Department of Paramedical Sciences

Faculty of Allied Health Sciences

SGT UNIVERSITY

Shree Guru Gobind Singh Tricentenary University

Gurgaon-122505

Syllabus

B.Sc. MEDICAL TECH. (CARDIAC CARE)

Duration: 3 years (6 Semester)

W.e.f. Academic Session 2020-21

SEMESTER
1st

HUMAN ANATOMY-I

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

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

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

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

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

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		
-	-	2	2	**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

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

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

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

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

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		
-	-	2	2	**Examination:**	**20 Marks**
				Internal Assessment:	**30 Marks**
				Total:	**50 Marks**

1. Haemoglobinometry
2. WhiteBloodCellcount
3. RedBloodCellcount
4. DeterminationofBloodGroups
5. Leishman'sstainingandDifferentialWBCcount
6. DeterminationofpackedcellVolume
7. Erythrocytesedimentationrate[ESR]
8. CalculationofBloodindices
9. DeterminationofClottingTime,BleedingTime

BASIC BIOCHEMISTRY

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

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

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

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

Unit-IV

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		
-	-	2	2	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.

COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT

PAPER – 7
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

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

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

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

Pronunciation

- Pronunciation

- Syllable and Stress
- Intonation and Modulation

UNIT V

Writing Comprehension

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

Project Writing: Features, Structure

SEMESTER
2nd

APPLIED ANATOMY & PHYSIOLOGY

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

EXCRETORY SYSTEM PARTS OF EXCRETORY SYSTEM

Shape Of Kidney, Blood Supply Components Of Kidney , Nephron ,Nerve Supply. Urine Formation (Filtration , Absorption & Secretion) Acid , Base Management . Renal Disease (Aki, Ckd & Stones)

Unit II

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

Male -Functions of testes, pubertal changes in males, Testosterone -action & regulations of secretion.Female -Functions of ovaries and uterus, pubertal changes,

Menstrual cycle, estrogens and progestron -action and regulation

Embryology

Spermatogenesis & oogenesis

Ovulation,fertilization, Placenta, Fetalcirculation

Unit III

Endocrinology

Physiology of the endocrine glands – Hormones secreted by these glands Their classifications and functions

Adrenal, Gonads Thymus, Pancreas. Pituitary Thyroid, Parathyroid

Unit IV

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)

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 ANATOMY I-PRACTICAL

PAPER-2

PAPER CODE

Semester II

L	T	P	Credits		
-	-	1	1	**Examination:**	**10 Marks**
				Total:	**50 Marks**

Identification and description of all anatomical structures.

Demonstration of dissected parts

Demonstration of skeleton-articulated and disarticulated.

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

HUMAN PHYSIOLOGY II-PRACTICAL

PAPER-2

PAPER CODE

Semester II

L	T	P	Credits		
-	-	1	1	**Examination:**	**10 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

APPLIED BIOCHEMISTRY

PAPER-3
PAPER CODE
Semester II

L	T	P	Credits		
3	1		43	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I

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

Introduction to lab apparatus

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

Unit III

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

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

UNIT V

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-4

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 & MICROBIOLOGY

PAPER – 5
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**

PATHOLOGY

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.

PRACTICAL- PATHOLOGY

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)

MICROBIOLOGY

Unit I

Principles of Microbiology:
Microscope- Different types including electron microscope.

Unit II

General introduction, and History of Microbiology
Classification of Microbes
Bacteria Cell
Bacterial Growth and Variation
Antibacterial Agents, and Anti-septics & Disinfection (Chemical Sterilization)

Unit III

Sterilization (Physical)-Heat, Filters, Radiation.

Equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization

Unit IV

Antibiotics, Chemotherapy and Drug Resistance
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.
Collection & Transportations of specimens.

PRACTICAL – MICROBIOLOGY

1. Compound microscope and its application in microbiology.
2. Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters
3. Grams staining.
4. Acid fast staining.
5. Principles and practice of Biomedical waste management.

PHARMACOLOGY

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

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

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 (PART 2)

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

BASIC OF CARDIAC CARE TECH.

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

Applied Anatomy and Physiology -

1. **Applied Anatomy**
   a) Structure of the heart and gross anatomy, normal position situs solitus, situs inverses with dextrocardia, situs solitus with dextrocardia, situs inversus with levocardia.
   b) Systemic and pulmonary circulation, coronary structure, coronary sinus structure and circulation.
   c) Chest topography - identification of imaginary lines, topographical landmarks over thorax, topography of heart and lungs.
   d) Surface marking of heart, aorta, pulmonary artery, precordium, heart valves, subclavian.

2. Applied Physiology

a) Control of heart rate.
b) Concepts of congenital heart (ASD, VSD, PDA, TOF and transpositions).
c) Blood circulation, cardiac output, pulmonary circulation, pulmonary oedema
d) Concepts of myocardial functions.
e) Control of circulation
f) Conduction system of the heart

UNIT-II

Noninvasive ECG and TMT -

ECG

a) Technique of ECG recording
b) ECG Leads system
c) ECG waves - PQRSTU, Osborn wave, delta wave, epsilon wave.
d) ECG rates, rhythm, axis calculation, lead positioning.
e) Intervals and segments - PR interval, PR segment, ST segment, QT interval, J point and QRS complex.
f) ECG anatomy - Chambers enlargement.
g) Technical artefacts
h) ECG reportingExercise Testing to Diagnose Obstructive Coronary Artery Disease - Rationale and Guidelines, Pretest Probability (true positive, false positive, true negative and false negative ST-Segment Interpretation, Confounders of Stress ECG Interpretation.
a) Result Reporting

UNIT-III

Noninvasive Echocardiography -

a) Introduction and purposes, demonstration of machine parts,
b) Basic windows
c) Echocardiographic views
d) parts,
e) Basic windows
f) Echocardiographic views

Imaging modes - two-dimensional (2D) imaging, M-mode imaging, and Doppler imaging, color - flow mapping

UNIT-IV

Invasive technologies -

a) Orientation to the Cath - Lab and biomedical equipments, Introduction and purposes of the Cath - Lab.
b) Radiation safety and protocols.
c) Vascular access - arterial in femoral, radial and ulnar, venous in femoral.
d) Catheterization left heart and right heart, Angiography - Chambers.
e) Transducers balancing, measurement of pressures, Calculations of gradients
f) Blood flows, cardiac output and Calculations of cardio shunts, resistances.
g) Management of patient in the Cath - Lab, coronary angiogram views.
h) Prerequisites of cat lab procedures: CBC, RFT, Serology, ECG, Echo, and customised list for all types of procedures.
i) Maintaining sterility, PPE - Personnel protective equipments.

BASIC OF CARDIAC CARE TECH.-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	

INTERPRETATION OF ABNORMAL & NORMAL ECG
P-WAVE , QRS COMPLEX, PR INTERVAL , ST SEGMENT , QT INTERVAL , CARDIAC AXIS (LAD & RAD)

TREADMIL TEST , CARDIAC STRESS TEST , BRUCE PROTOCOL , BICYCLE ERGOMETRY TEST

ECHOCARDIOGRAPHY : BASIC OF CARDIAC WINDOW AND AXIS, M-MODE , 2D THRANSTHORACIC ECHO, DOPPLER ECHO : PULSE & CONTINOUS

CARDIAC CATH LAB: ORIENTATION OF CARDIAC CATH LAB

ENVIRONMENTAL STUDIES

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 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.

PATIENT CARE AND MEDICAL EMERGENCIES

PAPER-7

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

SEMESTER
4^{th}

Basic Intensive Care

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

General ICU Care and Monitoring

1. 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.
2. Monitoring in critical care: vital signs, drains, ECG, fluid intake & output, invasive hemodynamic and central venous pressure monitoring

3. central venous pressure monitoring

Unit II

Infection Control and Nutrition in ICU

3. Infection control in ICU: prevention of cross infection, personal protection, antibiotics and policy.
4. Nutrition and Fluid balance - total parentral nutrition, nasogastric tube, gastric tube, jejunostomy tube care and feeding, IV Fluids.

Unit III

Systemic Diseases and Care in ICU

5. Cardiac care in ICU: hypertension, hypotension, arrhythmias, cardiac arrest, ACLS
6. Respiratory care in ICU: airway care, tracheostomy care, endotracheal intubation, mechanical ventilation, care of ventilated patient, complications and weaning.
7. Renal failure: types, etiology, complications, corrective measures
8. Hepatic failure: types, etiology, complications, corrective measures

Unit IV

Head Injury and Trauma care in ICU

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

10.Blood and blood products transfusion: Transfusion reactions & complications, Massive transfusion

Unit V

Acid base disorders, neonatal ventilation, imaging in ICU

11.Acid-base & electrolyte balance and their correction, fluid, electrolyte, nutrition balance and management.

12.Neonatal mechanical ventilation: intubation and problems inherent to the neonate, basic principles of neonatal ventilation, modes, initiation and maintenance.

13.Miscellaneous: X-rays, ultrasound, chest and limb physical therapy in ICU

Basic Intensive Care

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	

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

BASIC CARDIAC EVALUATION

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:	**3 Hours**

UNIT-I

Heart diseases and related disorders

a) Ischaemic heart disease
b) Rheumatic heart disease
c) Congenital heart disease
d) Arrhythmias
e) Peripheral vascular disease
f) Pericardial disease
g) Shock state
h) Cardiomyopathy
i) Hypertension, diabetes, dyslipidaemias
j) Infective endocarditis
k) Heart failure

Pulmonary hypertension and embolism

Unit II

Cardiovascular investigations: Noninvasive

a) ECG - cardiac diagnosis by ECG: Chambers enlargement, arrhythmias, myocardial ischaemia and infarction.
b) Echocardiography - cardiac diagnosis: valvular heart diseases, myocardial diseases, ischaemic heart diseases, Cardiomyopathies
c) Pulmonary hypertension, infective endocarditis, intracardiac masses.
d) Stress test- treadmill test review, pharmacological stress testing.
e) 24 hours Holter monitoring
f) Ambulatory BP monitoring
f) Tilt table test
g) Ankle-Brachial Index

Unit III

a) Diagnosis of coronary artery disease
b) Diagnosis of valvular heart diseases in the cath-lab - stenosis, regurgitation and mixed
c) Diagnosis of shunts
d) Evaluation of pulmonary hypertension
e) Diagnosis of pericardial constriction
f) Diagnosis of peripheral and aortic diseases

g) Complications of cardiac catheterization
Complications and management of Contrast

Unit IV

Cardiovascular interventional therapies

a) Coronary angioplasty
b) Peripheral angioplasty
c) Mitral valvoplasty
d) Pulmonary and aortic valvuplasty
e) Device closures
f) Pacemakers
g) Pericardiocentesis
h) Myocardial biopsy
i) Retrieval of foreign bodies
j)Clot aspiration

BASIC CARDIAC EVALUATION - PRACTICAL

PAPER - 3
PAPER CODE
Semester IV

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

Non invasive Technology;

a) ECG recording basic
b) ECHO evaluation basic
c) Preparation for treadmill test
d) Preparation for 24 hours Holter monitoring
e) Preparation for ABPM

Invasive Technology;

a) Cardiac Cath right Heart
b) Cardiac Cath Left Heart
c) Cardiovascular Angiography
d) Cardiac Pacing
e) Relevant instrumentation in Cath Lab
f) Cardiac Emergencies in Cath Lab

B.Sc. Cardiac Care Technology

Semester IV
Paper 3

Basics of Medical Disorders **Total Hours 50**

S.NO	TOPIC	METHOD	HOURS
1	**Cardiac and Respiratory diseases** **1. Cardio vascular diseases** **a. Hypertension, Ischemic heart diseases, Myocardial Infarction, arrhythmias** **b. Heart failure, shock - types, causes** **2. Respiratory diseases** **a. Pneumonia, tuberculosis,** **b. Chronic obstructive pulmonary disease, asthma** **c. Pleural effusion, pneumothorax** **d. Interstitial lung disease**		
2	**Neurological, Renal, GI and infectious diseases** **3. Neurological diseases** **a. Polio myelitis, Gullian Barre Syndrome, Myasthenia Gravis, epilepsy / seizure disorder, cerebro vascular accident / stroke** **4. Renal Diseases** **a. Acute kidney injury** **b. Chronic Kidney Disease** **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, leptospirosis**		
3	**Blood, fluid, electrolyte and acid base abnormalities** **7. Blood loss and Anemia, thrombocytopenia** **8. Fluid Electrolyte imbalance and corrective methods** **9. Acid Base abnormalities and corrective methods**		
4	**Pulmonary Oedema, Sepsis and MODS** **10. Pulmonary Oedema, Acute Lung Injury and Acute Respiratory Distress Syndrome** **11. Sepsis, multi-organ failure, Multi-organ dysfunction syndrome**		
5	**Health problems in Specific conditions and Toxicology –** **. Health problems in specific conditions** **a. Pregnancy - antenatal care, disorders in pregnancy** **b. Children and new born** **c. Obesity** **d. Diabetes mellitus**		

	e. HIV infections and AIDS f. Elderly subjects and disability g. Brief mention about endocrine disorders 13. Poisoning and drug over dosing a. Classification of poisons b. Principles of treatment of poisoning and Primary care c. Poisons and drug over dosing requiring ventilation 14. Miscellaneous a. Drowning b. Hanging		

PRACTICAL **25 HOURS**

S.NO	TOPIC	METHOD	HOURS
1	History Taking and clinical examination, monitoring of patient.		
2	Therapeutic options for various diseases and conditions		

B.Sc. Cardiac Care Technology

Semester IV
Paper 4-

Coronary Angiography **Total Hours 50**

Introduction to coronary angiogram

History of coronary angiography

Instrumentation in coronary angiography

Indications for coronary angiography

Contraindications for coronary angiography

Procedure

Approach

Seldingers technique

Catheters for coronary angiography

Views for coronary angiography

Evaluation of a coronary lesion

Reporting of coronary angiography

Decision making on management

Revascularization PTCA or CABG

Planning review of protocol

Post procedure care

Drugs

Groin care (femoral approach)
Wrist care (radial approach)

Complications and management

Practical assessment:

Spotters

Video Clips

Demonstration of common disorders

B.Sc. Cardiac Care Technology

Semester V
Paper 1-

Cardiac Evaluation **Total Hours 50**

S.NO	TOPIC	METHOD	HOURS
1	Clinical disorders of heart a) Clinical presentation, evaluation and management of acute coronary syndromes b) Clinical presentation, evaluation and management of stable ischemic heart disease c) Hypertension, diagnosis, complications and management d) Cardiac arrhythmia, presentation, diagnosis and management e) Heart failure, classification, diagnosis and management		
2	Drugs and Nutrition in Cardiac Care Drugs acting on cardiac system and emergency cardiovascular drugs a. Antiplatelets drugs b. Antiischaemic drugs c. Thrombolytic drugs d. Antiarrhythmic drugs		
3	Patient monitoring in cardiac care Monitoring of a patient with cardiac disease a) Cardiac Rhythm and rate. b) Trans-cutaneous oxygen monitors and Pulse oximeters. c) Invasive hemodynamic monitoring d) Multi parameter monitoring e) ACT monitoring f) Monitoring response to therapy and progression of disease		
4	Cardiovascular investigations: Noninvasive a) ECG - Review of ECG patterns in ischaemic heart diseases, hypertensive heart disease. b) Echocardiography - A review of Evaluation of valvular heart diseases, ischaemic heart diseases, Cardiomyopathies and pericardial diseases c) Pulmonary hypertension, infective endocarditis, intracardiac masses. d) Stress test- treadmill test review, pharmacological stress testing. e) 24 hours Holter monitoring		
5	Cardiovascular investigations: Invasive a) Coronary angiography b) Diagnosis of mitral stenosis, regurgitation and mixed c) Diagnosis of shunts A review d) Diagnosis of peripheral and aortic diseases e) Complications of cardiac catheterization f) Contrast induced nephropathy prevention and management		

PRACTICALS **50HOURS**

S.NO	TOPIC	METHOD	HOURS
1	Diagnostic patterns of ECG changes in a patient with chest pain		
2	Diagnostic patterns of ECG changes during stress test		
3	Evaluation of rheumatic mitral stenosis by echocardiography		
4	Evaluation of Pericardial effusion by echocardiography		

B.Sc. Cardiac Care Technology

Semester V
Paper 2-

Basic Cardiac Evaluation and Therapies (Part 1) **Total Hours 50**

S.NO	TOPIC	METHOD	HOURS
1	Electrocardiography a) Optimum recording of 12 leads ECG and computerised interpretation b) Trouble shooting of ECG artefacts c) Bradyarrhythmais and tachyarrhythmias. Stress test (tread mill, bicycle and others) a) Indications/ contra indications b) Complications		
2	Echocardiography a) Evaluation of left ventricular studies - 16 segment model b) Evaluation of left ventricular studies - systolic and diastolic functions c) Evaluation of right ventricle		
3	Invasive techniques a) Guide wires b) Diagnostic catheters for coronary angiography c) Diagnostic catheters for carotid, /cerebral angiography d) Diagnostic catheters for renal angiography e) Diagnostic catheters for abdominal vessels		
4	Invasive techniques Procedures a) Carotid and cerebral angiography b) Renal angiography c) Studies of abdominal aorta, mesenteric, iliac and others		
5	Care of patient undergoing vascular procedures a) Indications, contraindications for angiographic studies b) Patient education of the invasive procedures, consent processes and preparation c) Monitoring physiological variables during cath lab procedures d) Post procedure protocols e) Reporting and data management of the cath procedures		

PRACTICAL (STUDENTS PRESENTATION) **50HOURS**

S.NO	TOPIC	METHOD	HOURS
1	Right sided ECG chest leads and its importance		
2	Demonstration of TAPSE		
3	Demonstration of estimation of pulmonary artery pressure by echocardiography		
4	Spotters on guide wires and diagnostic catheters		

B.Sc. Cardiac Care Technology

Semester V
Paper 3-
Basic Cardiac Evaluation and Therapies

S.NO	TOPIC	METHOD	HOURS
1	Electrocardiography a) PR interval b) QT interval c) Calculation of heart rate d) Analysis of ST segment e) Artefacts in tread mill ECG		
2	Echocardiography a) Basics of pediatric echocardiography. b) Echocardiography in acute rheumatic fever c) Echocardiography in chronic rheumatic heart disease d) Echocardiography in cardiac tamponade		
3	Invasive techniques a) Cardiac pacing indications b) Cardiac anatomy and its importance in pacing c) Cardiac pacing physiology d) Cardiac pacing temporary e) Cardiac pacing permanent f) Programing of pacemakers g) Common problems associated with pacemakers. h) External cardiac pacingz		
4	Basics of Nuclear cardiology a) Principles of nuclear cardiology b) Tracers used in nuclear cardiology c) Imaging techniques in nuclear cardiology d) Indications of nuclear diagnostic procedures in cardiology		

Practicals/ students presentations - round table

1. **Pacemaker interrogation**
2. **Demonstration of estimation of severe mitral stenosis by echocardiography**

B.Sc. Cardiac Care Technology
Semester V
Paper 4-
Skill Enhancement-2 Research Methodology and Biostatistics Total Hours 50

S.NO	TOPIC	METHOD	HOURS
1	Introduction and Presentation of data Meaning , Branches of Statistics, Uses of statistics in		

	medicine, Basic concepts, Scales of measurement, Collection of data, Presentation of data; Tabulation, Frequency Distribution, Diagrammatic and Graphical Representation of Data.		
2	**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**		
3	**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**		
4	**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**		
5	**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.**		

Hospital Management& medical ethics (Theory)
Semester V
PAPER 5

UNIT-1Introduction to hospital staffing- Hospital staffing, administration, PACS, HIS, RIS, DICOM.Medical records and documentation.

UNIT-2Legal & 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-3Handling 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.

B.Sc. Cardiac Care Technology
Semester VI

Cardiac Care Technology Clinical **Total Hours 50**

Unit I
Documentation and Assessment for Cardiac care
1.Documentation in Non-Invasive technology
a) ECG
b) ECHO
c) TMT
2.Documentation in Invasive technology
a) Angiography
b) Interventional procedures
Unit II
Electrocardiography A review
a) Chamber hypertrophy
b) Acute coronary syndromes
c) Bradyarrhythmia
d) Tachyarrhythmais
e) Pericardial diseases
Unit III
Ambulatory cardiac technologies
a) Holter monitoring
b) Loop recorders
c) Ambulatory blood pressure recording
d) Newer technologies for monitoring the patients with heart diseases
Unit IV
Invasive technologies
a) Coronary angiogram for performing angioplasty
b) PTCA
c) Coronary Stents
d) Optimizing the results of PTCA
Unit V
Invasive technologies
a) Intra-aortic balloon pump
b) Fractional flow reserve

c) Rotational atherectomy
d) Intra vascular ultrasound
e) Optical coherence tomography

Practicals/ students presentations - round table
a) Demonstration of various ECGs
b) Demonstration of ambulatory blood pressure hook up and analysis
c) Demonstration of ambulatory (Holter) ECG hook up and analysis

Paper 2-

Cardiac Care Technology Applied Total Hours 50

S.NO	TOPIC	METHOD	HOURS
1	Electrocardiography a) Diagnoses of acute myocardial infarction b) Diagnoses of hyperkalemia c) Diagnoses of WPW syndrome		
2	Echocardiography 1) Congenital heart diseases a) ASD b) VSD c) PDA d) Coarctation of aorta e) Pulmonary and aortic stenosis		

	e) Tetralogy of Fallot f) Others 2) Transesophageal echocardiography 3) Stress echocardiography (pharmacological 3D echocardiography		
3	Invasive a) Organization of cath lab services b) Data management of cath lab c) Management of intra coronary thrombus d) Management of hypotension e) Management of vasovagal attack f) Management of coronary perforation g) Management of retrieval of dislodged foreign materials in the vessels		
4	Case studies in cardiology a) A case of myocardial infarction with complications b) A case of multivalvular heart disease c) A case of pulmonary thrombo embolism d) A case of infective endocarditis e) A case of mitral valve prolapse f) A case of rheumatic mitral stenosiS		

PRACTICAL **50 HOURS**

S.NO	TOPIC	METHOD	HOURS
1	Demonstration of various varieties of myocardial infarction by ECG		
2	Demonstration of ASD various types Demonstration of VSD various types		
3	Demonstration of PDA and Coarctation of aorta		
4	Stent booster technology Foreign body retrieval methods in the cath lab		
5	Balancing transducer Pressure traces, pressure gradients		
6	Steps of PTMC Steps of PTCA		

Department of Paramedical Sciences

Faculty of Allied Health Sciences

SGT UNIVERSITY

Shree Guru Gobind Singh Tricentenary University

Gurgaon-122505

Syllabus

B.Sc. MEDICAL TECH. (PERFUSION TECH)

Duration: 3 years (6 Semester)

W.e.f. Academic Session 2020-21

SEMESTER
1st

HUMAN ANATOMY-I

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

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

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

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

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

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		
-	-	2	2	**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

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

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

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

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

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		
-	-	2	2	**Examination:**	**20 Marks**
				Internal Assessment:	**30 Marks**
				Total:	**50 Marks**

1. Haemoglobinometry
2. WhiteBloodCellcount
3. RedBloodCellcount
4. DeterminationofBloodGroups
5. Leishman'sstainingandDifferentialWBCcount
6. DeterminationofpackedcellVolume
7. Erythrocytesedimentationrate[ESR]
8. CalculationofBloodindices
9. DeterminationofClottingTime,BleedingTime

BASIC BIOCHEMISTRY

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

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

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

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

Unit-IV

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		
-	-	2	2	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.

COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT

PAPER – 7
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

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

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

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

Pronunciation

- Pronunciation
- Syllable and Stress
- Intonation and Modulation

UNIT V

Writing Comprehension

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

Project Writing: Features, Structure

SEMESTER
2nd

APPLIED ANATOMY & PHYSIOLOGY

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

EXCRETORY SYSTEM PARTS OF EXCRETORY SYSTEM
Shape Of Kidney, Blood Supply Components Of Kidney , Nephron ,Nerve Supply. Urine Formation (Filtration , Absorption & Secretion) Acid , Base Management . Renal Disease (Aki, Ckd & Stones)

Unit II

Male & female reproductive system Parts of male and female reproductive system with salient gross features of testis & uterus, ovary and fallopian tube
Male -Functions of testes, pubertal changes in males, Testosterone -action & regulations of secretion.Female -Functions of ovaries and uterus, pubertal changes,
Menstrual cycle, estrogens and progestron -action and regulation
Embryology
Spermatogenesis & oogenesis
Ovulation,fertilization, Placenta, Fetalcirculation

Unit III

Endocrinology
Physiology of the endocrine glands – Hormones secreted by these glands Their classifications and functions
Adrenal, Gonads Thymus, Pancreas. Pituitary Thyroid, Parathyroid

Unit IV

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)
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 ANATOMY I-PRACTICAL

PAPER-2

PAPER CODE

Semester II

L	T	P	Credits		
-	-	1	1	**Examination:**	**10 Marks**
				Total:	**50 Marks**

Identification and description of all anatomical structures.

Demonstration of dissected parts

Demonstration of skeleton-articulated and disarticulated.

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

HUMAN PHYSIOLOGY II-PRACTICAL

PAPER-2

PAPER CODE

Semester II

L	T	P	Credits		
-	-	1	1	**Examination:**	**10 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

APPLIED BIOCHEMISTRY

PAPER-3
PAPER CODE
Semester II

L	T	P	Credits		
3	1		43	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I

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

Introduction to lab apparatus

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

Unit III

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

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

UNIT V

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-4

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 & MICROBIOLOGY

PAPER – 5
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**

PATHOLOGY

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.

PRACTICAL- PATHOLOGY

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)

MICROBIOLOGY

Unit I

Principles of Microbiology:

Microscope- Different types including electron microscope.

Unit II

General introduction, and History of Microbiology

Classification of Microbes

Bacteria Cell
Bacterial Growth and Variation
Antibacterial Agents, and Anti-septics & Disinfection (Chemical Sterilization)

Unit III

Sterilization (Physical)-Heat, Filters, Radiation.
Equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization

Unit IV

Antibiotics, Chemotherapy and Drug Resistance
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.
Collection & Transportations of specimens.

PRACTICAL – MICROBIOLOGY

1. Compound microscope and its application in microbiology.
2. Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters
3. Grams staining.
4. Acid fast staining.
5. Principles and practice of Biomedical waste management.

PHARMACOLOGY

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

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

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 (PART 2)

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 Perfusion Technology

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

History and evolution of Cardiac Surgery & Cardiopulmonary Bypass. Dr John Gibbons Heart Lung Machine, Cross circulation (Gross Well) technique Hypothermic Cardiac Surgery, Advent of Cardiopulmonary BypasS

UNIT-II

Basic Principles of: Extracorporeal Circulation, Extracorporeal gas exchange Biocompatible Materials used in Perfusion Aseptic techniques and Sterility in perfusion

UNIT-III

Basics of diagnostic techniques, Chest X-ray, ECG, Echo, Coronary Angiography Laboratory investigations- arterial blood gas, Venous blood gas, Renal function test, liver function test, coagulation profile, Haemoglobin, haematocrit, platelet, RBC, WBC, Electrolytes

UNIT-IV

Basic components used in CPB- Heart lung machine, Oxygenator, Heater cooler unit Blood cardioplegia device ACT Machine, Basics of general Anaesthesia., Types of anaesthesia - general anaesthesia, regional anaesthesia ,local anaesthesia Drugs in anaesthesia- Propofol, Thiopentone, Keatamine, Etomidate, Muscle relaxants-Vercuronium, Pancuronium,Atracurium, Benzodiazepine-Midazolam, Diazepam, Inhalations agents - Halothane, Sevoflurane, Isoflurane

UNIT V

Basics of monitoring, Setting up of ECG machine, Pressure transducer, Syringe and peristaltic pumps, Anaesthesia Monitors,Pulse oximeters, Temperature probes and Thermoregulatory monitoring, Defibrillators, Fibrillators, ACT (Activated Clotting Time)

Introduction to Perfusion Technology

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:	

1. Chest X-ray
2. ECG
3. Echocardiography
   Coronary Angiography
4. ACT Machine
5. Laboratory investigations- arterial blood gas, Venous blood gas, Renal function test, liver function test, coagulation profile.
6. Assembling of Heart Lung Machine

ENVIRONMENTAL STUDIES

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.

PATIENT CARE AND MEDICAL EMERGENCIES PAPER-7

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

SEMESTER
4^{th}

Basic Intensive Care

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

General ICU Care and Monitoring

1. 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.
2. Monitoring in critical care: vital signs, drains, ECG, fluid intake & output, invasive hemodynamic and central venous pressure monitoring

3. central venous pressure monitoring

Unit II

Infection Control and Nutrition in ICU

3. Infection control in ICU: prevention of cross infection, personal protection, antibiotics and policy.
4. Nutrition and Fluid balance - total parentral nutrition, nasogastric tube, gastric tube, jejunostomy tube care and feeding, IV Fluids.

Unit III

Systemic Diseases and Care in ICU

5. Cardiac care in ICU: hypertension, hypotension, arrhythmias, cardiac arrest, ACLS
6. Respiratory care in ICU: airway care, tracheostomy care, endotracheal intubation, mechanical ventilation, care of ventilated patient, complications and weaning.
7. Renal failure: types, etiology, complications, corrective measures
8. Hepatic failure: types, etiology, complications, corrective measures

Unit IV

Head Injury and Trauma care in ICU

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

10.Blood and blood products transfusion: Transfusion reactions & complications, Massive transfusion

Unit V

Acid base disorders, neonatal ventilation, imaging in ICU

11.Acid-base & electrolyte balance and their correction, fluid, electrolyte, nutrition balance and management.

12.Neonatal mechanical ventilation: intubation and problems inherent to the neonate, basic principles of neonatal ventilation, modes, initiation and maintenance.

13.Miscellaneous: X-rays, ultrasound, chest and limb physical therapy in ICU

Basic Intensive Care

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	

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

Basics of Pumps, Oxygenators & Blood Components

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-1

Oxygenators-History of Oxygenators, Types of Oxygenators, Disc and Screen Oxygenators, Bubble Oxygenators, Membrane Oxygenators, Design & function of various Oxygenators

UNIT-2

Pumps- History of Pumps, Characteristics of an Ideal Pump, Types of Pumps Roller pumps, Centrifugal pumps, Peristaltic pumps, Design & function of Roller pumps, Design & function of Centrifugal pumps.

UNIT-3

Filters-Arterial filters, Cardiotomy filters, Gas line filters, Leucocyte filters, Types of tubing's used in CPB, Heat Exchangers.

UNIT-4

Blood components-Blood grouping and Cross Matching, PRBC, Whole blood, Platelets, FFP, Cryoprecipitate

UNIT-5

Coagulation system-Platelet Disorders- Thrombocytopenia, Thrombophilia, Coagulation pathway disorders - Von willibrands diseases Haemophilia, DIC- Disseminated intravascular coagulation, Fibrinolytic system and its disorders.

Basics of Pumps, Oxygenators & Blood Components

PAPER – 4

PAPER CODE

Semester IV

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

Design & function of Roller pumps
Arterial filters Cardiotomy filters, Gas line filter , Leucocyte filters
Types of tubing’s used in CPB & Heat Exchangers

CONDUCTION OF CARDIOPULMONARY BYPASS

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	

UNIT-1

PRIMING SOLUTION :
CRYSTALLOID & COLLLOID SOLUTION

UNIT-2

PREBYPASS CHECKLIST
PREPARATION OF PATIENT

UNIT-3

INITIATION OF BYPASS : PROTOCOLS

UNIT-4

EQUIPMENT OF CPB : OXYGENATORS SIZE ,CANNULA SIZE & TUBING SIZE

UNIT-5

BLOOD CARDIOPLEGIA DEVICE : TYPES OF CARDIOPLEGIA SOLUTION

CONDUCTION OF CARDIOPULMONARY BYPASS

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	

CONDUCTION OF BYPASS : INITIATIAN , MAINTENANCE & TERMINATION OF BYPASS
EVALUATION OF DIFFERENT PERFUSION STRATEGIES

BASICS OF MEDICAL DISORDER

PAPER - 7
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

Cardiac and Respiratory diseases

1. Cardio vascular diseases

a. Hypertension, Ischemic heart diseases, Myocardial Infarction, arrhythmias
b. Heart failure, shock - types, causes

2. Respiratory diseases

a. Pneumonia, tuberculosis,
b. Chronic obstructive pulmonary disease, asthma
c. Pleural effusion, pneumothorax
d. Interstitial lung disease

Unit II

Neurological, Renal, GI and infectious diseases

3. Neurological diseases

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

4. Renal Diseases

a. Acute kidney injury
b. Chronic Kidney Disease

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, leptospirosis

Unit III

Blood, fluid, electrolyte and acid base abnormalities

7. Blood loss and Anemia, thrombocytopenia
8. Fluid Electrolyte imbalance and corrective methods
9. Acid Base abnormalities and corrective methods

Unit IV

Pulmonary Oedema, Sepsis and MODS

10. Pulmonary Oedema, Acute Lung Injury and Acute Respiratory Distress Syndrome
11. Sepsis, multi-organ failure, Multi-organ dysfunction syndrome

Unit V

Health problems in Specific conditions and Toxicology –

. Health problems in specific conditions

a. Pregnancy - antenatal care, disorders in pregnancy
b. Children and new born
c. Obesity
d. Diabetes mellitus
e. HIV infections and AIDS
f. Elderly subjects and disability
g. Brief mention about endocrine disorders

13. Poisoning and drug over dosing

a. Classification of poisons
b. Principles of treatment of poisoning and Primary care
c. Poisons and drug over dosing requiring ventilation

14. Miscellaneous

a. Drowning
b. Hanging

BASICS OF MEDICAL DISORDER - PRACTICAL

PAPER - 8
PAPER CODE
Semester IV

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

History Taking and clinical examination, monitoring of patient.
Therapeutic options for various diseases and conditions

SEMESTER

5^{th}

Conduct of CPB and Cannulation Techniques

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	

UNIT-1

Cardiopulmonary Bypass Circuitry: Adult circuit, Paediatric circuit, Neonatal circuit

UNIT-2

Cannulation Techniques Arterial cannulation- Aortic, femoral, iliac, Venous cannulation-

SVC, IVC, RA, femoral vein, Cardioplegia cannulation- Antegrade, Retrograde, Osteal

UNIT-3

Priming solutions and Haemodilution in CPB
Crystalloids, Ringer lactate, Normal saline, Plasmalyte A,Dextrose,Colloids – Hetastarch Albumin,FFP. Additional drugs used in them - Mannitol, Heparin, Bicarbonate

UNIT-4

Conduct of CPB-Chart Review and selection of Equipments, Assembling the circuit: Priming and Setting occlusion, Initiation of CPB and Gas management.
Venting of the Heart and Cardiotomy Suction, Pre-CPB checklist, Pre weaning off, bypass checklist, Cardioplegia dosage and management, ABG and ACT management, Adequacy of Perfusion, Weaning From CPB.

UNIT-5

Renal System - Presentation, Diagnosis and Management
ARF Acute renal failure, CRF Chronic renal failure, Why and when do we do, Haemodialysis, Types of Dialysis, CNS Aetiology, presentation and diagnosis of, Hemiplegia, Paraplegia, Stroke, Cerebral haemorrhage

Conduct of CPB and Cannulation Techniques- Practical

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:	

Adult circuit, Pediatric circuit , Neonatal circuit
Arterial cannulation- Aortic, femoral, iliac
Venous cannulation- SVC, IVC, RA, femoral vein
Cardioplegia cannulation- Antegrade, Retrograde, Osteal
Assembling the circuit: Priming and Setting occlusion
Initiation of CPB and Gas management.
Venting of the Heart and Cardiotomy Suction
Cardioplegia dosage and management
ABG and ACT management Adequacy of Perfusion

Myocardial Protection and drugs used in CPB

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	

UNIT-1

Myocardial protection : Crystalloid Cardioplegia - St Thomas solution, Del Nido solution, Custodiol HTK solution -Histidine-Tryptophan-Ketoglutarate Blood cardioplegia delivery Devices-MPS myocardial protection system, Cardioplegia reservoir

UNIT-2

Drugs used in CPB: Vasodilators- Sodium Nitroprusside, Nitroglycerine, Vasoconstrictors- Phenylephrine, Anti Arrhythmics- Amiodarone, Magnesium, Lignocaine Diuretic- Frusemide, Mannitol. Anticoagulants- Heparin, Low molecular Weight heparin, Dabagatrin Argatroban, Protamine, Steroids- Dexamethasone

UNIT-3

Coagulation management during CPB and its reversal Heparin Pharmacology Heparin Dosing And Monitoring Heparin Resistance Alternatives To Unfractionated Heparin – Heparin Induced Thrombocytopenia Protamine Pharmacology Protamine reaction Temperature management during CPB Temperature monitoring sites , Types of hypothermia Temperature gradient.

UNIT-4

Inhalation agents-Sevoflurane, Isoflurane, Analgesics- Fentanyl, Morphine, Sedatives- Midazolam, Thiopentone, Antiplatelets- Aspirin, Clopidogrel, Ticlopidine, Prasugrel.

UNIT-5

Sodium Bicarbonate, Potassium Chloride, Heparin and its alternatives- Bivalirudin, Argatroban, Lepirudin Inotropes-Adrenaline, Noradrenaline, Dopamine, Dobutamine, Milrinone, Vasopressin, Levosimendan.

Myocardial Protection and drugs used in CPB-Practical

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:	

St Thomas solution, Del Nido solution, Custodiol HTK solution -Histidine-Tryptophan-Ketoglutarate
MPS myocardial protection system, Cardioplegia reservoir, , Vasodilators- Sodium Nitroprusside, Nitroglycerine, Vasoconstrictors- Phenylephrine, Anti Arrhythmics- Amiodarone, Magnesium, Lignocaine Diuretic- Frusemide, Mannitol
Anticoagulants- Heparin, Low molecular Weight heparin
Protamine Steroids- Dexamethasone
Sodium Bicarbonate, Potassium Chloride ,Heparin and its alternatives- Bivalirudin, Argatroban , Adrenaline, Noradrenaline, Dopamine, Dobutamine, Milrinone, Vasopressin, Levosimendan

Cardiac, Thoracic and Vascular Surgical Disorders

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	

UNIT-1

IHD (Ischaemic Heart Disease), ACS - angina types - typical, atypical, STEMI, NSTEMI, MI, Cardiomyopathy-Types, presentation, diagnosis and management of Presentation, Diagnosis and Management of Left ventricular failure, Right ventricular failure

UNIT-2

Rheumatic Heart Disease-Causes, presentation, diagnosis and management of Mitral stenosis, Mitral regurgitation, Aortic regurgitation, Aortic stenosis, Tricuspid, regurgitation, Tricuspid stenosis

UNIT-3

Congenital Heart Disease, presentation, diagnosis and management of, Atrial septal defect, VSD, PDA,TOF, TGA, TAPVC, Coarctation of aorta.

UNIT-4

Vascular Diseases-Classification, presentation, diagnosis and management of Aneurysms and dissections, Ascending aorta, Arch of aorta, Descending thoracic aorta.

UNIT-5

Respiratory System, Presentation, Diagnosis and Management, Chronic obstructive airway diseases, Bronchial asthma, Pneumonia, H_IN_I, Pneumothorax, Haemothorax, Basics of PFT and its interpretation

Cardio-Thoracic and Vascular Surgical Disorders- Practical

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:	

Case scenarios of adult heart disease, congenital heart disease and thoracic vascular disease and lung diseases mentioned in the above units.

Practical, Identify and Discuss - CXR, CT thorax, angiogram, CT angiogram and PFT and ECHO findings of the above diseases

RESEARCH METHODOLOGY AND BIOSTATISTICS

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

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}

Effects on Various Organs during CPB and Introduction to IABP and ECMO

PAPER - 1
PAPER CODE
Semester VI

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

UNIT-1

Effect of CPB, Effect of CPB on CNS, Effect of CPB on Respiratory System, Effect of CPB on Renal system, Effect of CPB on Hepatic system

UNIT-2

Effect of CPB on Immune system, Effect of CPB on Endocrine system, Systemic Inflammatory Response Syndrome, Heparin Resistance, Heparin Induced Thrombocytopenia, Protamine Reactions

UNIT-3

Introduction to IABP, Parts of IABP machine, Parts of IABP balloon, Insertion sites, Different IABP sizes, Indications, steps of insertion and removal, complications and contraindications

UNIT-4

Introduction to ECMO, Components of ECMO circuits, Indications and contraindications to ECMO, Types of ECMO. Cardiac Support Devices, Extra Corporeal Life Support (ECMO / ECLS), Ventricular Assist Devices (LVAD / RVAD), Artificial Heart

UNIT-5

Safety devices in CPB, Level detector, Bubble detector Pressure sensor, Pump slave, Hand cranks, Pulsatile, Perfusion

UNIT-6

Minimal Invasive Cardiac Surgeries, CPB for Minimal Invasive Cardiac Surgeries, CPB for Non Cardiac Surgeries, Recent advances in Perfusion

Effects on Various Organs during CPB and Introduction to IABP and ECMO-Practical

PAPER - 2

PAPER CODE

Semester VI

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

Level detector, Bubble detector, Pressure sensor, Pump slave, Hand cranks, Pulsatile Perfusion, Introduction to IABP, Indications, steps of insertion and removal, complications and contraindications:

Identification, Uses, Principles, Discussion and Demonstration of above practical syllabus-

Connecting and setting up the IABP

-

Special Situations in Perfusion Technology

PAPER - 3
PAPER CODE
Semester VI

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

UNIT-1

CPB CHECK LIST, Prebypass check list, Initiation of CPB, Maintenance of CPB, Weaning of CPB

UNIT-2

CPB special conditions, Foetal circulation, CPB in pregnancy, Reperfusion injury

UNIT-3

CPB in Infants & Children, Selection of circuit, Selection of cannulae Blood prime

UNIT-4

Management of CPB in Cyanotic patients, Blood Gas Management, ABG, VBG calculation of circulating hematocrit, Various priming options

UNIT-5

Hemo-concentration, Conventional ultrafiltration CUF, Modified Ultra filtration MUF. Blood conservation techniques in Cardiac Surgery, Preoperative, Peri Operative, Post Operative, Cell Saver

UNIT-6

Deep Hypothermic Circulatory Arrest (DHCA), Steps Taken Before Going On DHCA, Antegrade & Retrograde Cerebral Perfusion, Alpha stat management
Ph stat management, Non hypothermic cardiac surgeries

Special Situations in Perfusion Technology-Practical

PAPER - 4
PAPER CODE
Semester VI

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

Assembling of CPB circuit , Initiation of CPB , Maintenance of CPB, Weaning of CPB
Conventional ultrafiltration CUF , Modified Ultra filtration MUF
Intra Aortic Balloon Pump (IABP) , Deep Hypothermic Circulatory Arrest (DHCA) , Antegrade & Retrograde Cerebral Perfusion , Setting up of DHCA circuit for ACP and RCP

Department of Paramedical Sciences

Faculty of Allied Health Sciences

SGT UNIVERSITY

Shree Guru Gobind Singh Tricentenary University

Gurgaon-122505

Syllabus

B.Sc. MEDICAL TECH. (RENAL DIALYSIS TECH)

Duration: 3 years (6 Semester)

W.e.f. Academic Session 2020-21

SEMESTER
1st

HUMAN ANATOMY-I

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

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

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

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

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

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		
-	-	2	2	**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

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

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

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

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

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		
-	-	2	2	**Examination:**	**20 Marks**
				Internal Assessment:	**30 Marks**
				Total:	**50 Marks**

1. Haemoglobinometry
2. WhiteBloodCellcount
3. RedBloodCellcount
4. DeterminationofBloodGroups
5. Leishman'sstainingandDifferentialWBCcount
6. DeterminationofpackedcellVolume
7. Erythrocytesedimentationrate[ESR]
8. CalculationofBloodindices
9. DeterminationofClottingTime,BleedingTime

BASIC BIOCHEMISTRY

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

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

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

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

Unit-IV

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		
-	-	2	2	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.

COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT

PAPER – 7
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

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

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

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

Pronunciation

- Pronunciation
- Syllable and Stress
- Intonation and Modulation

UNIT V

Writing Comprehension

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

Project Writing: Features, Structure

SEMESTER
2nd

APPLIED ANATOMY & PHYSIOLOGY

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

EXCRETORY SYSTEM PARTS OF EXCRETORY SYSTEM
Shape Of Kidney, Blood Supply Components Of Kidney , Nephron ,Nerve Supply. Urine Formation (Filtration , Absorption & Secretion) Acid , Base Management . Renal Disease (Aki, Ckd & Stones)

Unit II

Male & female reproductive system Parts of male and female reproductive system with salient gross features of testis & uterus, ovary and fallopian tube
Male -Functions of testes, pubertal changes in males, Testosterone -action & regulations of secretion.Female -Functions of ovaries and uterus, pubertal changes,
Menstrual cycle, estrogens and progestron -action and regulation
Embryology
Spermatogenesis & oogenesis
Ovulation,fertilization, Placenta, Fetalcirculation

Unit III

Endocrinology
Physiology of the endocrine glands – Hormones secreted by these glands Their classifications and functions
Adrenal, Gonads Thymus, Pancreas. Pituitary Thyroid, Parathyroid

Unit IV

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)
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 ANATOMY I-PRACTICAL

PAPER-2

PAPER CODE

Semester II

L	T	P	Credits		
-	-	1	1	**Examination:**	**10 Marks**
				Total:	**50 Marks**

Identification and description of all anatomical structures.

Demonstration of dissected parts

Demonstration of skeleton-articulated and disarticulated.

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

HUMAN PHYSIOLOGY II-PRACTICAL

PAPER-2

PAPER CODE

Semester II

L	T	P	Credits		
-	-	1	1	**Examination:**	**10 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

APPLIED BIOCHEMISTRY

PAPER-3
PAPER CODE
Semester II

L	T	P	Credits		
3	1		43	**Examination:**	**60 Marks**
				Int. Assessment:	**40 Marks**
				Total:	**100 Marks**
				Duration of Examination:	**3 Hours**

UNIT-I

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

Introduction to lab apparatus

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

Unit III

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

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

UNIT V

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-4

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 & MICROBIOLOGY

PAPER – 5
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**

PATHOLOGY

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.

PRACTICAL- PATHOLOGY

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)

MICROBIOLOGY

Unit I

Principles of Microbiology:

Microscope- Different types including electron microscope.

Unit II

General introduction, and History of Microbiology

Classification of Microbes

Bacteria Cell
Bacterial Growth and Variation
Antibacterial Agents, and Anti-septics & Disinfection (Chemical Sterilization)

Unit III

Sterilization (Physical)-Heat, Filters, Radiation.
Equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization

Unit IV

Antibiotics, Chemotherapy and Drug Resistance
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.
Collection & Transportations of specimens.

PRACTICAL – MICROBIOLOGY

1. Compound microscope and its application in microbiology.
2. Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters
3. Grams staining.
4. Acid fast staining.
5. Principles and practice of Biomedical waste management.

PHARMACOLOGY

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

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

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 (PART 2)

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

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

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)

ENVIRONMENTAL STUDIES

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.

PATIENT CARE AND MEDICAL EMERGENCIES PAPER-7

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

SEMESTER
4^{th}

Basic Intensive Care

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

General ICU Care and Monitoring

1. 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.
2. Monitoring in critical care: vital signs, drains, ECG, fluid intake & output, invasive hemodynamic and central venous pressure monitoring

3. central venous pressure monitoring

Unit II

Infection Control and Nutrition in ICU

3. Infection control in ICU: prevention of cross infection, personal protection, antibiotics and policy.
4. Nutrition and Fluid balance - total parentral nutrition, nasogastric tube, gastric tube, jejunostomy tube care and feeding, IV Fluids.

Unit III

Systemic Diseases and Care in ICU

5. Cardiac care in ICU: hypertension, hypotension, arrhythmias, cardiac arrest, ACLS
6. Respiratory care in ICU: airway care, tracheostomy care, endotracheal intubation, mechanical ventilation, care of ventilated patient, complications and weaning.
7. Renal failure: types, etiology, complications, corrective measures
8. Hepatic failure: types, etiology, complications, corrective measures

Unit IV

Head Injury and Trauma care in ICU

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

10.Blood and blood products transfusion: Transfusion reactions & complications, Massive transfusion

Unit V

Acid base disorders, neonatal ventilation, imaging in ICU

11.Acid-base & electrolyte balance and their correction, fluid, electrolyte, nutrition balance and management.

12.Neonatal mechanical ventilation: intubation and problems inherent to the neonate, basic principles of neonatal ventilation, modes, initiation and maintenance.

13.Miscellaneous: X-rays, ultrasound, chest and limb physical therapy in ICU

Basic Intensive Care

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	

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

Basic Concepts of Renal Disease

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:

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 II:

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

Unit III:

Renal stone diseases, inherited and cystic renal diseases
Composition of kidney stones, risk factors for recurrent stones, clinical presentation, prevention of recurrent stones & treatment

Unit IV

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

Unit V:

Nephrotic syndromes- definition, clinical features, causes(MCNS, FSGS, MGN…), Primary & secondary NS, complications, management
Acute glomerulonephritis/RPGN- definition, causes(PSGN,vasculitis, anti GBM, SLE, HSP….), clinical features, management.

Basic Concepts of Renal Disease-Practical

PAPER – 4

PAPER CODE

Semester IV

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

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

Recommended Books Recent edition

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

Acute and chronic kidney diseases and nutrition

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	

Unit I:

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

Unit II:

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

Unit III:

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

Unit IV:

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

Unit V:

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

Acute and chronic kidney diseases and nutrition

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	

Practicals

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

-

Hemodialysis part 1

PAPER – 7

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.

Hemodialysis part 1 - Practical

PAPER – 8

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.

SEMESTER

5^{th}

Hemodialysis part 2

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

Unit II

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

Unit III:

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

Unit IV:

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

Unit V:

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

Hemodialysis part 2

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:

1. Demonstrate priming of dialysis apparatus-10 marks

2. Demonstrate reuse of dialysers- 10 marks

3. Spotters- HD catheters, dialysers, AV needle, tubings, dialysis machine, PD set, perm catheters, dialysis solutions, chemicals used in hemodialysis. 20 marks

Hemodialysis part 3

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:

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.

Unit II:

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

Unit III:

Hemofilteration/ Hemodiafilteration/ SCUF

Unit IV:

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

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

Hemodialysis part 3

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	

Practicals:

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

Hands on training in Continuous ambulatory peritoneal dialysis

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:

Setting up Acute PD- catheter insertion, connections , performing and monitoring of PD

Unit II:

Setting up CAPD, performing and monitoring of CAPD, seeing CAPD catheter insertion.

Unit III:

Technical aspects of APD machine and performing and monitoring of APD

Unit IV:

Introduction to PD solutions

Unit V:

Performing PET test

RESEARCH METHODOLOGY AND BIOSTATISTICS

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

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

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Peritoneal dialysis & Dialysis in Special Situations

PAPER - 1

PAPER CODE

Semester VI

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

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
Dilaysis in pregnancy-causes for AKI in pregnancy, dialysis regimen during pregnancy, indications for dialysis in pregnancy
Dialysis in HIV/ HBsAg/ HCV positive patients - Guidelines, infection control practices in HD units, dedicated machines, vaccination for dialysis patients.
Dialysis in patients with congestive cardiac failure- special precautions

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 & Dialysis in Special Situations- Practical

PAPER - 2

PAPER CODE

Semester VI

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**

. Case discussion (a patient on peritoneal dialysis)

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

Recent Advances in Dialysis Technology

PAPER - 3
PAPER CODE
Semester VI

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

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

UNIT 6
Renal Transplantation :

Options for patient with ESRD, basics in transplant immunology, donor selection, recipient evaluation
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.
Monitoring of patient on the waiting list for transplant.
Watching transplant inside the operation theatre

Recent Advances in Dialysis Technology

PAPER - 1

PAPER CODE

Semester VI

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

Practical:

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