vessels

Applied anatomy& Joints

Musculoskeletal system

Connective tissue & its modification, tendons, membranes, special connective tissue.

Bone structure, blood supply, growth, ossification, and classification.

Muscle classification, structure and functional aspect.

Joints classification, structures of joints, movements, range, limiting factors, stability, blood supply

Nerve supply, dislocations and applied anatomy

UNIT-II 10 Hours

Extremity (Lower & Upper extremities)

Bony architecture

Joints – structure, range of movement

Muscles – origin, insertion, actions, nerve supply

Major nerves – course, branches and implications of nerve injuries Development of limb bones, muscles and anomalies

Radiographic identification of bone and joints Applied anatomy

Lower extremity

Bony architecture

Joints – structure, range of movement

Muscles – origin, insertion, actions, nerve supply

Major nerves – course, branches and implications of nerve injuries Development of limb bones, muscles and anomalies

Radiographic identification of bone and joints Applied anatomy

UNIT-III 10 Hours

Spine and thorax

Back muscles -Superficial layer

Deep muscles of back, their origin, insertion, action and nerve supply.

Vertebral column – Structure & Development, Structure & Joints of vertebra. Thoracic cage

Head and neck: Cranium

Facial Muscles – origin, insertion, actions, nerve supply Temporal mandibular Joints – structure, types of movement

UNIT-IV 10 Hours

Cardiovascular system (with relevant applied anatomy)

Heart-Size, location, chambers.

Circulation -Systemic & pulmonary

Great vessels of the heart, branches of aorta.

Overview of blood vessels of upper extremity and lower extremity

Lymphatic system- (with relevant applied anatomy)

Salient features of lymphatic organs (spleen, tonsil, thymus, lymph node)

UNIT-V 10 Hours

Gastro-intestinal system (with relevant applied anatomy)

Parts of the gastrointestinal tract

Gross anatomy of Tongue, stomach, small and large intestine, liver, gall bladder Pancreas and other digestive organ& related applied anatomy

Respiratory system (with relevant applied anatomy)

Parts of respiratory system with salient gross features of lung

Brief description of intercostal muscles and Para-nasal air sinuses

HUMAN ANATOMY I-PRACTICAL

PAPER – 2

PAPER CODE-

Semester I

L	T	P	Credits		
-	-	1	1	**Examination:**	**20 Marks**
				Internal Assessment:	**30 Marks**
				Total:	**50 Marks**

1) Identification and description of all anatomical structures.

2) Demonstration of dissected parts (upper extremity, lower extremity, thoracic & abdominal viscera, face and brain).

3) Demonstration of skeleton-articulated and disarticulated.

4) Surface anatomy: Surface land mark-bony, muscular and ligamentous. Surface anatomy of major nerves, arteries of the limbs.

HUMAN PHYSIOLOGY-I

Course Objective: The course focuses on general physiology of blood, cells & tissue of organs in human bodies. After learning this subject the students able to understand the functions of different organs of human bodies.

PAPER 3
PAPER CODE
Semester I

L	T	P	Credits
3	1	-	4

Examination: 60 Marks
Internal Assessment: 40 Marks
Total: 100 Marks

Duration of Examination: 3 Hours

UNIT-I 10 Hours

General Physiology

Cell: morphology, Structure and function of cell organelles Structure of cell membrane Transport across cell membrane Intercellular communication Homeostasis

Blood

Introduction-composition & function of blood

W.B.C., R.B.C., Platelets formation & functions, Immunity

Plasma: composition, formation & functions, Plasma Proteins: -types & functions, Blood Groups-types, significance, determination.

Hemoglobin, Heamostasis

Lymph-composition, formation, circulation & functions

UNIT-II 10 Hours

Cardiovascular system

Conducting system-components, impulse conduction Heart valves Cardiac cycle-definition, phases of cardiac cycle.

Cardiac output-definition, normal value, determinants.

Stroke volume and its regulation.

Heart rate and its regulation:

Arterial pulse, Blood pressure-definition, normal values, factors affecting blood pressure.

Shock-definition, classification, causes and features, Basic idea of ECG, Cardiovascular changes during exercise

UNIT-III 14 Hours

Respiratory System

Mechanics of respiration Lung volumes and capacities

Pulmonary circulation, transport of respiratory gases

Factors affecting respiration, Regulation of respiration-neural regulation, voluntary control and chemical regulation

Hypoxia, Hypercapnoea, Hypocapnoea,

Artificial respiration Disorders of respiration- dyspnoea, orthopnoea, hyperpnoea, hyperventilation, apnoea, Tachypnoea, Respiratory changes during exercise.

Digestive System Digestion& absorption of nutrients, Gastro-intestinal secretions & their regulation Functions of Liver & Stomach

UNIT-IV 14 Hours

Nervous system

Introduction, central and peripheral nervous system, functions of nervous system

Reflexes-monosynaptic, polysynaptic, superficial, deep &withdrawal reflex Sense organ, receptors, electrical& chemical events in receptors.

Sensory pathways for touch, temperature, pain, proprioception & others.

Control of tone & posture: Integration at spinal, brain stem, cerebellar, basal ganglion levels, along with their functions.

Motor mechanism: motor cortex, motor pathway: the descending tracts -pyramidal & extrapyramidal tracts-origin, course, termination & functions. Upper motor neuron and lower motor neuron paralysis.

Special senses-eye, ear, nose, mouth

Water excretion, concentration of urine-regulation of Na+, Cl-, K+ excretion

Nerve Muscle Physiology

Muscles-classification, structure, properties, Excitation, contraction, coupling, Motor unit, EMG, factors affecting muscle tension, Muscle tone, fatigue, exercise .

Nerve – structure and function of neurons, classification, properties Resting membrane potential & Action potential their ionic basis, All or None phenomenon Neuromuscular transmission Ionic basis of nerve conduction.

Concept of nerve injury & Wallerian degeneration Synapses.

Electrical events in postsynaptic neurons Inhibition & facilitation at synapses .

Chemical transmission of synaptic activity Principal neurotransmitters. Chemical transmission of synaptic activity Principal neurotransmitters.

HUMAN PHYSIOLOGY I-PRACTICAL

PAPER – 4

PAPER CODE

Semester I

L	T	P	Credits		
-	-	1	1	**Examination:**	**20 Marks**
				Internal Assessment:	**30 Marks**
				Total:	**50 Marks**

1. Haemoglobinometry
2. White Blood Cell count
3. Red Blood Cell count
4. Determination of Blood Groups
5. Leishman'sstainingand Differential WBC count
6. Determination of packed cell Volume
7. Erythrocyte sedimentation rate[ESR]
8. Calculation of Blood indices
9. Determination of Clotting Time, BleedingTime
10. Blood pressure recording
11. Auscultation for Heart Sounds
12. Artificial Respiration

BASIC BIOCHEMISTRY

Course Objective: The course focuses on chemical analysis of human bodies on cellular level. After learning this subject students are able to understand the biomolecules like carbohydrates, fats, proteins & vitamins.

PAPER -5
PAPER CODE
Semester I

L	T	P	Credits		
3	1		4	**Examination:**	**60 Marks**
				Internal Assessment:	**40 Marks**
				Total:	**100 Marks**

Duration of Examination: 3 Hours

Unit-I 12 Hours

Carbohydrates: Definition, function and classification of carbohydrate. Monosaccharide, glycoside formation, oligosaccharides and polysaccharides. Glycolysis, catabolic fates of pyruvate, metabolic fate of Acetyl-CoA and Citric acid cycle, gluconeogenesis, glycogen metabolism, pentose phosphate pathway.

Unit-II 12 Hours

Amino acids and proteins: Definition, structure, classification, essential &non essential amino acids. Proteins definition and classification. Primary, secondary, tertiary and quaternary of proteins of proteins

Unit-III 12 Hours

Vitamins: Definition and classification of vitamins, difference between fat soluble and water soluble vitamins. Water soluble vitamins and fat soluble vitamins

Unit-IV 12 Hours

Lipids: Definition, classification and function of lipids. Fatty Acids, Triacylglycerols or Triacylgcerides or neutral fat. Fatty acid metabolism. Ketone body metabolism.

BASIC BIOCHEMISTRY-PRACTICAL

PAPER-6
PAPER CODE
Semester I

L	T	P	Credits		
-	-	1	1	**Examination:**	**20 Marks**
				Internal Assessment:	**30 Marks**
				Total:	**50 Marks**

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1. Identification of carbohydrates by Molisch's test.
2. Identification of reducing sugar by Benedict's test.

3. Identification of protein by Biuret's test.
4. Identification of ketose sugars by Seliwanoff's test.
5. Identification of reducing sugar by Osazone test.
6. Identification of cholesterol by Salkowski's test.

GENERAL MICROBIOLOGY

Course Objective: The course focuses on study of micro-organisms. After learning this subjects students are able to understand how micro-organism affect the human being and How can we sterilize the medical equipment to prevent from infection

PAPER -7

PAPER CODE

Semester I

L	T	P	Credits		
3	1		4	**Examination:**	**60 Marks**
				Internal Assessment:	**40 Marks**
				Total:	**100 Marks**

Duration of Examination: 3 Hours

UNIT-I

Safety measures in laboratory

Microscopy: Principle, working and applications of Light microscope, Dark field, Phase contrast microscopy, Fluorescent & Electron microscopy

Sterilization and Disinfection: Physical Methods of Sterilization, Chemical Methods of Sterilization, Methods of Disinfection

UNIT-II

Introduction and classification of Bacteria, Morphology of bacteria, Growth, Nutrition & Metabolism of Bacteria

Normal microbial flora of human body, role of normal flora, probiotics.

Bacterial genetics- Bacterial DNA & RNA, Replication of bacteria.

Microbial pathogenicity

UNIT-III

Bacterial Culture and Identification: Culture Media & Transport Media, Aerobic Bacterial Culture Techniques, Anaerobic Bacterial Culture Techniques, Sample collection and transport methods

Bacterial identification techniques: Conventional methods, Automated culture techniques.

UNIT-IV

Smear preparation & Staining methods: Gram stain, Acid fast stain, Negative stain, Spore stain

Antimicrobial susceptibility testing: Principle and techniques of Diffusion Methods Dilution Methods

Preservation techniques of bacteria

GENERAL MICROBIOLOGY-PRACTICAL

PAPER-8
PAPER CODE
B. Sc. Semester I

L	T	P	Credits		
-	-	1	1	**Examination:**	**30 Marks**
				Int. Assessment:	**20 Marks**
				Total:	**50 Marks**

1. Microscope : Light & Compound Microscope
2. Staining: Grams staining , ZN staining, Negative stain
3. Preparation of commonly used culture media : Nutrient Agar, Blood Agar, Chocolate agar, Mac Conkey agar, Muller Hinton agar
4. Culture methods : Streak method, Lawn method, Stroke method, Stab method, Pour Plate method, Liquid method
5. Antibiotic susceptibility test: Diffusion methods, Dilution Methods

COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT

Course Outcome : to prepare students to be confident communicators for different real-life contexts, through repetitive oral practices and student-student cooperation.

PAPER – 9
PAPER CODE
Semester I

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**

Duration of Examination: 3 Hours

Unit I 10 Hours

Listening Comprehension

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

Unit II 10 Hours

Conversation Skills

- Greetings and introducing oneself
- Framing questions and answer
- Role play
- Buying: asking details etc
- Word formation strategies
- Vocabulary building: Antonyms, Synonyms, Affixation, Suffixation, One word substitution

Unit III 10 Hours

Reading Comprehension

- Simple narration and Stories
- Simple Passages
- Newspaper and articles clippings
- Note Making
- Paragraph Writing
- Comprehension
- Report Writing: types, characteristics
- Introduction to Letter Writing

Unit IV **08 Hours**

Pronunciation

- Pronunciation
- Syllable and Stress
- Intonation and Modulation

UNIT V **10 Hours**

Writing Comprehension

- Letters: types, format, style
- Précis Writing
- Paragraph: Order, Topic sentence, consistency, coherence
- Report and Proposal

Project Writing: Features, Structure

SEMESTER
2nd

HUMAN ANATOMY-II

Course outcome: The course focus on antomy of urinary system, reproductive system, endocrine system & nervous system. After learning this subject students are able to understand the anatomical location and histology of mentioned organ.

PAPER-1
PAPER CODE
Semester II

L	T	P	Credits		
3	1		4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I **08 Hours**

Urinary system (with relevant applied anatomy)

Parts of urinary system

Salient gross features of kidney, urinary bladder, ureter and urethra.

UNIT-II **10 Hours**

Reproductive system

Parts of male and female reproductive system with salient gross features of testis & uterus, ovary and fallopian tube

UNIT-III **10 Hours**

Endocrine glands

List of the endocrine glands, their position and salient gross features

Hormones produced by each endocrine glands

Embryology

Spermatogenesis & oogenesis

Ovulation,fertilization, Placenta, Fetalcirculation

UNIT-IV **10 Hours**

Nervous system

Classification of the nervous system, Definitions of central, peripheral and autonomic nervous system

Neuron- structure and classification, neuroglia

Names of lobes of Cerebrum and cerebellum, Parts of brainstem (salient features only)

.Cerebrospinal fluid and its circulation, names of cranial nerves, spinal nerve, meninges, ventricles (salient features only)

UNIT-V **10 Hours**

Sensory organs

Skin: Its appendages and functions

Eye: Parts of eye and its structure

Ear: Parts of ear- external, middle and inner ear and contents**.**

HUMAN PHYSIOLOGY-II

Course outcome: The course focus on physiology of excretory system, endocrine system, reproductive system & nervous system. After learning these subjects students are able to understand functions and how they affects other organs of the human bodies of mentioned system.

PAPER CODE-3
B. Sc. Semester II

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I **10 Hours**

Excretory system:
Functions of kidneys,
Composition of urine
Mechanism of urine formation
Regulations of body temperature
Fluid and electrolyte balance
Alterations in disease

UNIT-II **10 Hours**

Sensory Organs:
Functions of skin, eye, ear, nose, tongue
Alterations in disease

UNIT-III **10 Hours**

Endocrines
Functions of pituitary, Pineal gland, Thymus, Thyroid, Parathyroid,
Pancreas,
Suprarenal & placenta
Alterations in disease

UNIT-IV **10 Hours**

Reproduction
Reproduction of cells-DNA, Mitosis, Meiosis, Spermatogenesis, Oogenesis
Functions of female reproductive organs:
Functions of breast, female sexual cycle
Introduction to embryology
Functions of male reproductive organs:
Fertility system
Alterations in disease

UNIT-V **08 Hours**

Lymphatic and Immunological system:

Circulation of lymph
Immunity
Formations of T- Cells and B- Cells
Types of Immune response
Antigens
Cytokine

APPLIED BIOCHEMISTRY

Course outcome: This course is focus on the application of biochemistry in the diagnosis method use to diagnose disease related to human serum, fluid, blood and urine. After learning this subject students are able to understand the collection method of sample, procedure and normal values for an accurate diagnosis

PAPER-5
PAPER CODE
Semester II

L	T	P	Credits		
3	1		4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I 10 Hours

Collection Of Specimen

Types of specimen(blood plasma, serum , urine , body fluid , CSF), there variables and normal range use of anticoagulant & types of vial

Unit II 10 Hours

Introduction to lab apparatus

Pippetes, biurettes & beakers
Flasks types and uses
Reagent bottles, funnels types & uses
Chemical balance

Unit III 10 Hours

Concepts of Acid - Base & salt reaction and hydrogen ion concentration, pH meter & buffer.
Enzymes- Definition, general classification, clinical and therapeutic significance of enzymes
Basic principles and estimation of blood gases and ph
Basic principles and estimation of electrolytes.

Unit IV 10 Hours

Chemistry of Carbohydrates
Chemistry of Lipids
Chemistry of Proteins- classification and examples

UNIT V 08 Hours

Liver function tests and their assessment
Renal function tests and their assessment

Cardiac profile- biochemical markers of myocardial infarction, basic principles, evaluation and application

APPLIED BIOCHEMISTRY-PRACTICAL

PAPER-6
PAPER CODE
Semester II

L	T	P	Credits		
-	-	2	2	**Examination:**	**20 Marks**
				Int. Assessment:	**30 Marks**
				Total:	**50 Marks**
				Duration of Examination:	**3 Hours**

Introduction to apparatus, instruments and use of chemical balance

Qualitative analysis, Identification of Carbohydrates, Proteins & substances of biochemical importance

Demonstration of colorimeter, spectrophotometer, pH meter, single pan balance

Urine examination for the detection of normal and abnormal constituents.

Interpretation and diagnosis through charts.

a. Liver function tests.
b. Lipid profile
c. Cardiac markers
d. Blood gases and electrolytes.

Estimation of blood sugar
Estimation of blood urea.

PATHOLOGY

Course outcome: This course focus on studies of pathogens. How they affects the cells, tissue and organs of human body. After learning this subject students are able to understand cause and pathology of any particular disease

PAPER – 7
PAPER CODE

Semester II

L	T	P	Credits		
3	1		4	**Examination:**	**60 Marks**
				Internal Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

Unit I

Introduction of pathology

Cell injury - types, etiology, morphology, Cell death-autolysis, necrosis, apoptosis, Cellular adaptations-atrophy, hypertrophy, hyperplasia, metaplasia.

Inflammation- 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 - defintion, nomenclature, features of benign and malignant tumors, spread of tumors, dysplasia, carcinoma in situ, precancerous lesions. Environmental and nutritional pathology - smoking, radiation injury, malnutrition, obesity, vitamin deficiencies**.**

Unit II

Haematological Disorders, Introduction and Haematopoiesis,

Anaemia - introduction and classification (morphological and etiological), iron deficiency anemia: distribution of body iron, iron absorption, causes of iron deficiency , lab findings, megaloblastic anaemia: causes, lab findings, haemolytic anemias: definition. Causes, classification and lab findings.WBC disorders - quantitative disorders, leukemia - introduction and classification, acute leukemias, chronic leukemias. Bleeding disorders - introduction, physiology of hemostasis. Classification, causes of inherited and Causes, classification and lab findings.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 : Blood collection - methods (capillary blood, venipuncture, arterial puncture) complications, anticoagulants, transport of the specimen, preservation, effects of storage, separation of serum and plasma, universal precautions,

complete hemogram - CBC, peripheral smear, BT, CT, PT, APTT, ESR, disposal of the waste in the laboratory.

Unit IV

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

UNIT V

Clinical Pathology 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 - rotheras test, bile salt - hays method, blood - benzidine test, urobilinogen and porphobilinogen - ehrlich aldehyde and schwartz test, bence jones protein.

PATHOLOGY

PAPER – 8
PAPER CODE
Semester II

L	T	P	Credits		
-	-	2	2	**Examination:**	**20 Marks**
				Int. Assessment:	**30 Marks**
				Total:	**50 Marks**
				Duration of Examination:	

HAEMATOLOGY

Hb Estimation-Sahli's method & Cyanmethhaemoglobin method
RBC Count
Retic count
Preparation of blood smears and staining with Leishman stain
WBC Count
WBC-Differential Count
Platelet Count
Absolute Eosinophil Count
ESR-Westergrens & Wintrobe's method
PCV
Sickling test-Demonstration
Bone Marrow Smear Preparation & staining procedure

CLINICAL PATHOLOGY
Urine Examination (Physical, Chemical, Microscopic)

PHARMACOLOGY-I

Course outcome: This course focus on introduction of drugs and drugs used for nervous system, cardiovascular system and renal system. After learning this subject students are able to understand how body react to drugs and vice versa

PAPER-7

PAPER CODE

Semester II

L	T	P	Credits		
3	1		4	**Examination:**	**60 Marks**
				Internal Assessment	**40 Marks**
				Total:	**100 Marks**

UNIT-I

GENERAL PHARMACOLOGY : Principles of drug administration and routes of administration and routes of administration, Pharmacokinetics : absorption, distribution, metabolism, excretion of drugs, factors influencing drug action, dosage and factors modifying it. Pharmacodynamics Drug allergy , poisoning & toxicity, synergetic antagonistic effect of drugs plasma half life , drug efficacy & potency , mechanism of drug action, adverse drug reaction

Unit II

ANS : Cholinergic & anticholinergic drugs , skeletal muscle relaxant, Sympathomimetics drugs(adrenergic drugs) , alpha & beta blockers

Unit III

CNS : Sedative & hypnotics , local & general anesthetics , Antiepileptic & Antipsychotics, Antidepressent & Analgesics

Unit IV

CVS : Antihypertensive drugs , Anti-anginal drugs , Anti arrhythmic drugs, Cardiac glycosides, plasma expendors

UNIT V

Antiemetic & Diuretics , UTI DRUGS

FUNDAMENTALS OF COMPUTER SCIENCE

Course outcome: This course focus on basic knowledge of computer science. After learning this subject students are able to understand usage of computer and its techniques in medical and research.

PAPER-8
PAPER CODE
Semester II

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I

Introduction:

What are computers, Application areas, Characteristics & limitations, Evolution of computers, Classification& generations of computers, Data representation in computer memory (numbering system)

Computers Architecture /Organization:

Basicarchitecture, Functional Block diagram, Types of computers on the basis of purpose, Signal and Portability.

UNIT-II

Hardware:

CPU their generations and performance parameters, Input, output and storage devices. Primary (Main) Memories (RAM, ROM, Types of RAM and ROM, Cache Memory, Registers and types of registers, Storage Evaluation Criteria, Memory Capacity), Secondary Storage Devices: (Magnetic Disk, Floppy and Hard Disk, USBs, Optical Disks CD-ROMs)

Software:

Types: System Software (Machine Level Languages, Operating Systems, Device Specific Drivers), Higher Level Languages, and Applications

UNIT-III

Languages: Machine Language, Assembly Languages, Programming Languages. Use of Compilers, Assemblers, Linkers, Loaders and interpreters in programming languages

Operating System: Booting/Start Up Procedure of machines, Introduction to Operating System, Functions and Classification of Operating Systems, Basic introduction to DOS, UNIX/LINUX OS, Windows

HTML, Use of Multimedia, Computer aided teaching and testing
Application Software MS office (Word, Excel and Powerpoint)

UNIT-IV

Basic Introduction to Computer Networks:

Data Communication, Network devices (Hub, Switches, Modems, and Routers etc), LAN, LAN topologies, WAN, MAN, Internet: Introduction, Basics of E-mail, Web browsers (IE, Google Chrome, and Mozilla Firefox),

Structure of Universal Resource Locator, Domains (.com, .in, .country specific, .org and rationale behind them), IP address, Backbone network, Network connecting devices, HTTP, DNS, Network Security and Search Engine.

SEMESTER

3rd

APPLIED PATHOLOGY

Course outcome: This course is focus on application of pathology in diagnosis of diseased organ of human body. After learning this subject students are able to learn about disease of cardiovascular system, respiratory system and renal system.

PAPER-1

PAPER CODE

Semester III

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

Unit-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT V

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

APPLIED PATHOLOGY-PRACTICA:

PAPER-2
PAPER CODE
Semester III

L	T	P	Credits		
-	-	2	2	**Examination:**	**20 Marks**
				Int. Assessment:	**30 Marks**
				Total:	**50 Marks**
				Duration of Examination:	**3 Hours**

Urine examination: physical, chemical, microscopy

Blood grouping & Rh typing

Hemoglobin estimation, packed cell volume (PCV), erythrocyte sedimentation rate (ESR)

Specimens : HEART & GREAT VESSELS SPECIMENS, LUNGS SPECIMENS , KIDNEY SPECIMEN , LIVER SPECIMENS

PHAMACOLOGY-II

Course outcome: This course focus on drugs used in chemotherapy, respiratory system, GIT & endocrine system. After learning this subject students are able to understand mechanism, indication, contraindication and adverse effect of drugs used in mentioned system.

PAPER-3
PAPER CODE
Semester III

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

Unit-I

Chemotherapy Of Infections : Bacteriostatic & Bacteriocidal Drugs , Sulphonamides , Penicillin, Cephalosporins Macrolides, Aminoglycosides, Antituberculer Drugs , Antiviral , Antiretroviral , Antifungal , Antimalarial, Antiamoebic , Anti-Cancer Drugs

UNIT-II

ANTICOAGULANT AGENTS. HEPARIN WARFARIN , ANTIPLATELET AGENTS, ANTIFIBRINOLYTICS , THROMBOLYTICS

UNIT-III

ANTIHISTAMINIC AGENTS , RESPIRATORY DRUGS : Introduction- modulators of bronchial smooth muscle tone and pulmonary vascular smooth muscle tone

a. Mucokinetic and mucolytic agents
b. Use of bland aerosols in respiratory care

Pharmacotherapy of bronchial asthma PROSTAGLANDINS, NSAIDS

UNIT-IV

Endocrine pharmacology: Thyroid harmones, glucocorticoids, anabolic steroids, calcitonin, insulin and oral hypoglycemic agents.

UNIT V

GIT DRUGS : ANTIDIARRHOEAL DRUGS, LAXATIVES , PHARMAVOTHERAPY OF PEPTIC ULCER

Introduction to Renal Dialysis Technology

Course outcome: This course focus on epidemiology of kidney disease. After learning this course students are able to understand anatomy physiology of Renal system.

PAPER-4
PAPER CODE
Semester III

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

Unit I-

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

Unit - II

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

Unit III

Clinical presentation of renal disease & history taking.

Unit IV

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

Unit V

Screening for chronic kidney disease and preventive nephrology.

Introduction to Renal Dialysis Technology- Practical

PAPER-5

PAPER CODE

Semester III

L	T	P	Credits		
-	-	2	2	**Examination:**	**20 Marks**
				Int. Assessment:	**30 Marks**
				Total:	**50 Marks**
				Duration of Examination:	**3 Hours**

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

University practical examinations:

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

MEDICAL EMERGENCIES AND PATIENT CARE

Course outcome: This course is focus on pathophysiology of complex patient conditions requiring intensive care,as well as assessment,monitoring and advance therapeutics.After learning this course students are able to understand general ICU care & monitoring,infection control care,systemic disease & trauma care.

PAPER-6

PAPER CODE

Semester III

L	T	P	Credits
3	1	-	4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

Unit – I:

Introduction to Emergency Services

Organization of Emergency Department, Guidelines in Emergency, Clinical Monitoring, Fluid Therapy and Blood Transfusion, Airway Management, Cardiopulmonary Resuscitation, Principal of Mechanical Ventilation, Injection – An Infusion Method, Acid Base and Electrolyte Imbalance

Unit – II:

Handling of Different Emergencies

Cardiogenic Shock, Congestive Cardiac Failure, Myocardial Infarction, Head Injuries, Vasovagal Syncope, Seizer, Epilepsy, Conjunctival and Corneal Foreign Body, Foreign Body in Nose & in Ear, Epistaxis, Asthma, COPD, Haemoptysis, Rib Fracture, Tear Gas Exposure, Food Poisoning, Diarrhea, Urine Retention, Blunt Scrotal Trauma, Hypo & Hyperthermia

Unit – III:

Fundamentals of Patient Care

Concept of health & Illness, Health Determinants, Concept of Patients & Their Types, Patient Centred Care & Fundamentals of Communications, Reporting & Recording of

Patients, Rights of Patients , Concepts of Disease & Its Types, General Concept, Care & Prevention of Accident, Trauma & Infections

Unit – IV:

Patient Care, Associated Units & Departments

Ambulatory Units, Critical Care Units ,Paediatric, Neonatal Intensive Care Unit (NICU), Emergency Department, Inpatient Units, Haematology/Oncology and Immunology Unit , Orthopaedic Unit, Psychiatry Unit ,Neurology and Neurosurgical Unit, Renal, Dialysis Unit, Gastroenterology/Endocrinology Unit, Life Flight Critical Care Transport Program, Radiology Department, Surgical Units, Cardiac Catheterization Lab, Operating Room, Post Anaesthesia Care Unit, Managing patients with disabilities, Geriatric Care, Care of Critically Ill Patients, Tracheotomise Patients. Nutritional Support in ICU

ENVIRONMENTAL SCIENCES

Course outcome: This course is focus on environmental studies. After learning this course students are able to understand nature of environmental studies, ecosystem,environment of pollution,social issues & enviroment

PAPER - 6

PAPER CODE

Semester III

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	

Unit 1:

The Multidisciplinary nature of environmental studies

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

Natural Resources

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

- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Unit 2:

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Biodiversity and its conservation

- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts

- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 3:

Environmental Pollution

Definition, causes, effects and control measures of:-

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Fireworks, their impacts and hazards
- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides.

Unit 4 :

Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions.
- Consumerism and waste products.
- Environmental Legislation (Acts and Laws)
- Issues involved in enforcement of environmental legislation

Human Population and the Environment

- Population growth, variation among nations with case studies
- Population explosion – Family Welfare Programmes and Family Planning Programmes
- Human Rights.
- Value Education.
- Women and Child Welfare.

SEMESTER
4th

Hemodialysis- I

Course outcome: This course focus on treatment of end stage renal disease that is hemodialysis. After learning this course students are able to understand mechanism of hemodialysis, components of hemodialysis and different modalities of hemodialysis.

PAPER – 1

PAPER CODE

Semester IV

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination	

Unit I:

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

Unit II:

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

Unit III

Vascular access for hemodialysis- venous catheters (type, design, location of insertion and methods used, complications of CVC, maintenance of dialysis catheters)
Arteriovenous access AVF/AVG (presurgical evaluation, advantages, complications and their management, cannulation techniques, measuring access flow, general measures to reduce infection)

Unit IV:

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

Unit V:

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

Unit- VI

Nutritional requirements of healthy adults, RDA, effects of renal failure on nutrient metabolism, lipid abnormalities, overview of calcium phosphorous metabolism, trace elements and vitamins
Diet in nephrotic syndrome, AKI, predialysis CKD, Nutrition in dialysis patients, foods to be avoided in CKD, fliuid restriction.

Hemodialysis part 1 - Practical

PAPER – 2

PAPER CODE

Semester IV

L	T	P	Credits		
-	-	2	2	Examination:	20 Marks
				Int. Assessment:	30 Marks
				Total:	50 Marks
				Duration of Examination	

Practicals:

1. Demonstrate priming of dialysis apparatus-10 M

2. Demonstrate reuse of dialysers- 10 M

3. Spotters- HD catheters, dialysers, AV needle, tubings, dialysis machine, PD set, catheters, dialysis solutions, chemicals used in hemodialysis.

Peritoneal dialysis

Course outcome: This course focus on a different treatment for kidney failure patients that peritoneal dialysis. After learning this course students are to understand the anatomy physiology of peritoneum and advantage disadvantage and mechanism of peritoneal dialysis

PAPER – 3
PAPER CODE
Semester IV

L	T	P	Credits
3	1	-	4

Examination: 60 Marks
Int. Assessment: 40 Marks
Total: 100 Marks
Duration of Examination

Unit I:

Functional anatomy of peritoneum, models of peritoneal transport, physiology of peritoneal transport, PET test, peritoneal clearance and clearance targets.
Dialysis in children - choice between Peritoneal dialysis and Hemodialysis, problems with vascular access, HD prescription in children ,nutrition and growth related issues

Unit II:

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

Unit III:

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

Unit IV:

Causes of fluid overload in CAPD, ultrafilteration failure, preserving residual renal function, Peritonitis and exit site infections -potential routes of infection,diagnosis, common organisms, drugs used and drug delivery methods. Use of hemoperfusion and dialysis for poisoning cases- common indications for HP/HD, drugs which can be removed (acetaminophen, salicylates, digoxin, barbiturates, toxic alcohols, lithium, anticonvulsants)

Unit V:

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

Peritoneal dialysis Practical

PAPER - 4

PAPER CODE

Semester

L	T	P	Credits		
-	-	2	2	**Examination:**	**20 Marks**
				Int. Assessment:	**30 Marks**
				Total:	**50 Marks**
				Duration of Examination	

Practical

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

Performing PET test

. Case discussion (a patient on peritoneal dialysis)

Spotters- cycler device, transfer sets, adaptor, minicaps, drain bags, PD solutions, catheters.

MEDICAL DISORDER & Intensive Care

Course outcome:This course is focus on heart & other diseases after learning this course students are able to understand cardiovascular diseases,respiratory diseases,health related diseases,pulmonary diseases & electrolyte imbalance.

PAPER - 5

PAPER CODE

Semester IV

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I 10 Hours

Cardiac and Respiratory diseases

1. Cardio vascular diseases

a. Hypertension, Ischemic heart diseases, Myocardial Infarction, arrhythmias
b. Heart failure, shock - types, causes
c. Cardiac care in ICU: hypertension, hypotension, arrhythmias, cardiac arrest, ACLS

2. Respiratory diseases

a. Pneumonia, tuberculosis,
b. Chronic obstructive pulmonary disease, asthma
c. Pleural effusion, pneumothorax
d. Interstitial lung disease
e. Pulmonary Oedema, Acute Lung Injury and Acute Respiratory Distress Syndrome

f. Respiratory care in ICU: airway care, tracheostomy care, endotracheal intubation, mechanical ventilation, care of ventilated patient, complications and weaning.

Unit II 10 Hours

Neurological, Renal, GI and infectious diseases

3. Neurological diseases

Polio myelitis, Gullian Barre Syndrome, Myasthenia Gravis, epilepsy / seizure disorder, cerebro vascular accident / stroke

Head injury and Trauma Care: Glasgow coma scale, care of head injury patient, poly trauma patient

4. Renal Diseases

a. Acute kidney injury
b. Chronic Kidney Disease
c. Renal failure: types, etiology, complications, corrective measures
d. Urinary tract infections: Definition, types of UTI, risk factors, diagnosis, treatment
e. Renal stone diseases, inherited and cystic renal diseases
f. Nephrotic syndromes- definition, clinical features, causes & types

5. Gastro intestinal and Liver Diseases

a. Gastritis / APD, peptic ulcer
b. Acute gastroenteritis
c. Hepatitis, Hepatic failure, alcoholic liver disease

Infectious diseases: Dengue, malaria

Unit III **10 Hours**

Blood, fluid, electrolyte and acid base abnormalities

Blood loss and Anemia, thrombocytopenia
Fluid and electrloyte 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 IV **08 Hours**

Infection Control and Nutrition in ICU

Infection control in ICU: prevention of cross infection, personal protection, antibiotics and policy. Sepsis, multi-organ failure, Multi-organ dysfunction syndrome
Nutrition and Fluid balance - total parentral nutrition, nasogastric tube,

Unit V **10 Hours**

Health problems in Specific conditions and Toxicology –

. Health problems in specific conditions

a. Pregnancy - antenatal care, disorders in pregnancy
b. Obesity
c. Diabetes mellitus
d. HIV infections and AIDS

Poisoning and drug over dosing

a. Classification of poisons, Principles of treatment of poisoning and Primary care. Poisons and drug over dosing requiring ventilation,
b. Drowning & Hanging

MEDICAL DISORDER & Intensive Care

PAPER - 6

PAPER CODE

Semester IV

L	T	P	Credits		
-	-	2	2	**Examination:**	**20 Marks**
				Int. Assessment:	**30 Marks**
				Total:	**50 Marks**
				Duration of Examination:	

1. Monitoring of Patients
2. Operating devices, ventilator and monitor settings for different clinical conditions
3. Drugs used in Intensive Care
4. Trouble shooting and maintenance of monitors, equipments and ventilators

General care and transport of ICU patient - eye, skin, bladder care, position, airways, drains, catheters. Transport of critically ill patient to and out of ICU, transport of patient with drains, airway, inotropes, mechanical ventilator.

Monitoring in critical care: vital signs, drains, ECG, fluid intake & output, invasive hemodynamic and central venous pressure monitoring

central venous pressure monitoring

SEMESTER

5^{th}

Hemodialysis- II

Course outcome: This course focus on application of hemodialysis. After learning this course students are to understand indication , contraindication, complication and reuse of hemodialysis after disinfection**.**

PAPER - 1
PAPER CODE
Semester V

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

Unit I:

Disinfection of HD machines and maintenance of RO plant- chemicals used and technique of disinfection, advantages
Dialyser reuse- definition, methods, advantages and disadvantages of reuse

Unit II

Hemodialysis for acute renal failure- indications, vascular access, HD prescription, common problems encountered, dialysis for critically ill patients.
Chronic hemodialysis- indications, residual renal function, clearance targets and adequacy, chronic HD prescription, dry weight, complications, access recirculation, dialysis disequilibrium
Anticoagulation- factors influencing clotting of extracorporeal circuit, signs of circuit clotting, drugs used for anticoagulation, various protocols, monitoring of anticoagulation, regional anticoagulation

Unit III:

SLED/SLED-f: advantages of SLED, protocols, anticoagulation.
Hemofilteration/ Hemodiafilteration/ SCUF
CRRT- about CRRT machine and tubings, schematic desription of circuit, advantages and disadvantages, indications for CRRT, anticoagulation, replacement fluid(dose, pre Vs post filter)

Unit IV:

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

Unit V:

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

Hemodialysis- II

PAPER - 2

PAPER CODE

Semester V

L	T	P	Credits		
-	-	2	2	**Examination:**	**20 Marks**
				Int. Assessment:	**30 Marks**
				Total:	**50 Marks**
				Duration of Examination	

Practicals:

. Setting up dialysis machine for dialysis

2. AVF/ AVG cannulation

3. Packing and sterilisation of dialysis trays

4.Preparation of concentrates

5. Initiation and maintenance of hemodialysis

6. Initiation and mentainance of CRRT

7. Priming of CRRT

8. Complication and troubleshooting of CRRT

9. Priming of dialysis apparatus

10. Troubleshooting in hemodialysis machine

11. Demonstrate priming of dialysis apparatus

12. Demonstrate reuse of dialysers

13. Spotters- HD catheters, dialysers, AV needle, tubings, dialysis machine, PD set, perm catheters, dialysis solutions, chemicals used in hemodialysis.

Dialysis in Special Situations

Course outcome: This course focus on Hemodialysis in some situations like poisoning , pregnancy and infants. After learning this subject students are able to understand hemoperfusion in poisoning, hemodialysis in pregnancy, HIV, HCV positive patients. This course also focus on renal transplantation.

PAPER - 3
PAPER CODE
Semester V

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

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

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

Unit III:

Renal Transplantation

Options for patient with ESRD, basics in transplant immunology, donor selection, recipient selection
Science of deceased donor and living donor renal transplant- ischemia times and its impact on kidney function, brief introduction to immunosuppression used in transplant.
Problems encountered in transplant recipient- rejection, infection, drug toxicity, dyslipidemias, diabetes, cosmetic changes, impaired graft function.

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

Unit V:
Dilaysis in pregnancy-causes for AKI in pregnancy, dialysis regimen during pregnancy, indications for dialysis in pregnancy
Dialysis in patients with congestive cardiac failure- special precautions

Dialysis in Special Situations

PAPER - 4

PAPER CODE

Semester V

L	T	P	Credits		
-	-	2	2	**Examination:**	**20 Marks**
				Int. Assessment:	**30 Marks**
				Total:	**50 Marks**
				Duration of Examination	

Practical

1. **Starting / Termination of in special situation dialysis**
2. **AV cannulation in dpecial situation**
3. **Initiating dialysis through central lines**
4. **Sterlization in HIV, HCV, HBsAg dialysis and universal precations**
5. **Preparation of concentrate for dialysis purpose**
6. **Performing Hemoperfusion**
7. **Renal Transplatation patient ,monitoring**
8. **Assisting minor procedures like central line insertions, renal biopsies**
9. **Performing isolated ultrafilteration**
10. **Priming and dialyser reuse**

Recent Advances in Dialysis Technology

Course outcome: This course is focus on recent advances in dialysis technology like MARS, Nocturnal dialysis and inline & home dialysis. After learning this course students are able to understand dialysis in advanced liver disease, some recent advancement and their mechanism and indication contraindication of uses.

PAPER - 5
PAPER CODE
Semester V

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

Unit I

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

Unit II

Nocturnal hemodialysis/ short daily dialysis -advantages

Unit III

Newer peritoneal dialysis solutions- advantages and disadvantages

Unit IV

Online dialysis

Unit V

Home Hemodialysis

Recent Advances in Dialysis Technology

PAPER - 6
PAPER CODE
Semester V

L	T	P	Credits		
-	-	2	2	**Examination:**	**20 Marks**
				Int. Assessment:	**30 Marks**
				Total:	**50 Marks**
				Duration of Examination	

Practical

1. Starting / Termination of MARS

2. AV cannulation in MARS, Home dialysis, Nocturnal dialysis
3. Initiating online dialysis through central lines
4. sterilization in home dialysis
5. Preparation of concentrayes for dialysis purpose.
6. Assisting minor procedures like central line insertions, renal biopsies
7. Performing isolated ultrafilteration
8.Priming of MARS

RESEARCH METHODOLOGY AND BIOSTATISTICS

Course outcome: This course is focus on the research methodology & biostatistics after learning this course students are able to understand the introduction and measurment of statistics,variability,data,central tendency & central technique.

PAPER - 7
PAPER CODE
Semester V

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I

Introduction
Meaning, definition, characteristics of statistics
Importance of the study of statistics
Branches of statistics
Statistics and health science including nursing
Parameters and estimates
Descriptive and inferential statistics
Variables and their types
Measurement scales

UNIT-II

Tabulation of Data
Raw data, the array, frequency distribution
Basic principles of graphical representation
Types of diagrams - histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve

UNIT-III

Measure of Central Tendency
Introduction: Uses, applications and practical approach
Definition and calculation of mean - ungrouped and grouped data
Meaning, interpretation and calculation of median ungrouped and grouped data
Meaning and calculation of mode
Comparison of the mean, and mode
Guidelines for the use of various measures of central tendency

UNIT-IV

Measure of Variability
Introduction: Uses, applications and practical approach
The range, the average deviation or mean deviation
The variance and standard deviation
Calculation of variance and standard deviation for ungrouped and grouped data
Properties and uses of variance and Standard deviation

UNIT-V

Sampling Techniques
Introduction: Uses, applications and practical approach

Criteria for good samples

Application of sampling in Community
Sampling methods, sampling and non-sampling errors
Sampling variation and tests of significance

HOSPITAL MANAGEMENT AND MEDICAL ETHICS

Course outcome: This course is focus on the principles of medical ethics & hospital management after learning this course students are able to understand introduction to hospital staffing,legal & medical issues,handling of patients,department safety & infection control & anesthesia.

PAPER - 8
PAPER CODE
Semester V

L	T	P	Credits		
3	1	-	4	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**

UNIT-1

Introduction to hospital staffing- Hospital staffing, administration, PACS, HIS, RIS, DICOM.Medical records and documentation.

UNIT-2

Legal & medical issues- Legal and Ethical issues towards patient rights, patient responsibility, legal concerns, History taking, patient monitoring, inform consent, mal-practice, patient privacy issues.Professional ethics and Code of conduct of radiographer. Medical legal issues (MLC).

UNIT-3

Handling of patients Seriously ill and traumatized patients, visually impaired, hearing and speech impaired patients, mentally impaired patients/ psychologically issues, infectious patients, critical/trauma patients, pregnant patient, patient with implant. Handling of patient with life threading diseases like HIV, STD, HBsAG, etc.

UNIT-4

Departmental Safety& Infection Control Safety and hazards from material and electricity etc. Biomedical waste management and control. **Infection control**Skin care, donning of gowns, gloves, face masks, head caps, shoe covers. **Vitals signs-** Vital signs. How to measure vital signs. **Body mechanics and transferring& shifting of patient** Draw sheet lift, use of slide boards, wheelchair to couch, couch to wheelchair, couch to table, three men lift and four men lift Orthodox & Austrian method etc.**First aid-** Artificial respiration, hemostasis, first aid techniques, ABCD management.

UNIT-5

Anesthesia-Local anesthesia and general anesthesia, uses in hospital, Facilities regarding general Anesthesia in different department of hospital. Management of adverse

SEMESTER
6^{th}

Clinical Training/Hospital Posting

Total Duration : 6 months

Area: Dialysis Room

Duration: 3 months

Area: Nephrology Department

Duration: 3 Months

SEMESTER
7^{th} & 8^{th}

Internship

Total Duration : 12 Months

Area: Nephrology Department

Duration: 6 months

Area: Dialysis Room

Duration: 6 Months