

SYLLABUS FOR WRITTEN TEST (OBJECTIVE TYPE) FOR THE POST OF ASSISTANT PROFESSOR MEDICAL EDUCATION DEPARTMENT

1- ANATOMY

Unit-I

General Anatomy

Anatomical Terminology - Anatomical position, Terms of Position & movement.

Skin & Fascia - Different types of skin, Dermatomes in body, Skin appendages & Skin Incisions. Superficial fascia, Deep fascia & its modifications.

Muscle - Classification of muscles, Differentiation between Tendons & aponeurosis, Shunt & Spurt muscle.

Nervous System - Components of Central, Peripheral & Autonomic nervous system, Neurons & Neuroglia, Typical Spinal nerve & Synapse, Sympathetic & Spinal Ganglia.

Bones & Joints - Classification & Ossification of Bones, Various types of cartilage, Classification of Joints.

Glands - Exocrine & Endocrine glands - classification & function.

Vascular & Lymphatic system -

General features of arteries, Veins, lymphatics, portal system, arterial anastomoses. Define Thrombosis, Infarction & Aneurysm.

Unit-II

Osteology - Structure, attachment, relations, ossification, age changes & blood supply of all bones & cartilages.

Unit-III

Myology - Attachment, action, nerve supply & vascular supply, relation of important muscles of Upper limb, Lower limb, Thorax, Abdomen, Pelvis, Perineum and Head & Neck.

Unit -IV

Arthology - Structure, relation, movements, vascular, nerve supply & applied anatomy of all joints of the body.

Unit -V

Cardio-Vascular - Pericardium, External & Internal features of all the chambers of Heart, Blood supply, Nerve supply, Fibrous Skeleton & Anatomical Basis of Ischemic Heart Disease.

Unit-VI

Lymphatic System - Immune System and the cell types involved in defence mechanisms of the body. Gross features, Cytology, architecture, functions, development and histogenesis of various primary and secondary lymphoid organs.

Biological and clinical significance of the major histocompatibility complex of man including its role in transplantation, disease susceptibility/resistance and genetic control of the immune response.

Lymphatic Drainage of all parts & organs of the body. Position & Relations of various

groups of lymph-nodes. Major lymph vessels of the body.

Unit-VII

Neuroanatomy – Brain and its environment including Meninges, CSF and Dural Venous Sinuses. Development of nervous system. Neuron and Neuroglia, Somatic Sensory system, Olfactory and Optic pathways, Cochleo-vestibular and Gustatory pathways, Motor pathways, Central autonomic pathways, Hypothalamo-hypophyseal system, Limbic system, Basal ganglia, Reticular system, Cross-sectional anatomy of the Brain, Brainstem and Spinal cord. Detailed structure of CNS and its applied anatomy. Blood supply of Brain and Spinal Cord.

Unit-VIII

Special Senses – Anatomy of peripheral receptors of Taste, Smell, Vision, Hearing & Touch and their central connections, pathways, functions & applied aspect.

Unit- IX

Splanchnology – Gross Anatomy of all viscera & organs including – Respiratory, Digestive, Urogenital, lymphoid organs, Endocrine & Exocrine glands.

Unit-X

Embryology –

General embryology: Gametogenesis, Uterine and Ovarian cycle, Fertilization, Implantation and Placenta. Early human embryonic development.

Systemic embryology: Development of organ systems and associated common congenital abnormalities with teratogenesis. Physiological Correlations of congenital abnormalities.

Unit-XI

Genetics – Human Chromosomes – Structure, number and classification, methods of chromosome preparation, banding patterns. Chromosome abnormalities, Autosomal and Sex chromosomal abnormalities & syndromes, Molecular and Cytogenetics.

Single Gene Pattern in inheritance –

Autosomal and Sex Chromosomal pattern of inheritance, Intermediate pattern and multiple alleles, Mutations, Non-mendelian inheritance. Mitochondrial inheritance, Genome imprinting, parental disomy.

Multifactorial pattern of Inheritance –

Teratology, structure gene, Molecular Screening, Cancer genetics, haematological malignancies, Pharmacogenetics.

Reproduction genetics – Male and Female infertility, Abortuses, Assisted reproduction, Preimplantation genetics, Prenatal diagnosis, Genetic counselling, ethics of genetics, principles of genetic therapy and its applied.

Unit-XII

Microanatomy – Cell Biology – Cytoplasm –

Cytoplasmic matrix, Cell membrane, Cell Organelles, Cytoskeleton, Cell Inclusions, Cilia and flagella. Nucleus – Nuclear envelope, nuclear matrix, DNA and other components of chromatin, protein synthesis, nucleolus, nuclear changes indicating cell death. Cell cycle – Mitosis, meiosis, cell



renewal, cellular differentiation and proliferation. Microscopic structure of Body-Types & parts, Study of histological features of all the cells, tissues & organs of the body. Principles of light, transmission and scanning, electron, fluorescent, confocal and virtual microscopy. Systems/Organs of Body-Cellular organization, light and electron microscopic features, structure-function correlations and cellular organization.

Unit-XIII

Applied Anatomy- Application of knowledge of structural, development, neuroanatomy to comprehend deviations from normal.

Clinical correlations of structure and function of human body. Anatomical basis and explanations for clinical problems.

Unit-XIV

Functional Anatomy – Relationship of structures & functions in respect to various Tissues & Organs of the body.

Unit-XV

Living Anatomy – Surface marking of all regions of the body. Interpretation of normal radiographs of the body including Barium studies, cholecystography, pyelography, salphingography, normal CT scan, MRI and Ultrasound.

Unit-XVI

Sectional Anatomy – Cross/Sagittal/Coronal Sections of Brain, Head & neck, Thorax, Abdomen, Pelvis & Limbs to understand inter-relation of organs & interpretation with CT & MRI.

Unit-XVII

Recent Advances – Recent advances in medical sciences which facilitate comprehension of structure function, correlations and applications in Clinical problems solving. Collection, maintenance and application of stem cells, cryobanking and principles of organ donation from recently dead bodies.

Unit-XVIII

RadioDiagnosis – Identification of Plain X-rays, special radiographic procedures and Arteriography.

Unit-XIX

Embalming –

Basic knowledge of types of embalming and types of embalming fluids. Embalming in special circumstances like burns, drowning and post mortem bodies etc.

Unit-XX

Forensic Medicine and Anthropology:

Identification of human bones from their remains and determination of sex, age and height for medicolegal application of Anatomy.

Different anthropological traits, identification and use of anthropological instruments. Pelvimetry and Cephalometry.

➤ **Recent advances and developments in the discipline.**



2-PHYSIOLOGY

Unit-I-General Physiological Principles:

Principles of homeostasis, Positive & Negative Feedback Mechanisms, Structure of Cell, Structure of Cell Membrane, Intercellular communications, Transport across Cell Membrane, Gibbs-Donnan equilibrium, Nernst Equation, Fluid compartments of the body. Measurement of Fluid Volumes, Osmotic Equilibrium between ECF & ICF. Basic principles of Genetics and its Applied aspects, Genetic code- its expression, and regulation of gene expression, Cell cycle and its regulation and Apoptosis. Applied aspects of General Physiology.

Unit-II-Blood:

Composition and functions of blood, types & functions of Plasma proteins, Immunoglobulins, RBC: formation & functions, Blood Indices: PCV, MCV, MCH, MCHC. Anemias with Classification & Description, Polycythemia, Fate of Red Blood Cells, Hemoglobin- synthesis and functions, Chemistry of Bilirubin Formation & Jaundice, Blood Groups: basis of blood grouping, & its clinical importance, blood banking and transfusion, Principles of transfusion medicine, WBC: formation, functions and Leucopenia & Leukemias, Macrophages, Inflammation-

Pathophysiology, Platelets: formation & functions. Haemophilia, DIC, Thrombocytopenic Purpura, Haemostasis and its applications inclusive of anticoagulants and Bleeding Disorders, Mechanism of Coagulation, Coagulation tests. Thymus and Immunity, Innate immunity, Acquired immunity, Allergy, Hypersensitivity and Immunodeficiency, Autoimmune Disorders. Tissue & Organ Transplant. Lymphoid Tissues & Lymph Abnormal clotting and bleeding (coagulation factors and anticoagulants), Fibrinolysis, Congenital Abnormalities.

Immune Disorders. The physiological basis of the treatment of such conditions and side effects of drugs used. Applied aspects of Hematology.

Unit-III-Muscle and Nerve Physiology:

Structure, functions and properties of Neuron and Neuroglia, Classification, functions and properties of Nerve Fibers, Molecular basis of resting membrane and action potential, Transmission of Nerve Impulse, Nerve Injuries, Wallerian Degeneration, Regeneration of Nerve Fibre after Injury, Structure, types and properties of Muscle Fibers, Action potential in different muscle types, Excitation-Contraction coupling, Mechanisms of muscle contraction, Structure and transmission across Neuro-Muscular Junction, Neuro-muscular blocking agents, Pathophysiology of Myasthenia gravis and Eaton-Lambert Syndrome, Muscular changes during exercise. Visceral smooth muscle, Multi unit

smooth muscle, Process of excitation-contraction coupling in smooth muscle, Characteristic s-Plasticity, Latch Phenomenon. Applied aspects of Nerve Muscle Physiology.



Unit-IV-RenalSystem:

Structure and functions of nephron, Structure and functions of Juxta glomerular apparatus inclusive of Renin-Angiotensin-Aldosterone system (RAAS), Physiology of urine formation, Transport maximum and Renal threshold, GFR and factors affecting GFR, Mechanism of concentration and dilution of urine inclusive of counter current mechanism, Acidification of Urine, Fluid, Body fluid compartments, Water balance: regulation of fluid balance, electrolyte, Regulation of extracellular sodium and osmolarity, Concept of Renal Clearance, Acid base balance and its regulation, Innervations of bladder, micturition, cystometrogram, Bladder Dysfunction, Diuretics, Artificial kidney, Dialysis, Radiology & Renal imaging, Renal Failure & Renal Function Test, Renal Transplant. Applied aspects of Renal Physiology.

Unit-V-DigestiveSystem:

General organization of GIT muscles, Innervation and Nerve Plexuses. Functions and composition of Salivary secretion, Gastric secretion, Pancreatic secretion, Intestinal secretion and Bile. Liver – structure and functions, liver function tests. Jaundice – types & laboratory investigations. Gastro-intestinal hormones – source, regulation and functions, Gastro-intestinal movements, G.I.T. reflexes. Vomiting and Diarrhea, Constipation. Dietry fibres. Digestion and absorption of carbohydrates, proteins, fats, vitamins, minerals and trace elements. Pathophysiology of peptic ulcer and diarrheal disease, Pathophysiology Cause & Clinical Features of Acute Pancreatitis. Gallstones, Constipation, Steatorrhea, Malabsorption Syndrome. Applied aspects of G.I.T.

Unit-VI-Endocrinology:

Types of hormones, mechanism of hormone action, Estimation and assessment of hormones. Physiological actions and effect of altered secretion of Pituitary Gland, Thyroid Gland, Parathyroid Gland, Adrenal Gland, Pancreas, Pineal and Hypothalamus. Disorders of Anterior & Posterior Pituitary, Thyroid Disorders, Thyroid function Tests, Anti-Thyroid drugs. Disorders of Parathyroid Gland, Calcium homeostasis, Bone Physiology, Applied-Metabolic Bone Diseases. Disorders of Adrenal Cortical & medullary hormones. Applied aspects of Endocrine System.

Unit-VII-ReproductiveSystem:

Sex differentiation & development functions of Testis & Ovary, Spermatogenesis & factors influencing it, Cryptorchidism, Chromosomal Abnormalities. Menstrual cycle – hormonal, uterine and ovarian changes, Menstrual Disorders, Physiological changes during pregnancy, foeto-placental Unit, Placental Hormones, parturition and lactation, Physiological basis for pubertal changes and menopause, Pubertal Disorders, Physiological effect of sex hormones, Tests of Pregnancy, Foetal and Neonatal Physiology, Physiology of Contraception and Contraceptive methods (male and female methods). Applied aspects of Reproductive System.

Unit-VIII-CardiovascularSystem:

Structure and properties of cardiac muscle, Resting membrane & action potential, Excitation – contraction coupling phenomenon, Process of cardiac muscle contraction, Pacemaker



potential, Conduction system of Heart, Mechanical events & pressure Volume changes during Cardiac Cycle, Heart Sounds, Murmurs, Valvular lesions. Frank Starling Law, Jugular Venous Pulse Regulation of heart rate and blood pressure and cardiac output, Electrocardiogram - physiological basis and applications, Abnormal ECG, Abnormal ECG pattern in myocardial infarction, cardiac arrhythmias (briefly), Effect of changes in ECF K^+ , Ca^{++} and Na^+ Conduction defects - define 1^o, 2^o and 3^o block (mention), electrical axis of heart. Heart blocks and Patho-Physiology of Heart-failure. Haemodynamics of circulatory system, Regional circulation - coronary, Splanchnic, cerebral, capillary, foetal and pulmonary circulation. Physiology of shock, coronary artery disease, hypertension, Cardio-pulmonary resuscitation, Lymphatic circulation. Cardiovascular response to exercise. Applied aspect of CVS.

Unit-IX-Respiratory System:

Functional anatomy of respiratory system, physical principles of gaseous exchange, Surfactants, Transport of respiratory gases, Mechanics of normal respiration, Pulmonary Volumes & Capacities, Pulmonary Ventilation, Ventilation-Perfusion Ratio, Regulation of respiration, Lung function test-clinical significance, Principles of artificial respiration, Oxygen Therapy, acclimatization at high altitude and decompression sickness. Hypoxia, Carbon monoxide poisoning, Oxygen Toxicity, cyanosis and asphyxia. Cardio-respiratory changes during exercise and Yoga, Pulmonary Abnormalities - Chronic Pulmonary Emphysema, Pneumonia, Atelectasis, Asthma, Blood Gas Analysis, Artificial Respiration, Effects of acceleratory forces on the body in Aviation & Space Physiology, Artificial Climate in the sealed Spacecraft, Weightlessness in Space, Physiological changes at High Altitude, Acute & Chronic Mountain Sickness, Pulmonary Oedema, Artificial ventilation & Cardiopulmonary Resuscitation, Hazards of Deep Seadiving. Applied aspects of Respiratory System.

Unit-X-Central Nervous System:

Organization of nervous system. Functions, types and properties of synapse, Neurotransmitters, Spinal Cord Anatomy & Its Functions, Stretch reflexes & Tendon Jerks, Muscle spindle & Golgi Tendon Organ, Physiology of Brain Stem, Sensory receptors. Motor and sensory system and its applied aspects. Neurophysiology of Cortex, Basal Ganglia, Thalamus, Hypothalamus, Cerebellum, Limbic system and Reticular activating system. Parkinsonism. Mechanism of maintenance of tone, posture and equilibrium, Regulation of Posture & Movement, Vestibular apparatus, Higher functions - Memory, Learning inclusive of conditioned reflexes, Speech & its disorders, Sections of spinal cord, EEG and Sleep. Epilepsy Alzheimer's disease, Sleep Disorders, Neuro-physiology of Pain. C.S.F. Autonomic nervous system. Autonomic Function Test, Drugs Acting on ANS. Applied aspect of CNS.

Unit-XI-Special Senses:

Functional anatomy of eye - Physiology of image formation, photo transduction, colour vision, refractive errors, Visual reflexes-pupillary and light reflex, Visual pathways and Visual field defects. Phototransduction of Light, Functional anatomy of ear, Functions of External ear, Middle ear & Cochlea, properties of sound, mechanism of hearing and deafness, Hearing Test. Hearing Aids, Role of Inner ear in Balance & Equilibrium. Perception of smell and taste sensation, pathways and its



applied aspects. Auditory & visual evoked potential. Applied aspects of Ear and Eye Physiology.

Unit-XII-Environmental Physiology:

Mechanism of temperature regulation, Adaptation to altered temperature (heat and cold), Mechanism of fever, cold injuries and heat stroke. Physiological changes to Adaptations in various environments.

Unit-XIII-Physiology of Sports, Exercise, Yoga and Meditation:

Cardio-respiratory and metabolic adjustments, Physiological effects of yoga and meditation.

Unit-XIV-Physiology of Ageing:

Physiological and Psychological changes of ageing, theories of ageing and Prevention of ageing.

Unit XV-History and Recent Advances in Physiology:

Contribution of Physiologists in development and evolution of new techniques and progress in field of Physiology.

➤ **Recent advances and developments in the discipline.**

3-BIO-CHEMISTRY

UNIT I: BIOCHEMISTRY LABORATORY

1. **Measurement of mass**-Basic calculations and preparation of solutions.
2. **Laboratory essentials**-
Laboratory glassware, basic equipments, collection and preservation of biological fluids, blood collection-methods, separation, precaution, preservation, storage and transport of blood sample.
3. **Good safe laboratory practice**-
Hazardous dangerous chemicals, infection hazards, first-aid and emergency treatment in laboratory.
4. **Instrumentation/techniques** - pH Meter, colorimetry, spectrophotometry, electrophoresis, chromatography, ISE, mass spectrometry, flow cytometry, chemiluminescence, radioimmunoassay, ELISA, autoanalyser, arterial blood gas analysis and clinical applications of the techniques.
5. **Biomedical waste management** - Classification of hazardous waste, waste management process.
6. **Total quality management**-
Quality laboratory processes, quality assurance, quality assessment, quality control, quality control charts, six sigma process, accreditation and certification.



UNIT II: PROTEIN STRUCTURE AND FUNCTION

1. **Amino acids and peptides-**

Classification and reactions of amino acids, peptide bond, biologically active peptides, amino acids separation techniques.

2. **Proteins-**

Properties, functions, classification, organisation of proteins, sequence analysis of protein structure, protein misfolding, quantitative estimation of proteins, clinical aspects.

3. **Plasma proteins** - Functions and clinical significance of plasma proteins.

4. **Enzymes-**

Classification and nomenclature, coenzymes, mode of action of enzymes, catalysis, enzyme kinetics, factors affecting enzyme activity, regulation of enzyme activity, enzyme inhibition, isoenzymes, enzyme assay methods, enzymes in clinical diagnosis, therapeutic enzymes.

5. **Hemoproteins** - Structure, function of Hemoglobin, myoglobin, oxygen dissociation curve, allosteric effects, minor hemoglobins, hemoglobinopathies.

UNIT III: OVERVIEW OF METABOLISM

1. Metabolic adaptations during fasting, starvation and under well fed state, interconversion of metabolic fuels.

2. Metabolic profile of organs, brain, skeletal muscle, cardiac muscle, adipose tissue, liver, heart, kidney, erythrocytes, metabolic changes during, pregnancy, lactation, trauma & critical illness.

UNIT IV: BIOENERGETICS AND CARBOHYDRATE METABOLISM

1. **Biologic oxidation, respiratory chain and oxidative phosphorylation** - Role of high energy phosphates, redox potential, enzymes involved in oxidation reactions, electron transport chain, transport systems, Oxidative phosphorylation, clinical aspects.

2. **Citric acid cycle** - Amphibolic role, reactions, energetics and regulation.

3. **Metabolism of Carbohydrates** - Functions, classification, properties and reactions of carbohydrates, glycosaminoglycans, Dietary carbohydrate metabolism, glucose transporters, glycolysis and the oxidation of pyruvate, metabolism of glycogen, pentose phosphate pathway and other pathways of hexose metabolism, gluconeogenesis and control of blood glucose, Diabetes mellitus and its laboratory diagnosis, metabolism of alcohol, aminosugars, blood group substances, glycosaminoglycans, proteoglycans and glycoproteins, clinical aspects of carbohydrate metabolism.

UNIT V: LIPID METABOLISM

1. **Metabolism of Lipids-**

Functions, classification, properties of lipids, fatty acids, prostaglandins, eicosanoids. Dietary lipid metabolism, oxidation & biosynthesis of fatty acids, diseases associated with impaired fatty acid oxidation, phospholipid, glycosphingolipid and eicosanoid metabolism, ketone body and acylglycerol metabolism, lipid transport and storage, metabolism of adipose tissue, fatty liver, lipotropic factors, cholesterol metabolism, role of dyslipidemia in atherosclerosis and cardiac biomarkers, clinical aspects of lipid metabolism.



UNITVI: PROTEINANDAMINOACIDMETABOLISM

1. **Amino acid metabolism** -Dietary protein metabolism , catabolism of proteins and aminoacid nitrogen, metabolism of ammonia, urea cycle and related disorders, catabolism ofcarbonskeletonsofaminoacids,conversionofaminoacidstospecialisedproducts,synthesisofnutritionallynonessentialaminoacids.metabolicdefectsinaminoacidmetabolism.
2. **Hemesynthesisandbreakdown-**
Structure,biosynthesisanddegradationofheme,porphyrias,bilirubin metabolism, jaundice.

UNITVII:NUCLEOTIDE METABOLISM

- 1.**Metabolism of nucleotides** - Biosynthesis, degradation andregulation of purineandpyrimidinenucleotides, disorders ofpurine and pyrimidinemetabolism.

UNITVIII:NUTRITION

1. **Energy metabolism and nutrition-**
Energyrequirementsin humans,importanceofdietary fats, carbohydrates and proteins, calorific value of foods, respiratory quotient, Basalmetabolicrate(BMR),Specificdynamicaction(SDA),dietaryfibers,balanced diet,glycemicindex,enteralandTotalparenteralnutrition,NutritionalDisorders-Proteinenergy malnutrition (PEM), obesity,atherosclerosis.
2. **Electrolytes,waterbalanceandbodyfluids-**
WaterBalance,sodium,potassium,chloride,magnesium, clinical aspects .
3. **Mineral metabolism** - Major elements and trace elements, clinical conditions resultingfromdeficiencyorexcess of minerals.
4. **Vitamins-** Sources, biochemical functions,RDA, clinical features, role in health anddisease.

UNITIX:HORMONES

1. Classificationofhormones,mechanismofactionofendocrinehormones.
2. Production,transportand storageofhormones,clinicalaspects.

UNITX:STRUCTURE,FUNCTIONANDREPLICATIONOFINFORMATIONALMACROMOLECULES

1. **Nucleotidesandnucleicacids-**
Compositionofnucleotides,syntheticnucleotides,Structure , functions andhigher organisationofDNA, structure, types and functions ofRNA.
2. **Molecular genetics, Recombinant technology and genomic technology-** Principles ofheredity, laws and patterns of inheritance, basic procedures and techniques involved inrecombinantDNAtechnologyandgeneticengineering,applicationsofrecombinanttechnology,DNA hybridization techniques,DNA sequencing.
3. **DNAorganisation,replicationandrepair-**
chromatin,higherorderorganisation,chromosomes, human mitochondrial DNA, cell cycle, DNA recombination, mechanism ofreplication in prokaryotes and eukaryotes, inhibitors, DNA repair mechanisms, diseasesassociatedwith defectiverepair mechanisms.
4. **RNA synthesis-**
Mechanismsofsynthesisinprokaryotesandeukaryotes,inhibitors,modifications,r



reverse transcription.

5. **Protein synthesis and the genetic code**- Characteristic of genetic code, mutations, Wobble hypothesis, mechanism of protein synthesis in prokaryotes and eukaryotes, inhibitors, post-translational processing.
6. **Regulation of gene expression**- Regulation of gene expression in prokaryotes and eukaryotes, gene amplification, epigenetic modifications, motifs.

UNIT XI: INBORN ERROR OF METABOLISM

1. Molecular basis of genetic disease, consequences of genetic disease, diagnosis and treatment of inborn error of metabolism.
2. Prenatal diagnosis, genetic counselling.

UNIT XII: ORGAN FUNCTION TESTS

1. Liver, renal, gastric, adrenal, thyroid, pancreatic function tests, clinical aspects.

UNIT XIII: SPECIAL TOPICS-A

1. **The extracellular matrix (ECM)**- Structural and functional properties of collagen, elastin, and other important proteins of ECM, bone and cartilage, associated diseases of ECM.
2. **Immunochemistry** - Antigen, immune response, antibody diversity, structure, classes and functions of immunoglobulins, transposition of genes, monoclonal antibodies, Major histocompatibility complex (MHC), complement system, vaccines, Paraproteinemia.
3. **Muscle biochemistry** - Protein composition of Skeletal muscle, Mechanism of Muscle Contraction, Source of Energy in Muscle Contraction, Muscle Disorders.
4. **Metabolism of xenobiotics**- Phases of xenobiotic metabolism, effects of xenobiotics.
5. **Body fluids**- Milk, colostrum, cerebrospinal fluid, amniotic fluid, ascitic fluid, pleural fluid, aqueous humor.
6. **Environmental biochemistry** - Air pollutants, toxic substances in food stuffs, neurotoxins, heavy metal poisoning, occupational and industrial hazards, corrosives and irritants, effect of extreme climate conditions on health, diseases associated with environmental pollutants.
7. **Radioisotopes in medicine**- Use of radioisotopes in diagnosis, treatment and research.

UNIT XIV: SPECIAL TOPICS-B

1. **Biochemistry of cancer**- Growth characteristics of cancer cells, carcinogenesis, causes of genetic damage, oncogenes, tumor suppressor genes, apoptosis, biochemical basis of cancer therapy, tumor markers, anticancer drugs, epigenetic mechanisms involved in cancer, clinical aspects.
2. **Biochemistry of AIDS**- Laboratory diagnosis of AIDS.
3. **Biochemistry of aging**- Theories of aging.
4. **Free radicals and antioxidants**- Sources of oxygen radicals in the body, free radical scavenger systems, antioxidants as prooxidants, lipid peroxidation, free radicals and diseases.
5. **Bioinformatics and computational biology**- Genomics, human genome project, bioinformatics and



- genomic resources, identification of proteins.
6. **Evidence based laboratory medicine (EBM)**-
Concept, definition and objectives of EBM, applying principles of EBM in routine practice.
 7. **Acid base balance**- Acids and bases, Henderson-Hasselbalch equation, Buffer systems, regulation of pH, Anion gap, disturbances in acid base balance, clinical aspects.

➤ **Recent advances and developments in the discipline.**

4-PATHOLOGY

Recent Advances Topics

- 1 Antibody-mediated rejection of solid organ allografts.
- 2 The maternal death autopsy.
- 3 Classification and treatment of non-small-cell lung carcinoma.
- 4 Pathology of obesity.
- 5 Stratified medicine for cancer: the role of the histopathologist.
- 6 Mucosal pathology of the gastric cardia and Barrett's esophagus.
- 7 Pathology of regenerative and neoplastic hepatocellular nodules.
- 8 Serrated lesions of colon and rectum.
- 9 An update on the pathology of chronic inflammatory bowel disease.
- 10 Diagnosis and therapy of gastrointestinal MALT lymphoma.
- 11 Medical revalidation for histopathologists.
- 12 Molecular testing for human papillomavirus.
- 13 Tensin in health and disease.
- 14 Pathology in the undergraduate curriculum.
- 15 Primary carcinoma of the salivary gland- Selected Recent Advances.
- 16 Cancer invasion and metastasis- The concept of epithelial mesenchymal transition.
- 17 Matrix metalloproteinases (MMP) in neoplastic progression- Where are we now?
- 18 Osteoarthritis- New concepts
- 19 Cutaneous pseudolymphoma.
- 20 Liquid based cytology for Cervical Screening.
- 21 Pitfall in the diagnoses of soft tissue tumours of childhood.
- 22 Sudden unexpected death in Infancy.
- 23 The Noninvasive or minimally invasive autopsy.
- 24 Bio-terrorism.
- 25 Predictive and prognostic molecular markers in breast cancer.
- 26 Digital photography in histopathology.
- 27 Adult stem cells and transdifferentiation.
- 28 Role of Immunohistochemistry in problematic prostate biopsy.
- 29 Cytokeratin immunostaining profile in diagnostic pathology.



1 **Cell Injury**

- Cause and mechanism: Ischemic, Toxic and Apoptosis.
- Reversible cell injury: Types, morphology, hyaline, fatty change.
- Irreversible cell injury: Types of necrosis, gangrene.
- Calcification: Dystrophic and metastatic.
- Extracellular accumulation: Amyloidosis, classification, pathogenesis, morphology.

2 **Inflammation and repair**

- Acute inflammation: features, causes, vascular and cellular events.
- Morphological variant of acute inflammation.
- Inflammatory cells and mediators.
- Chronic inflammation: causes, types, non-specific and granulomatous with common examples.
- Wound healing by primary and secondary union, factors promoting and delaying the process and complications.

3 **Immunopathology**

- Immunopathology: organization, cells, antibodies and regulation of immune responses.
- Hypersensitivity: types and examples, antibodies and cell-mediated tissue injury with examples.
- Autoimmune disorders like Systemic Lupus Erythematosus.
- Organ transplantation: immunological basis of rejection and graft versus host reaction.

4 **Infectious diseases**

- Mycobacterial diseases: tuberculosis and leprosy.
- Bacterial diseases: pyogenic, typhoid, diphtheria, gram-negative infections, bacillary dysentery, syphilis.
- Viral: polio, herpes, rabies, measles, reagent sial, chlamydial infections.
- Fungal disease and opportunistic infections.
- Parasitic diseases: malaria, filarial, amoebiasis, kala-azar, cysticercosis, hydatid.
- AIDS: etiology, modes of transmission, pathogenesis, pathology, complications, diagnostic procedures and handling of infected materials and health education.

5 **Circulatory disturbances**

- Oedema: pathogenesis and types.
- Chronic venous congestion: lung, liver, spleen.
- Thrombosis and embolism: formation, fate and effects.
- Infarction: types, common sites, gangrene.
- Shock: pathogenesis, types, morphological changes.

6 **Growth disturbances**

- Atrophy, hypertrophy, hyperplasia, hypoplasia, metaplasia, malformation, agenesis, dysplasia.



- Neoplasia: causes, classification, histogenesis, biological behaviour, benign and malignant, carcinoma and sarcoma.
- Malignant neoplasia: grades and stages, local and distant spread.
- Carcinogenesis : Environmental carcinogen, chemical, viral, occupational, hereditary and basics of molecular basis of cancer.
- Tumour and host interaction: systemic effects including paraneoplastic syndrome, tumour immunology.
- Laboratory diagnosis: cytology, biopsy, tumour markers.
- Tumours and tumour like conditions of soft tissues.

7 **Miscellaneous disorders**

- Autosomal and sex-linked disorders with examples.
- Protein energy malnutrition and vitamin deficiency disorders.
- Radiation injuries.
- Disorders of pigments and mineral metabolism such as bilirubin, melanin, haemosiderin.

8 **Haematopathology**

- Anaemia: classification and clinical features.
- Nutritional anaemia: Iron deficiency, folic acid/vit. B12 deficiency anaemia including pernicious anaemia.
- Haemolytic anaemia: classification and investigation.
- Hereditary haemolytic anaemia: thalassemia, sickle cell anaemia, hereditary spherocytosis and G6PD deficiency.
- Acquired Hemolytic anemias : malaria, Kala Azar, Autoimmune, alloimmune, drug induced, microangiopathic.
- Haemostatic disorders: platelet deficiency, ITP, drug induced, secondary.
- Coagulopathies: coagulation factor deficiency, hemophilia, DIC and anticoagulant control.
- Leucocytic disorders: Leucocytosis, leucopenia, leukemoid reaction.
- Acute and chronic leukemia: classification and diagnosis.
- Multiple myeloma and dysproteinemias.
- Blood transfusion: grouping and cross matching and transfusion reactions, transfusion related infections including HIV and hepatitis.
- Myelodysplastic syndrome.
- Myeloproliferative disorders: polycythemia, myelofibrosis.

9 **Cardiovascular Pathology**

- Acute Rheumatic fever : etiopathogenesis and morphological changes and complications including rheumatic heart disease.
- Infective endocarditis : etiopathogenesis and morphological changes and complications.
- Atherosclerosis and ischemic heart disease: myocardial infarction.
- Hypertension and hypertensive heart disease.
- Congenital heart disease: ASD, VSD, Fallot's tetralogy, Bicuspid aortic Valve PDA.
- Pericarditis.

- Cardiomyopathy.

10 **Respiratory Pathology**

- Structure of bronchial tree and alveolar walls, normal and altered in inflammatory diseases of bronchi: chronic bronchitis, bronchiectasis.
- Pneumonias: lobar, broncho, interstitial.
- Lung abscess: etiology, pathogenesis and morphology and complications.
- Pulmonary tuberculosis: primary and secondary, morphologic types including pleuritis.
- Emphysema: type and pathogenesis.
- Tumours: Epithelial Malignant Neoplasms of Lung, Etiology, pathogenesis.

Concepts of obstructive and restrictive lung disorders – Chronic bronchitis, emphysema, Asthma.

- Nasopharyngeal and laryngeal tumors.
- Occupational lung disorders: anthracosis, silicosis, asbestosis, mesothelioma.
- Atelectasis and hyaline membrane disease.

11 **Renal & Urinary tract pathology**

- Basics of impaired function and urinalysis.
- Glomerulonephritis: classification, primary proliferative and nonproliferative, secondary (SLE, polyarteritis, amyloidosis, diabetes mellitus).
- Clinical presentation of renal disorders including nephritic, nephrotic syndrome, acute renal failure, recurrent hematuria, CRF.
- Acute renal failure: acute tubular and cortical necrosis.
- Pyelonephritis, reflux nephropathy, interstitial nephritis.
- Renal cell tumors: renal cell carcinoma, nephroblastoma.
- Urinary bladder: Cystitis, carcinoma.
- Progressive renal failure and end stage renal disease.
- Renal vascular disorders.
- Urinary tract tuberculosis.
- Nephrolithiasis and obstructive nephropathy.
- Renal malformation polycystic kidney.

12 **Pathology of Gastrointestinal tract**

- Oral pathology: leukoplakia, carcinoma of oral cavity and esophagus.
- Peptic ulcer: etiology, pathogenesis and complications, gastritis types.
- Tumors of stomach: benign, polyp, leiomyoma, malignant, adenocarcinoma, other gastric tumors.
- Inflammatory diseases of small intestine: typhoid, tuberculosis, Crohn's disease, appendicitis.
- Inflammatory diseases of large intestine: amoebic colitis, bacillary dysentery, ulcerative colitis.
- Large and small intestine tumors: polyps, carcinoid, carcinoma, lymphoma.



- Pancreatitis.
- Salivary gland tumors.
- Ischemic and pseudomembranous enterocolitis, diverticulitis.
- Malabsorption-coeliac disease, tropical sprue and other causes.
- Pancreatic tumors: endocrine, exocrine and paraneoplastic.

13 **Liver and Biliary tract pathology**

- Jaundice: types, etiopathogenesis and differentiation.
- Hepatitis: acute and chronic, etiology, pathogenesis and pathology.
- Cirrhosis: etiology, classification, pathology, complications.
- Portal hypertension: types and manifestation.
- Diseases of gallbladder: Cholecystitis, cholelithiasis, carcinoma.
- Tumors of liver: hepatocellular, metastatic, tumor markers.

14 **Lymphoreticular System**

- Lymphadenitis: non-specific, granulomatous, Hodgkin's lymphoma.
- Non-Hodgkin's lymphoma, classification, morphology.
- Diseases of spleen: splenomegaly and effects.

15 **Reproductive system**

- Diseases of cervix: cervicitis, cervical carcinoma, etiology, cytological diagnosis.
- Hormonal influences and histological appearances of different phases of menstrual cycles and the abnormality associated with it.
- Diseases of uterus: endometrial hyperplasia and carcinoma, adenomyosis, smooth muscle tumors.
- Trophoblastic diseases: hydatidiform mole and choriocarcinoma.
- Diseases of breast: mastitis, abscess, fibrocystic disease, neoplastic lesions, fibroadenoma, carcinoma, phyllodes tumors.
- Prostate: nodular hyperplasia, carcinoma.
- Ovarian and testicular tumors.
- Carcinoma of penis.
- Pelvic inflammatory disease including salpingitis.
- Genital tuberculosis.

16 **Osteopathology**

- Osteomyelitis: acute, chronic, tuberculosis.
- Metabolic diseases: rickets/osteomalacia, osteoporosis, hyperparathyroidism.
- Tumors: primary, osteosarcoma, osteoclastoma, Ewing's sarcoma, chondrosarcoma, metastatic.
- Arthritis: rheumatoid, osteoid and tuberculosis.
- Healing of fractures.

17 **Endocrine pathology**

- Diabetes mellitus: types, pathogenesis, pathology.
- Non-neoplastic lesion of thyroid: Iodine deficiency goiter, autoimmune thyroiditis.



ditis, thyrotoxicosis, myxoedema.

- Tumors of thyroid : adenoma, carcinoma: papillary, follicular, medullary, anaplastic.
- Adrenal disease: cortical hyperplasia, atrophy, tuberculosis, tumors of cortex and medulla.
- Parathyroid hyperplasia and tumors.

18 Neuropathology

- Inflammatory disorders: pyogenic and tubercular meningitis, brain abscess, tuberculoma.
- CNS tumors- primary glioma and meningioma and metastatic.
- CSF and its disturbances: cerebral edema, raised intracranial pressure.
- Cerebrovascular disease ; atherosclerosis, thrombosis, embolism, aneurysm, hypoxia, infarction and hemorrhage.

19 Dermato-pathology

- Skin tumors: squamous cell carcinoma, basal cell carcinoma, and melanoma, adenexial tumours with common non neoplastic skin diseases.

20 Tumours of soft tissues

- Routine processing & frozen sections.
- Ancillary diagnostic tests, Immunohistochemistry, tumour markers & their interpretation.

21 Molecular genetics

- Hybrid DNA techniques &
- Application in diseases.

22 Cytopathology

- Collection procedures and diagnosis interpretation.
- Exfoliative cytology of body fluids, urinary tracts, female genital tract, amniotic fluid & tears.
- Fine Needle Aspiration Cytology.
- Imprint, crush smear, biopsy sediment cytology.
- Buccal smears for Sex chromatin bodies.

23 Laboratory Hi-tech instruments: Knowledge about

- Tech. Procedures, principles and clinical interpretation of tests using.
- Haematology auto-analysers, Flow-Cytometer, Polymerase chain reaction. (PCR) Electrochemiluminescent immunoassay (ECLIA).
- High performance liquid Chromatography (HPLC).
- Electron Microscope, Phase Contrast Microscope.
- Fluorescent Microscope & Electrophoresis.

24 Rational use & safe Blood Transfusion: Blood banking procedures & preparation of Blood Components with their storage.



➤ **Recent advances and developments in the discipline.**

5-MICROBIOLOGY

GENERAL MICROBIOLOGY

Historical Introduction: Microscopy, Micrometry, Laboratory use & care of instruments in microbiology; Biosafety measures & containment facilities, shipment of microbiological material; Sterilization and Disinfection, Sterility testing, Sterilization indicators; Nomenclature and classification of microorganisms, normal flora of human body, Microbiology of water, milk, air & its application; collection, transportation and processing of clinical specimens for laboratory, diagnosis of infections, various culture media, culture methods, stains and identification tests, maintenance of stock cultures; Care, use & experimental techniques on laboratory animals; Microbial Infections Molecular genetics and microbiological applications.

A. BACTERIOLOGY

Morphology, Physiology, Taxonomy, cultural characteristics, virulence factors, antigenicity & mechanisms of drug resistance in bacteria, Anaerobiosis, Conventional & non-conventional (recent & molecular) methods for detection of bacteria of medical importance viz Gram positive cocci like staphylococci, Streptococci, pneumococci, etc., Gram Negative cocci like Neisseria, peptostreptococci etc. Gram Negative bacilli like Enterobacteriaceae family, Haemophilus Bordetella, Brucella & others including fastidious organisms and Gram positive bacilli like coryne bacterium, Bacillus, Clostridium & Mycobacterium. Tuberculosis and Nontubercular mycobacteria, Mycobacterium leprae, Actinomycetes, Rickettsiaceae, Orientia ehrlichia & Coxiella, Chlamydia and Chlamydophila mycoplasma and ureaplasma, Treponemes, Borrelia, Laptospira other Nonsporanaerobes miscellaneous/rarely encountered bacteria of medical importance; Identification of non-cultivable bacterial pathogens; Mechanisms of drug resistance in bacteria & choice of antibacterial agents.

B. IMMUNOLOGY

Infection and Immunity; Antigen, antibody, complement, Antigen-Antibody reaction with special reference to simple, rapid & automated techniques like ELISA, Immuno chromatography, blotting techniques etc.; Structure and Function of immune system, Immune response, detection methods and application; Hypersensitivity, Immunodeficiency diseases, Autoimmunity; Immunology of transplantation & malignancy, HLA typing & tissue matching techniques; use of monoclonal.

antibodies in disease diagnosis, Immunoprophylaxis, Immunomodulation & Immunotherapy; Immunohaematology, Transfusion transmissible infection (TTI) & use of experimental animals (suckling mice, SCID mice, Nude mice, Knock-out mice etc.) in

immunology.

C. MYCOLOGY

General properties, Nomenclature, classification & Morphology of fungi of medical

importance; Epidemiology, pathogenesis, clinical manifestations, prevention, control & treatment of Fungal infections; Lab diagnosis (Cultural techniques including Slide culture, Scotch tape preparation, Germ tube test, Cornmeal agar inoculation & identification based on morphology, Sugar Fermentation & assimilation tests, Exo-antigen tests as well as non-cultural techniques like serology, animal inoculation, & molecular methods) of various fungal infections viz- coetaneous, subcutaneous, Deep, Systemic and opportunistic mycoses caused by yeasts, yeast-like fungi, hyalohyphomycetes, Phaeohyphomycetes, Phycomycetes & dimorphic fungi; Anti-fungal drugs & in-vitro antifungal susceptibility testing and mechanism of drug resistance.

D. VIROLOGY

General properties, Nomenclature, classification, replication, cultural and non-cultural methods of laboratory diagnosis of various viruses & infections caused by them. Special techniques of virus culture eg-shell vial culture, egg inoculation; collection & transportation & processing of samples for viral disease diagnosis, recent advances in techniques for virus detection; Virus-host interactions, viral genetics & pathogenesis of viral infections caused by various viruses of human importance. viz -DNA viruses, RNA viruses, Bacteriophage Slow Viruses including prions and conventional viruses & oncogenic viruses with special reference to Hepatitis & HIV; miscellaneous viruses, - SARS & corona, zika viruses, Avian influenza virus; Viral haemorrhagic fevers etc. Viral vaccines & antiviral drugs.

E. PARASITOLOGY

General Introduction:

Taxonomy, Host, Host-parasite relationship, transmission epidemiology, lifecycle, pathogenesis, Immunology and laboratory diagnosis and treatment of various parasites of medical importance.

- Introduction to protozoa, General features and classification.
- Amoeba including free living amoeba
- Intestinal Flagellates and Genital Flagellates
- Hemoflagellates
- Malarial parasites and babesia
- Opportunistic coccidian parasites
- Miscellaneous protozoa
- Helminthology: - General characteristics, morphology and lifecycle
- Cestodes
- Trematodes or flukes
- Intestinal Nematodes and nematodes of lower animals
- Somatic nematodes
- Miscellaneous parasite and lab diagnosis

F. APPLIED MICROBIOLOGY, SCOPE & RECENT ADVANCES

Biomedical waste management & techniques for proper disposal of infectious wastes; Monitoring of drug resistance in bacteria especially MRSA, VRSA, VISA, VRE & ESBL production in Gram Negative bacilli; Hospital acquired infections & its control (HAI, HAICC); Epidemiological typing methods & infectious disease outbreak management; Opportunistic infections



with special reference to HIV/ AIDS; Cost effective microbiological diagnostic techniques which are simple & rapid as well; Epidemiology of infectious diseases including anthrax, zoonoses; Biological warfare & Bioterrorism; Gene manipulation, Genetic engineering, Gene cloning, Gene therapy; Infectious agents & cancer association; Emerging & re-emerging infectious diseases; Recent advances in molecular diagnostic methods like PCR, TMA, DNA probe detection etc. Automation, quality control and assurance, antimicrobial therapy and drug resistance including antimicrobial stewardship, New vaccine development against various infectious diseases

- Including all practical techniques related to the above mentioned topics & any other related topic(s) of microbiological interest.

➤ **Recent advances and developments in the discipline.**

6-PHARMACOLOGY

Unit-I-Basic and clinical Pharmacology

- Pharmacology-History & Development.
- Structure activities, relationships & its significance.
- Chemical nomenclature as used in PHARMACOLOGY.
- Passage of drug across biological membranes.
- Absorption and Distribution of drugs: Binding of drugs to Plasma proteins.
- Biotransformation, Excretion of Drugs & Factors affecting these.
- Mechanism of action.
- Drug-Drug interactions & Iatrogenic Disorder.
- Pharmacogenetics.
- Drug addiction and its management.
- Teratogenicity and Carcinogenicity including methods for their study.
- Drug Resistance.

Unit-II-Autonomic Nervous System

- Anatomical and Physiological consideration of A.N.S.
- Cholinergic Agonists and Anti-cholinergic Drugs.
- Neuromuscular blocking agents, Screening of Neuromuscular blocking and Ganglionic blocking agents.
- Anticholinesterase agent and Anticholinesterase Reactivators.
- Receptor mechanism, Adrenergic receptor and their Pharmacological characterization.
- Catecholamine biosynthesis, release and factors affecting these.
- Catecholamine, their Pharmacology and Therapeutics.
- Non Catecholamine Sympathomimetic agents.
- Alfa & Beta adrenergic blocking agents.

Unit-III-CNS & Peripheral Nervous System

- Physiology and Pharmacology of neurohormonal transmission in CNS.
- Pathophysiology and Management of Parkinsonism and other neurodegenerative disorders.
- Preanaesthetic medication and stages of anaesthesia.



- General Anaesthetic agents.
- Local anaesthetic and their screening.
- Opioid receptors Enkephalins and Endorphins.
- Opioid Analgesics and their antagonists.
- Analgesics, Antipyretics and anti-inflammatory agents.
- Antidepressant drugs.
- Antipsychotic drugs and Lithium.
- Sedative & Hypnotics.
- Anti-anxiety drugs.
- Centrally acting muscle relaxants and their screening methods.
- Alcohols.
- CNS Stimulants and cognition enhancers.
- Drug Abuse.
- Antiepileptic drugs.

Unit-IV-Cardiovascular System

- Pathophysiology and treatment of Cardiac Arrhythmias.
- Pathophysiology and treatment of Cardiac failure.
- Pathophysiology and treatment of Ischemic Heart Diseases.
- Anti-hypertensive drugs and treatment of HT.
- Drugs for peripheral vascular disease.

Unit-V-Antimicrobial Agents

- Introduction mechanism of action and principles of Antimicrobial therapy
- Sulphonamides
- Beta-lactams antibiotics
- Tetracyclines and Chloramphenicol
- Aminoglycosides
- Macrolides
- Quinolones and treatment of Urinary tract Infections.
- Antiamoebic Drugs.
- Antimalarial agents
- Anti-Tubercular Drugs
- Anti-Leprotic Drugs
- Antifungal agents
- Antiviral agents
- Anthelmintics
- Antineoplastic Agents
- Miscellaneous antimicrobials.

Unit-VI-Endocrinology

- Androgens and anabolic steroids.
- Adrenal steroids, Sex hormones & Anti-fertility agents.
- Hypothalamic and pituitary hormones.
- Pancreatic hormones.
- Anti-diabetic agents.
- Thyroid and Anti-thyroid drugs.
- Calcium Metabolism & Drugs affecting bone mineralization.
- Drugs acting on the Uterus.

Unit-VII -Renal System

- Diuretics and Antidiuretics.

Unit–VIII -Autacoids

- HistamineandAnti-Histaminics.
- 5-HT,itsAgonistsandAntagonists. Treatmentof Migraine.
- Prostaglandins, LeukotrienesandPlateletsActivatingFactors.
- Ergotalkaloids.

Unit–IX-RespiratorySystem

- TreatmentofCough, Bronchial AsthmaandCOPD.

Unit– X-GastrointestinalSystem

- Treatmentof acidpepticdiseases.
- EmeticsandAntiemetics.
- Drugsforconstipation,DiarroheaandInflammatoryBowelDiseases.

Unit–XI-Blood

- Haematinics,Erythropoietin.
- Coagulantsandanti-coagulants,Antiplatelets&Thrombolytics.
- Hypolipidemicdrugs.
- PlasmaexpandersandPharmacotherapyofshock.

Unit–XII-Miscellaneous Topics

- Antineoplasticagents.
- Immunotherapy.
- GeneTherapy.
- ChelatingAgents.
- Vitamins,Vaccines,Sera, Immunoglobulin.
- DermatologicalPharmacology.
- AntisepticsandDisinfectants.

Unit–XIII-AppliedPharmacology

- Vasoactivepeptides.
- Pharmacoeconomics.
- Pharmacogenetics.
- Pharmacoepidemiology.
- Drugsin sports and Doping test.
- Pharmacogenomics.
- Microdosing.
- AlternativestoAnimalexperiments.
- Roleofbiotechnologyinrecentdrug development.
- Roleoffreeradicalinhealthanddisease.
- Newerdrugdeliverysystem.
- NoblelaureatesinPharmacology.
- Pharmacovigilance

Unit–XIV–BiochemicalPharmacology

- Analyticalmethods in PharmacologyandToxicology.
- Principals involved in identification and quantification of substances by - Chromatography –Spectrophotometry - Flame photometry - Spectro fluoro photometry-HPLC and Gaschromatography-MassSpectrometry.
- Principlesofimmunologicalassays includingRadioimmunoassayandtheir importance.
- Tracertechniquesusingradioactivesubstancesandmeasurements.

Unit–XV–ClinicalPharmacology

- Generalprinciplesof



clinical Pharmacology i.e. dynamics, kinetics, ADR, and factors modifying drug effects.

- Clinical pharmacokinetics concentration effect relationship & parameter, Target concentration strategies, Plateau principles, population pharmacokinetics.
- Therapeutic drug monitoring.
- A.D.R. monitoring and prevention.
- Bioavailability and bioequivalence studies.
- Placebo.
- Design and implementation of clinical trials.
- Clinical drug development studies (Phase 1, 2, 3, 4).
- Drug therapy in extremes of age (Neonate, Elder, Old).
- Drug therapy in pregnancy and lactation.
- Iatrogenic disorder.
- Prescription auditing and critical evaluation of research papers, promotional material etc.
- Ethical and legal aspects in clinical trials and drug therapy.

Unit–XVI–Research Methodology

- Keeping and breeding laboratory animals.
- Regulatory guidelines (CPCSEA) and alternatives to animal experiments.
- Drug development (preclinical and clinical).
- Drug regulations. Preclinical in vitro and in vivo.
- Bioassay and its importance.
- Screening methods in Pharmacology for evaluation of drug activities on A-A.N.S. B-C.N.S (sedatives, hypnotics, psychotropics, anxiolytics, antidepressant, anti-convulsants, local anaesthetics, anti-parkinsonian drugs, NSAIDS, OPIOIDS). C-Respiratory system drugs. D-C,V,S (Anti-anginal, anti-hypertensive, anti-arrhythmic, drugs used in CHF). E-Diuretics screening. F-G.I.T Drugs (Peptic ulcer, emetics and anti-emetics, anti-diarrhoeal agents). G-Oxytocin and tocolytics. H-Hormones (Oral hypoglycemics, screening of fertility and anti-fertility agents).
- Toxicity studies-Acute/sub/chronic toxicity studies in animals.
- Protocol designing and writing of thesis.
- Writing of papers, reports, review of scientific journals.

Unit-XVII– Biostatistics

- Normal distribution, random numbers.
- Mean, mode, median, standard deviation, standard error.
- Z Test and P Values.
- Student's t test (paired and unpaired), chi-square test.
- Non-parameter test for one, two and K sample problems.
- ANOVA.
- Correlation, simple linear regression and multiple linear regression.
- Epidemiological statistics.

➤ **Recent advances and developments in the discipline.**



7-FORENSIC MEDICINE

1. Law in Relation to Medical Man.
2. Legal procedure, Inquest Different types of courts & Powers of different courts, Medico legal Reports, Dying declaration/ Dying Deposition, Medical Witness. Professional secrecy / Privileged communication, Professional Negligence / Contributory negligence Warning Notice/ infamous conduct, vicarious Liability & consent.
3. Medico legal autopsy including Decomposed & mutilated bodies Examination of Skeleton/ Exhumation.
4. Death & Postmortem changes, Modes of death/ sudden Death, Moment of death/ Presumption of Death.
5. Identification of Living & Dead Determination of Race, Sex, Age & their Medico legal aspects, Including fingerprints & DNA Finger Print, Anthropometry, Scars, Tattoos marks, Occupational marks, Intersex & Teeth.
6. Examination of Blood Stains, Seminal stains, Hairs & Fibre Forensic Science Laboratory & Artefacts.
7. Violent Asphyxial Death Including Hanging, Strangulation, Throttling, Suffocation, Drowning, Traumatic Asphyxia, Café coronary.
8. Thermal injuries Including Burns, Scalds, Cold & Heat, Electricity, Lightning & Radiation.
9. Mechanical Injuries & their Medico Legal Aspects; including Ante mortem & post mortem injury, Determination of age of injury.
10. Regional Injuries including skull fracture, Intracranial Haemorrhages, Cerebral concussion, Counter coup injury, Spinal injury chest & Abdominal injury.
11. Impotence & Sterility, Artificial Insemination, Virginity, Signs of Pregnancy & delivery & their Medico legal Aspect.
12. Sexual offences, Rape including – recent changes in the Law of Rape. Un-Natural Sexual offences & Various Sexual perversions.
13. **Natural & Criminal abortion:** MTP Act 1971, PCPNDT Act, Duty of Doctor in criminal abortion, Infanticide – Including Live born, Dead born, Stillborn & Related Tests.
14. **Forensic Psychiatry:** Delirium, Delusion Hallucination, Impulse, Psychosis & Neurosis, I.Q., Mental Health Act 1987, Real & Feigned Mental illness, Restraint of the Mentally ill person, Civil & Criminal Responsibility of Insane.
15. **Forensic Toxicology:** General Considerations, Sale of Poison with Reference to various acts, Dangerous Drugs Act, Classification of Poisons, Action of Poison & its modifications, Diagnosis of poison in Living & Dead, Preservation of Viscera, Duties of Physician in case of suspected poisoning.
16. Corrosive poison, Non-Metallic poison, Metallic Poison & their Medico-legal aspects Including clinical Picture, treatment P.M. findings.
17. Insecticide & Weed killers, Organic irritant Including Snakes Bite Food poisons.
18. Somniferous Poisons including Opium & Derivatives Inebriant Poisons Including Ethyl & Methyl alcohol, Deliriant poison including Dhatura, Cannabis, Cocaine, Drug addiction, Drug dependence, Management of Drug Addict.
19. Cardiac Poison – Aconite & HCN, Spinal Poisons, Asphyxiants – Including CO, Sewer Gases & War Gases.



➤ **Recent advances and developments in the discipline.**

8A-COMMUNITY MEDICINE (Assistant Professor/Assistant Professor, I/c UTHC/RTHC) [Level-11]

- 1 History, Concepts and Practice of Community Medicine, Evolution of Medicine and public health services, principles of Preventive, Social and Community Medicine. Community diagnosis, Mendelian's law & Genetic Diseases and Genetic counseling.
- 2 Concepts of Health and Disease, Dimensions of Health and disease, determinants of health, ecology of health, indicators of health and disease, dynamics of disease transmission, Iceberg phenomenon, levels of prevention and interventions, lifestyle diseases.
- 3 Social and behavioural sciences (Sociology, Social Psychology and Social Anthropology); concepts of society and culture, family and community structure, its characteristics and functions, group dynamics, leadership patterns, social stratification, social changes, urbanization and its problems, principles of learning, process of communication, cultural factors in relation to health and disease, social stress and deviant behaviour, medico-social work, hospital sociology, Health Problems of Urban Slums.
- 4 Introduction of Biostatistics and health statistics; Census and other sources of data; collection and presentation of data; Measures of central tendency, Measures of variability; elementary statistical analysis; tests of significance; sampling and sampling procedures; designing of experimental and community based studies; scope; sources and uses of health; Testing of hypothesis; life table. Correlation and regression analysis, Types of Research Methodology and its importance in Health.
- 5 Applied nutrition; Principles of Nutrition; nutritional requirements; balanced diets; deficiency diseases; nutritional assessment; ecology of malnutrition and approaches to control malnutrition; food toxins; food processing and preservation of various foodstuffs; nutritive value of commonly consumed food articles; diet and diseases; food Additives fortification and enrichment; National programmes related to nutrition. Nutrition monitoring & Surveillance, Food Security Act.
- 6 Personal and environmental health; control of physical and biological environments for prevention of diseases and promotion of health; water; air; humidity; ventilation; light; radiation; noise and housing and their effect on health and preventive measures; meteorological environment and measuring equipment. Assessment of portable water.
Disposal of wastes- Types, methods of collection, Storage and disposal, Safe disposal of Human excreta, municipal waste, camp sanitation. Disposal of E-waste, Global Warming, Pre & Post Exposure Prophylaxis in Health Care.
- 7 Definition – Preparedness and Response to Natural disasters. Types of Disasters.
Response to Disaster, Triage.
National Disaster Management Authority. Impact on Health.
- 8 Classification & Management of Biomedical waste in Hospital and its related legislation.
- 9 Health Education – Objectives, Approaches, Principles and Methods. Communication in Health, its type and mode.



- Counseling in Health.
GATHER approach and its application in related Health and Disease.
- 10 Aims of Epidemiology its uses, epidemiological approaches, rates and ratios; measurement of morbidity and mortality; epidemiological studies; association and causation; infectious disease epidemiology; disease transmission, principles and methods of disease control, investigation of epidemics, IDSP.
 - 11 Immunity; active and passive immunity and immunizing agents, History to recent Development and Adverse events after vaccination, evaluation of vaccine coverage in the community. cold chain, National Immunization schedule.
 - 12 Concepts of screening for disease; uses of screening, types of screening. Evaluation & screening test.
 - 13 Epidemiology of CVD, CHD, DM, HT, cancers, obesity, Blindness & Accidents. National programme related to Non-Communicable Disease.
 - 14 Epidemiology and prevention of communicable disease – Air borne, intestinal arthropod borne infections, Zoonotic disease, surface infections; STD, HIV/AIDS; emerging and re-emerging infectious diseases, Food Poisoning, Parasitic infestations, Hospital Acquired Infection, Criteria for disease Eradication & Elimination, National Programmes related to various communicable disease.
 - 15 Maternal and child health problems; ante-natal, natal and post-natal care; social obstetrics; care of infants and children; low birth weight; infant feeding and weaning; growth and development; care of pre-school children; under five clinic; rights of a child; indicators of MCH care; social Paediatrics; school health services, care of handicapped children; behavioral problems in children; child labour etc., ICDS, NHM, Reproductive and Child Health – IMNCI, School Health Services, Adolescent Health, Gender issues and women empowerment, PCPNDT Act.
PEM & Malnutrition treatment centre.
 - 16 Preventive geriatrics – health problems of aged and remedial measures, Action towards Healthy ageing, National Policy on Older Persons, Geriatrics abuse, Benefits to senior citizens.
 - 17 Demography, Demographic cycle, Demographic Variables and trends, World Population Trend, Population Problem in India, Social Marketing Programmes in Health & Family Welfare, Family Welfare Services – family planning, contraceptive methods, MTP, approaches in family planning etc., National Population Policy, Evaluation of contraceptive methods, fertility indicators.
 - 18 Occupational health – physical, chemical, biological and psychological hazards, principles of prevention, industrial toxicology – lead, arsenic, chromium, mercury and various gases – sulfur dioxide, carbon monoxide, hydrogen sulphide and fluorine, Ergonomics, occupational accidents, sickness absenteeism, Legislation including ESI Act, Social security of woman in Industry.
 - 19 Mental health – types of mental illnesses and prevention; mental health service in India; Alcoholism, Drug dependence & addiction, smoking hazards prevention and legislation.
 - 20 Principles of administration process – planning, management and evaluation, Various Committee, health policy, operational research, Health Management Functions, Supervision as Management tool, PERT, Health Care financing, Management Problems & their solutions.
 - 21 Three tiers system, centre & state health care system.
 - 22 National Health Programmes & policies. Public Health Legislation.



- 23 International and voluntary health agencies and their role in health sector. Global Health Security and International Health Regulations, International Statistical classification of Disease and Related Health Problems, Public health aspect of international travel, Bio-Terrorism, SDG.
- 24 Uses of IT in Community Medicine, Computer Application & Telemedicine.
- 25 Research methodology
- 26 Principles of Epidemiology
- 27 Epidemiologic studies- descriptive, analytical, experimental
- 28 Biostatistics- (i) The scope and Uses of Biostatistics.
(ii) Collection, Classification and Presentation of Statistical Data.
(iii) Analysis and Interpretation of Data.
(iv) Obtaining Information and computing indices (rates and ratio) and making comparisons.
(v) Apply Statistical methods in Designing of Studies.
a. Choosing of appropriate sampling methods and sample size.
b. Applying suitable test of significance.
c. Use of Statistical Tables.
- 29 Association & Causation

➤ **Recent advances and developments in the discipline.**

8B- COMMUNITY MEDICINE (Epidemiologist-Cum-Assistant Professor)

- 1 History, Concepts and Practice of Community Medicine, Evolution of Medicine and public health services, principles of Preventive, Social and Community Medicine. Community diagnosis, Mendelian's law & Genetic Diseases and Genetic counseling.
- 2 Concepts of Health and Disease, Dimensions of Health and disease, determinants of health, ecology of health, indicators of health and disease, dynamics of disease transmission, Iceberg phenomenon, levels of prevention and interventions, lifestyle diseases.
- 3 Social and behavioural sciences (Sociology, Social Psychology and Social Anthropology); concepts of society and culture, family and community structure, its characteristics and functions, group dynamics, leadership patterns, social stratification, social changes, urbanization and its problems, principles of learning, process of communication, cultural factors in relation to health and disease, social stress and deviant behaviour, medico-social work, hospital sociology, Health Problems of Urban Slums.
- 4 Introduction of Biostatistics and health statistics; Census and other sources of data; collection and presentation of data; Measures of central tendency, Measures of variability; elementary statistical analysis; tests of significance; sampling and sampling procedures; designing of experimental and community based studies; scope; sources and uses of health; Testing of hypothesis; life table. Correlation and regression analysis, Types of Research Methodology and its importance in Health.
- 5 Applied nutrition; Principles of Nutrition; nutritional requirements; balanced diets;



- deficiency diseases; nutritional assessment; ecology of malnutrition and approaches to control malnutrition; food toxins; food processing and preservation of various foodstuffs; nutritive value of commonly consumed food articles; diet and diseases; food additives fortification and enrichment; National programmes related to nutrition. Nutrition monitoring & Surveillance, Food Security Act.
- 6 Personal and environmental health; control of physical and biological environments for prevention of diseases and promotion of health; water; air; humidity; ventilation; light; radiation; noise and housing and their effect on health and preventive measures; meteorological environment and measuring equipment. Assessment of portable water.
Disposal of wastes- Types, methods of collection, Storage and disposal, Safe disposal of Human excreta, municipal waste, camp sanitation. Disposal of E waste, Global Warming, Pre & Post Exposure Prophylaxis in Health Care.
- 7 Definition – Preparedness and Response to Natural disasters. Types of Disasters.
Response to Disaster, Triage.
National Disaster Management Authority. Impact on Health.
- 8 Classification & Management of Biomedical waste in Hospital and its related legislation.
- 9 Health Education – Objectives, Approaches, Principles and Methods. Communication in Health, its type and mode.
Counseling in Health.
GATHER Approach and its application in related Health and Disease.
- 10 Aims of Epidemiology its uses, epidemiological approaches, rates and ratios; measurement of morbidity and mortality; epidemiological studies; association and causation; infectious disease epidemiology; disease transmission, principles and methods of disease control, investigation of epidemics, IDSP.
- 11 Immunity; active and passive immunity and immunizing agents, History to recent Development and Adverse events after vaccination, evaluation of vaccine coverage in the community. cold chain, National Immunization schedule.
- 12 Concepts of screening for disease; uses of screening, types of screening. Evaluation & screening test.
- 13 Epidemiology of CVD, CHD, DM, HT, cancers, obesity, Blindness & Accidents. National programme related to Non-Communicable Disease.
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- 15 Maternal and child health problems; ante-natal, natal and post-natal care; social obstetrics; care of infants and children; low birth weight; infant feeding and weaning; growth and development; care of pre-school children; under five clinic; rights of a child; indicators of MCH care; social Paediatrics; school health services, care of handicapped children; behavioral problems in children; child labour etc., ICDS, NHM, Reproductive and Child Health – IMNCI, School Health Services, Adolescent Health, Gender issues and women empowerment, PCPNDT Act.
PEM & Malnutrition treatment centre.
- 16 Preventive geriatrics – health problems of aged and remedial measures,



- Action towards Healthy ageing, National Policy on Older Persons, Geriatrics abuse, Benefits to senior citizens.
- 17 Demography, Demographic cycle, Demographic Variables and trends, World Population Trend, Population Problem in India, Social Marketing Programmes in Health & Family Welfare, Family Welfare Services – family planning, contraceptive methods, MTP, approaches in family planning etc., National Population Policy, Evaluation of contraceptive methods, fertility indicators.
- 18 Occupational health – physical, chemical, biological and psychological hazards, principles of prevention, industrial toxicology – lead, arsenic, chromium, mercury and various gases – sulfur dioxide, carbon monoxide, hydrogen sulphide and fluorine, Ergonomics, occupational accidents, sickness absenteeism, Legislation including ESI Act, Social security of woman in Industry.
- 19 Mental health – types of mental illnesses and prevention; mental health service in India; Alcoholism, Drug dependence & addiction, smoking hazards prevention and legislation.
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- 24 Uses of IT in Community Medicine, Computer Application & Telemedicine.
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(ii) Collection, Classification and Presentation of Statistical Data.
(iii) Analysis and Interpretation of Data.
(iv) Obtaining Information and computing indices (rates and ratio) and making comparisons.
(v) Apply Statistical methods in Designing of Studies.
a. Choosing of appropriate sampling methods and sample size.
b. Applying suitable test of significance.
c. Use of Statistical Tables.
- 29 Association & Causation

➤ **Recent advances and developments in the discipline.**



8C- COMMUNITY MEDICINE(Statistician-Cum-Assistant Professor)

- 1 History, Concepts and Practice of Community Medicine, Evolution of Medicine and public health services, principles of Preventive, Social and Community Medicine. Community diagnosis, Mendelian's law & Genetic Diseases and Genetic counseling.
- 2 Concepts of Health and Disease, Dimensions of Health and disease, determinants of health, ecology of health, indicators of health and disease, dynamics of disease transmission, Iceberg phenomenon, levels of prevention and interventions, lifestyle diseases.
- 3 Social and behavioural sciences (Sociology, Social Psychology and Social Anthropology); concepts of society and culture, family and community structure, its characteristics and functions, group dynamics, leadership patterns, social stratification, social changes, urbanization and its problems, principles of learning, process of communication, cultural factors in relation to health and disease, social stress and deviant behaviour, medico-social work, hospital sociology, Health Problems of Urban Slums.
- 4 Introduction of Biostatistics and health statistics; Census and other sources of data; collection and presentation of data; Measures of central tendency, Measures of variability; elementary statistical analysis; tests of significance; sampling and sampling procedures; designing of experimental and community based studies; scope; sources and uses of health; Testing of hypothesis; life table. Correlation and regression analysis, Types of Research Methodology and its importance in Health.
- 5 Applied nutrition; Principles of Nutrition; nutritional requirements; balanced diets; deficiency diseases; nutritional assessment; ecology of malnutrition and approaches to control malnutrition; food toxins; food processing and preservation of various foodstuffs; nutritive value of commonly consumed food articles; diet and diseases; food additives for fortification and enrichment; National programmes related to nutrition. Nutrition monitoring & Surveillance, Food Security Act.
- 6 Personal and environmental health; control of physical and biological environments for prevention of diseases and promotion of health; water; air; humidity; ventilation; light; radiation; noise and housing and their effect on health and preventive measures; meteorological environment and measuring equipment. Assessment of portable water.
Disposal of wastes- Types, methods of collection, Storage and disposal, Safe disposal of Human excreta, municipal waste, camp sanitation. Disposal of E-waste, Global Warming, Pre & Post Exposure Prophylaxis in Health Care.
- 7 Definition – Preparedness and Response to Natural disasters. Types of Disasters.
Response to Disaster, Triage.
National Disaster Management Authority. Impact on Health.
- 8 Classification & Management of Biomedical waste in Hospital and its related legislation.
- 9 Health Education – Objectives, Approaches, Principles and Methods. Communication in Health, its type and mode.
Counseling in Health.
GATHER Approach and its application in related Health and Disease.
- 10 Aims of Epidemiology its uses, epidemiological approaches, rates and ratios; measurement of morbidity and mortality; epidemiological studies; association and causation; infectious disease epidemiology; disease



- transmission, principles and methods of disease control, investigation of epidemics, IDSP.
- 11 Immunity; active and passive immunity and immunizing agents, History to recent Development and Adverse events after vaccination, evaluation of vaccine coverage in the community. cold chain, National Immunization schedule.
 - 12 Concepts of screening for disease; uses of screening, types of screening. Evaluation & screening test.
 - 13 Epidemiology of CVD, CHD, DM, HT, cancers, obesity, Blindness & Accidents. National programme related to Non-Communicable Disease.
 - 14 Epidemiology and prevention of communicable disease – Air borne, intestinal arthropod borne infections, Zoonotic disease, surface infections; STD, HIV/AIDS; emerging and re-emerging infectious diseases, Food Poisoning, Parasitic infestations, Hospital Acquired Infection, Criteria for disease Eradication & Elimination, National Programmes related to various communicable disease.
 - 15 Maternal and child health problems; ante-natal, natal and post-natal care; social obstetrics; care of infants and children; low birth weight; infant feeding and weaning; growth and development; care of pre-school children; under five clinic; rights of a child; indicators of MCH care; social Paediatrics; school health services, care of handicapped children; behavioral problems in children; child labour etc., ICDS, NHM, Reproductive and Child Health – IMNCI, School Health Services, Adolescent Health, Gender issues and women empowerment, PCPNDT Act. PEM & Malnutrition treatment centre.
 - 16 Preventive geriatrics – health problems of aged and remedial measures, Action towards Healthy ageing, National Policy on Older Persons, Geriatrics abuse, Benefits to senior citizens.
 - 17 Demography, Demographic cycle, Demographic Variables and trends, World Population Trend, Population Problem in India, Social Marketing Programmes in Health & Family Welfare, Family Welfare Services – family planning, contraceptive methods, MTP, approaches in family planning etc., National Population Policy, Evaluation of contraceptive methods, fertility indicators.
 - 18 Occupational health – physical, chemical, biological and psychological hazards, principles of prevention, industrial toxicology – lead, arsenic, chromium, mercury and various gases – sulfur dioxide, carbon monoxide, hydrogen sulphide and fluorine, Ergonomics, occupational accidents, sickness absentism, Legislation including ESI Act, Social security of woman in Industry.
 - 19 Mental health – types of mental illnesses and prevention; mental health service in India; Alcoholism, Drug dependence & addiction, smoking hazards prevention and legislation.
 - 20 Principles of administration process – planning, management and evaluation, Various Committee, health policy, operational research, Health Management Functions, Supervision as Management tool, PERT, Health Care financing, Management Problems & their solutions.
 - 21 Three tiers system, centre & state health care system.
 - 22 National Health Programmes & policies. Public Health Legislation.
 - 23 International and voluntary health agencies and their role in health sector. Global Health Security and International Health Regulations, International Statistical classification of Disease and Related Health Problems, Public health aspect of international travel etc., Bio-Terrorism, SDG.
 - 24 Uses of IT in Community Medicine, Computer Application & Telemedicine.



- 25 Research methodology
- 26 Principles of Epidemiology
- 27 Epidemiologic studies- descriptive, analytical, experimental
- 28 Biostatistics- (i) The scope and Uses of Biostatistics.
 (ii) Collection, Classification and Presentation of Statistical Data.
 (iii) Analysis and Interpretation of Data.
 (iv) Obtaining Information and computing indices (rates and ratio) and making comparisons.
 (v) Apply Statistical methods in Designing of Studies.
 a. Choosing of appropriate sampling methods and sample size.
 b. Applying suitable test of significance.
 c. Use of Statistical Tables.
- 29 Association & Causation

➤ **Recent advances and developments in the discipline.**

8D- COMMUNITY MEDICINE (LADY MEDICAL OFFICER)

- 1 History, Concepts and Practice of Community Medicine, Evolution of Medicine and public health services, principles of Preventive, Social and Community Medicine. Community diagnosis, Mendelian's law & Genetic Diseases and Genetic counseling.
- 2 Concepts of Health and Disease, Dimensions of Health and disease, determinants of health, ecology of health, indicators of health and disease, dynamics of disease transmission, Iceberg phenomenon, levels of prevention and interventions, lifestyle diseases.
- 3 Social and behavioural sciences (Sociology, Social Psychology and Social Anthropology); concepts of society and culture, family and community structure, its characteristics and functions, group dynamics, leadership patterns, social stratification, social changes, urbanization and its problems, principles of learning, process of communication, cultural factors in relation to health and disease, social stress and deviant behaviour, medico-social work, hospital sociology, Health Problems of Urban Slums.
- 4 Introduction of Biostatistics and health statistics; Census and other sources of data; collection and presentation of data; Measures of central tendency, Measures of variability; elementary statistical analysis; tests of significance; sampling and sampling procedures; designing of experimental and community based studies; scope; sources and uses of health; Testing of hypothesis; life table. Correlation and regression analysis, Types of Research Methodology and its importance in Health.
- 5 Applied nutrition; Principles of Nutrition; nutritional requirements; balanced diets; deficiency diseases; nutritional assessment; ecology of malnutrition and approaches to control malnutrition; food toxins; food processing and preservation of various foodstuffs; nutritive value of commonly consumed food articles; diet and diseases; food Additives fortification and enrichment; National programmes related to nutrition.



- on.Nutrition monitoring&Surveillance,FoodSecurityAct.
- 6 Personalandenvironmentalhealth;controlofphysicalandbiologicalenvironment
s for prevention of diseases and promotion of health; water;
air;humidity;ventilation;light;radiation;noiseandhousingandtheireffectonheal
thandpreventivemeasures;meteorologicalenvironmentandmeasuringequipme
nt.Assesmentof portable water.
Disposal of wastes- Types, methods of collection, Storage and disposal,
Safedisposal of Human excreta, municipal waste, camp sanitation. Disposal
of Ewaste,Global Warming, Pre&Post ExposureProphylaxisinHealth Care.
 - 7 Definition – Preparedness and Response to Natural disasters.Types of
Disasters.
ResponsetoDisaster,Triage.
NationalDisasterManagementAuthority.ImpactonHealth.
 - 8 Classification&ManagementofBiomedicalwasteinHospitalanditsrelatedlegislati
on.
 - 9 Health Education – Objectives, Approaches, Principles and
Methods.CommunicationinHealth,its type andmode.
Counselingin Health.
GATHERapproachanditsapplicationinrelatedHealthandDisease.
 - 10 Aims of Epidemiology its uses, epidemiological approaches, rates and
ratios;measurement of morbidity and mortality; epidemiologicalstudies;
associationand causation; infectious disease epidemiology; disease
transmission, principlesand methods
ofdiseasecontrol,investigationofepidemics,IDSP.
 - 11 Immunity;activeandpassiveimmunityandimmunizingagents,Historytorecents
Development and Adverse events after vaccination, evaluation of
vaccinecoverageinthecommunity. cold chain,National Immunizationschedule.
 - 12 Conceptsofscreeningfordisease;usesofscreening,typesofscreening.Evaluation
&screeningtest.
 - 13 Epidemiology of CVD, CHD, DM, HT, cancers, obesity, Blindness &
Accidents.Nationalprogramme relatedto Non-Communicable Disease.
 - 14 Epidemiology and prevention of communicable disease – Air borne,
intestinalarthropodborneinfections,Zoonosticdisease,surfaceinfections;STD,H
IV/AIDS;emergingandreemerginginfectiousdiseases,FoodPoisoning,Parasitici
nfestations,HospitalAcquiredInfection,CriteriasfordiseaseEradication&Elimina
tion,NationalProgrammesrelatedtovariouscommunicabledisease.
 - 15 Maternal and child health problems; ante-natal, natal and post-natal care;
socialobstetrics; care of infants and children; low birth weight; infant
feeding andweaning; growth and development; care of pre-school children;
under five
clinic;rightsofachild;indicatorsofMCHcare;socialPaediatrics;schoolhealthservi
ces, care of handicapped children; behavioral problems in children;
childlabouretc.,ICDS,NHM,ReproductiveandChildHealth–
IMNCI,SchoolHealthServices,AdolescentHealth,Genderissuesandwomenemppo
werment,PCPNDTAct.
PEM&Malnutritiontreatment centre.
 - 16 Preventive geriatrics – health problems of aged and remedial measures,
Actionstowards Healthy ageing, National Policy on Older Persons,
Geriatricsabuse,Benefitstosenior citizens.
 - 17 Demography, Demographic cycle, Demographic Variables and trends,
WorldPopulationTrend,Population ProbleminIndia,SocialMarketing
Programmes in



- Health&FamilyWelfare,FamilyWelfareServices–
familyplanning,contraceptivemethods,MTP,approachesinfamilyplanningetc.,N
ationalPopulationPolicy,Evaluationofcontraceptivemethods,fertiligyindicators.
- 18 Occupational health – physical, chemical, biological and psychological
hazards,principles of prevention, industrial toxicology-lead, arsenic,
chromium, mercuryand various gases – sulfur dioxide, carbon monoxide,
hydrogen sulphide andfluorine, Ergonomics, occupational accidents, sickness
absentism, Legislationincluding ESIAct,Socialsecurityofwomanin Industry.
- 19 Mental health – types of mental illnesses and prevention; mental health
service inIndia; Alcoholism, Drug dependence & addiction, smoking hazards
preventionand legislation.
- 20 Principles of administration process – planning, management and
evaluation,VariousCommittee,healthpolicy,operationalresearch,HealthManag
ementFunctions,SupervisionasManagementtool,PERT,HealthCarefinancing,M
anagement Problems&theirsolutions.
- 21 Threetiersystem,centre&statehealthcaresystem.
- 22 NationalHealthProgrammes&policies.PublicHealthLegislation.
- 23 International and voluntary health agencies and their role in health sector.
GlobalHealth Security and International Health Regulations, International
Statisticalclassification of Disease and Related Health Problems, Public
health aspect ofinternationaltravellerss.,Bio-Terrorism,SDG.
- 24 UsesofITinCommunityMedicine,ComputerApplication &Telemedicine.
- 25 Research methodology
- 26 Principles of Epidemiology
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- 28 Biostatistics- (i) The scope and Uses of Biostatistics.
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making comparisons.
(v) Apply Statistical methods in Designing of Studies.
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c. Use of Statistical Tables.
- 29 Association & Causation

➤ **Recent advances and developments in the discipline.**



9-GENERAL MEDICINE

I. BASICSOFMEDICINE

- DecisionmakinginClinicalmedicine.
- Safetyand qualityofHealth Care.
- Promotinggoodhealth.
- EthicalissuesinClinicalMedicine.
- PrinciplesofClinicalPharmacology.
- Pharmacogenomics.
- Therapeutics&goodprescription.
- IntegrativeHealthPractices.
- InformationTechnologyinHealthCare.
- Lifestylediseases.

II. INFECTIOUSDISEASES

- Clinicalsyndromes-Communityacquiredinfections.
- Healthassociatedinfections.
- Diseasescaused byGram positive Bacteria.
- DiseasescausedbyGramNegativeBacteria.
- MycobacterialDiseases.
- FungalDiseasesandtheirTreatment.
- SpirochetalDiseases.
- RickettsialDiseases-Chlamydia/Mycoplasma.
- TherapyforBacterialDiseases.
- MiscellaneousBacterialinfections.

III. INFECTIOUSDISEASES

- Infectiondueto DNAvirus.
- InfectionduetoRNAvirus.
- InfectionduetoImmunodeficiencyvirus.
- ProtozoalInfection.
- HelminthicInfestation.
- Arthropod&RodentBorneDiseases.
- PrinciplesofInfectiousDisease.
- SexuallyTransmittedDisease.
- Infectionsdueto Human Immunodeficiencyvirus&otherRetro Virus.
- EvaluationofPyrexiaofunknownorigin.

IV. GERIATIC&WOMENHEALTH CARE

- Biologyofageing.
- MedicalDisordersofPregnancy.
- PalliativeandEndof Lifecare.
- Practiceof FamilyMedicine.
- ClinicalProblemsassociatedwithageingprocess.
- GeriatricGiants.
- DisorderduringAdolescence.
- SarcopenicObesity.
- Frailityin Elderly.
- Women&LeadershipinMedicine.



V. DISORDERS OF CARDIOVASCULAR SYSTEM

- Approach to Patient of Cardiovascular Diseases.
- Heart Failure.
- Valvular Heart Diseases.
- Congenital Heart Diseases.
- Peripheral Vascular Diseases & Hypertension.
- Coronary Heart Diseases.
- Noninvasive cardiac Imaging.
- Bradyarrhythmias.
- Tachyarrhythmias.
- Cardiomyopathy & myocarditis.

VI. RESPIRATORY SYSTEM

- Approach to Patient with Respiratory Diseases.
- Occupational & Environmental Lung Diseases.
- COPD & Asthma.
- Interstitial Lung Diseases.
- Diseases of Pleura & Mediastinum.
- Disorders of Ventilation.
- Sleep Apnoea.
- Lung Transplant.
- Diagnostic Procedures in Respiratory Diseases.
- Hypersensitivity Pneumonias.
- Bronchiectasis & Cystic Fibrosis.

VII. CRITICAL CARE MEDICINE

- Approach to Patient with Critical Illness And Clinical procedures .
- Acute Respiratory Distress Syndrome.
- Respiratory Failure.
- Mechanical Ventilatory Support.
- Shock & Management.
- Cardiac Arrest & Sudden Cardiac Death.
- Coma.
- Hypertensive Crisis.
- Acid Base Disorder.
- Fluid & Electrolyte Balance.

VIII. DISORDER OF KIDNEY & URINARY TRACT

- Acute Kidney Injury.
- Chronic Kidney Disease.
- Dialysis.
- Renal Transplant.
- Glomerular Disease.
- Tubulointerstitial Disease.
- Vascular Injury to Kidney.
- Diabetes Insipidus.
- Renal Tubular Acidosis.
- Bone & Mineral Metabolism.

IX. DISORDER OF G.I. SYSTEM

- Approach to G.I. Disease & Liver Disease.
- G.I. Endoscopy.



- Disease of Stomach & Esophagus.
- Disorder of Absorption.
- Inflammatory Bowel Diseases.
- Irritable Bowel Syndrome.
- Viral Hepatitis & Toxic Hepatitis.
- Evaluation of Liver Function.
- Alcoholic Liver Disease.
- Non-Alcoholic Fatty Liver Disease.

X. RHEUMATOLOGY

- Immune System in Health & Disease.
- Anaphylaxis – Urticaria/ Angioedema.
- Autoimmune Disorders.
- SLE & Antiphospholipid Syndrome.
- Spondyloarthritides.
- Vasculitis Syndrome.
- Inflammatory myopathies.
- Scleroderma & related disorders.
- Rheumatoid Arthritis.
- Disorder of Joint and adjacent tissues.

XI. ENDOCRINOLOGY

- Approach to Endocrine Disorders.
- Disorders of Neurohypophysis.
- Pituitary Disorders.
- Thyroid and Parathyroid Gland Disorders.
- Adrenal Gland Disorders.
- Autoimmune Polyendocrine Syndrome.
- Disorder of Sex Development.
- Disorder of Male Reproductive System.
- Disorder of Female Reproductive System.
- Menopause & Postmenopausal Hormone Therapy.

XII. DIABETES MELLITUS & METABOLIC SYNDROME

- Pancreatitis (Acute and Chronic)
- Obesity
- Metabolic Syndrome
- Diabetes Mellitus – Diagnoses & Classification
- Gestational Diabetes Mellitus
- Management and Therapies of DM
- Complications of DM
- Lipoprotein Metabolism
- Disorder of Intermediary Metabolism
- Hypoglycemia

XIII. NEUROLOGY-I

- Approach to Diseases of Nervous System.
- Neuroimaging.
- Seizures & Epilepsy.
- Cerebrovascular Accidents.
- Migraine & other Headaches.
- Alzheimer's Diseases & Dementias.



- Parkinson's Diseases.
- Movement disorders.
- Motor Neuron Diseases.
- Multiple Sclerosis.

XIV. NEUROLOGY-II

- Autonomic Nervous System.
- Diseases of Cranial Nerves.
- Diseases of Spinal Cord.
- Infection in Neurology.
- Peripheral Neuropathies.
- Neuro Muscular Junction Disorders.
- Muscle Diseases.
- Chronic Fatigue Syndrome.
- Psychiatric Disorders.
- Drugs & Alcohol Dependence.

XV. HAEMATOLOGY

- Stem Cells & Transplant.
- Hypoproliferative & Nutritional Anaemia.
- Hemoglobinopathies & Hereditary Anaemia.
- Bone marrow Failure & Myelodysplasia.
- Polycythemia Vera & Myeloproliferative Disorders.
- Transfusion Biology.
- Coagulation Disorders.
- Arterial & Venous Thrombosis.
- Antiplatelets, Anticoagulant & Fibrinolytic Drugs.
- Haemolytic Anaemia.

XVI. ONCOLOGY

- Acute Leukemias.
- Chronic Leukemias.
- Lymphomas.
- Plasma Cell Disorders.
- Oncology Emergencies.
- Principles of Cancer Therapies.
- Solid Tumors.
- Paraneoplastic Syndrome.
- Carcinoma of Unknown Primary.
- Cancer Genetics.

XVII. POISONING, ENVIRONMENTAL & GENETIC DISEASES

- Heavy Metal Poisoning & Drug overdose.
- Medical Terrorism.
- Snake Bite.
- Altitude Illnesses.
- Thermoregulatory Disorders.
- Fetal Origin of adult Diseases.
- Organophosphorus, Cephalos & Other Poisoning.
- Radiation Hazards.
- Microbial Genome & Infectious Diseases.
- Practice of Genetics in Clinical Medicine.

XVIII. RECENT ADVANCES & MISCELLANEOUS



- Adult Immunization.
- Sports & Travel Medicine.
- Diet in Medical Disorders.
- Research Methodology & Ethics of Clinical Research.
- Exercise & Yoga in Health Diseases.
- Medical Evaluation of Surgical Patients.
- Role of Epigenetics in Disease & Treatment.
- Role of Circadian Biology in Health & Diseases.
- Emerging Neurotherapeutic Technologies.
- Telomere Diseases & Other Recent Advances.

➤ **Recent advances and developments in the discipline.**

10-TUBERCULOSIS & RESPIRATORY DISEASES

Unit-I

- History of Pulmonary Medicine and Tuberculosis with emphasis on Indian contribution.

Unit-II

- Development (embryology) growth and structure of normal lung.
- Physiological principles of normal lung functions.
- Lungs in different physiological states e.g. exercise, pregnancy, ageing, high altitude, diving etc.
- Congenital anomalies of Lung.

Unit-III

- Immunology, microbiology and various pharmacological aspects pertaining to respiratory diseases, Pharmacovigilance.

Unit-IV

- Approach to a patient with respiratory symptoms and signs diagnostic procedures in respiratory disorders (radiographic imaging, interventional radiology, nuclear imaging, pulmonary function testing, arterial blood gas analysis, bronchoscopy and thoracoscopy, EBUS, Fenotest, Bronchoprovocation test, aerosol therapy).

Unit-V

Pulmonary infections

- Acute/chronic respiratory tract infections, including viral Pneumonia-(swine flu).
- Pneumonia-Community and hospital acquired.
- Pneumonia in immunocompromised patients.
- Non-resolving pneumonia.
- Lung abscess.
- Bronchiectasis.

Unit-VI

Obstructive airway disease

- Chronic obstructive airway disease.
- Bronchial asthma.

- Bronchiolitis.
- CysticFibrosis.
- Bullousdiseaseofthelung.

Unit-VII

Tumorsof thelungs

- Neoplasticandnon-neoplastic diseasesoflung.
- Solitarypulmonarynodule
- PleuralMesothelioma.

Unit-VIII

Smoking

- Practices,Epidemiology, illeffectsandcessation.

Unit-IX

DiffuseInterstitialLungDiseases.

- Idiopathicandnonidiopathicpulmonaryfibrosis.

Unit-X

- OccupationalPulmonaryDisordersincludingorganicandinorganicdustexposure.
- Airpollutionincluding indoorairpollution.
- Healthimpactsofglobal warming.

Unit-XI

- Druginducedpulmonarydisordersincludingradiationinducedinjury.
- Druginducedrespiratoryemergencies.

Unit-XII

PulmonaryCirculatoryDisorders

- Pulmonaryhypertensionandcorpulmonale.
- Acuterespiratorydistress syndrome.
- Pulmonarythromboembolicdiseases andinfarction.
- Pulmonaryarterio-venousmalformations.

Unit-XIII

Immunologicaldisorders

- Sarcoidosis.
- Hypersensitivitypneumonitis.
- Eosinophiliclungdisorders.
- Pulmonaryvasculiticdisorders.
- Connectivetissuediseases involvingthe respiratorysystem.

Unit-XIV

AlveolarDiseases

- Alveolarhemorrhage (PrimaryandSecondary).
- Pulmonaryalveolar proteinosis.
- Alveolarmicrolithiasis.

Unit-XV

Tuberculosis

- Immunologyandetiopathogenesis.
- Diagnosticmethods-
conventionalandnewertechnique(CBNAAT,LPA,MGIT,BACTEC,MODS.)
- Differentialdiagnosis.
- Management ofpulmonarytuberculosis.
- Complicationsintuberculosisanditsmanagement.



- Tuberculosis in children and geriatric tuberculosis.
- Miliary and disseminated tuberculosis.
- Mycobacteria other than tuberculosis (MOTT).
- Extra pulmonary tuberculosis- lymph node, pleural, pericardial, genitourinary, intestinal, osteoarticular, CNS and skin.
- HIV and TB.
- Prevention and management of MDR and XDR tuberculosis.
- Diabetes mellitus and TB.
- Pneumoconiosis and TB.
- Treatment of TB in special situations, including MDR.
- Control of tuberculosis including RNTCP, DOTS & DOTS PLUS.
- BCG vaccination and Mantoux testing.
- National tuberculosis Elimination program (NTEP).
- Tuberculosis Notification.

Unit-XVI

Diseases of the Mediastinum

- Developmental disorders.
- Benign and malignant (primary and secondary) neoplasms of lung.

Unit-XVII

Disorders of the pleura

- Pleural dynamics and effusion.
- Non-neoplastic and neoplastic pleural diseases.
- Pneumothorax, Hemothorax and Chylothorax.
- Pyothorax and broncho-pleural fistula.
- Management of pleural diseases.

Unit-XVIII

Critical Care in Pulmonary Medicine

- Principle of critical care medicine.
- Non-invasive ventilation.
- Invasive Mechanical ventilatory support.

Unit-XIX

Extrapulmonary manifestations of pulmonary diseases

Unit-XX

- Surgical aspects in respiratory diseases including VATS and Pleuroscopy, Pre and Post operative evaluation of thoracic surgical patient.

Unit-XXI

- Depositional and infiltrative disorders.
- Histiocytosis X.
- Lymphangioleiomyomatosis.
- Inborn errors of metabolism pertaining to lungs.

Unit-XXII

Sleep-related pulmonary diseases

- Physiology of sleep.
- Diagnostic Polysomnography.
- Management of obstructive sleep apnoea.
- Other sleep-disordered breathing syndromes.



Unit-XXIII

- Diseases of the diaphragm.

Unit-XXIV

- Disorders of chest wall.

Unit-XXV

- Lung transplantation.

Unit-XXVI

- Preventive Pulmonology -
Prevention of airborne infection and vaccination in pulmonary diseases.

Unit-XXVII

- Current trends, Recent advancement in field of tuberculosis, Respiratory medicine including, Laser therapy, Coiling treatment of emphysema, Cryobiopsy, Bronchial, Thermoplasty, Bronchial artery embolisation, Pulmonary Rehabilitation Programme, Palliative care in case of lung malignancy & ILD.

➤ Recent advances and developments in the discipline.

11-DERMATOLOGY, VENEREOLOGY & LEPROSY

Unit I

History, Structure and Function of the Skin, Histopathology of the Skin : General Principles, Diagnosis of Skin Disease, Epidemiology of Skin Disease, Genetics and the Skin, Inflammation, Immunology and Allergy, Photobiology, Cutaneous Response to Injury and Wound Healing, Psychological and Social Impact of Long-term Dermatological Conditions, Adverse Immunological Reaction to Drugs, Topical Drug Delivery, Clinical Pharmacology.

Unit II

Principles of Holistic Management of Skin Disease, Principles of Measurement and Assessment in Dermatology, Principles of Evidence-based Dermatology, Principles of Topical Therapy, Principles of Systemic Therapy, Principles of Skin Surgery, Principles of Phototherapy, Principles of Photodynamic Therapy, Principles of Cutaneous Laser Therapy, Principles of Radiotherapy.

Unit III

Viral Infections, Bacterial Infections, Mycobacterial Infections, Leprosy, Syphilis and Congenital Syphilis, Other Sexually Transmitted Bacterial Diseases, HIV and the Skin, Fungal Infections, Parasitic Diseases, Arthropods.

Unit IV

Psoriasis and Related Disorders, Pityriasis Rubra Pilaris, Lichen Planus and Lichenoid Disorders, Graft-versus-host Disease, Eczematous Disorders, Seborrheic Dermatitis, Atopic Eczema, Urticaria, Recurrent Angio-oedema without Weals, Urticarial Vasculitis,



Autoinflammatory Diseases Presenting in the Skin, Mastocytosis, Reactive Inflammatory Erythemas, Adamantiades-Behçet Disease, Neutrophilic Dermatoses, Immunobullous Diseases, Lupus Erythematosus, Antiphospholipid Syndrome, Dermatomyositis, Mixed Connective Tissue Disease, Dermatological Manifestations of Rheumatoid Disease, Systemic Sclerosis, Morphoea and Allied Scarring and Sclerosing Inflammatory Dermatoses.

Unit V

Cutaneous Amyloidoses, Cutaneous Mucinoses, Cutaneous Porphyrias, Calcification of the Skin and Subcutaneous Tissue, Xanthomas and Abnormalities of Lipid Metabolism and Storage, Nutritional Disorders Affecting the Skin, Skin Disorders in Diabetes Mellitus.

Unit VI

Inherited Disorders of Carnification, Inherited Acantholytic Disorders, Ectodermal Dysplasias, Inherited Hair Disorders, Genetic Defects of Nails and Nail Growth, Genetic Disorders of Pigmentation, Genetic Blistering Diseases, Genetic Disorders of Collagen, Elastin and Dermal Matrix, Disorders Affecting Cutaneous Vasculature, Genetic Disorders of Adipose Tissue, Congenital Naevi and Other Developmental Abnormalities Affecting the Skin, Chromosomal Disorders, Poikiloderma Syndromes, DNA Repair Disorders with Cutaneous Features, Syndromes with Premature Ageing, Hamartoneoplastic Syndromes, Inherited Metabolic Diseases, Inherited Immunodeficiency.

Unit VII

Pruritus, Prurigo and Lichen Simplex, Mucocutaneous Pain Syndromes, Neurological Conditions Affecting the Skin, Psychodermatology and Psychocutaneous Disease.

Unit VIII

Acquired Disorders of Epidermal Keratinization, Acquired Pigmentary Disorders, Acquired Disorders of Hair, Acne, Rosacea, Hidradenitis Suppurativa, Other Acquired Disorders of the Pilosebaceous Unit, Disorders of the Sweat Glands, Acquired Disorders of the Nails and Nail Unit, Acquired Disorders of Dermal Connective Tissue, Granulomatous Disorders of the Skin, Sarcoidosis, Panniculitis, Other Acquired Disorders of Subcutaneous Fat.

Unit IX

Purpura, Cutaneous Vasculitis, Dermatoses Resulting from Disorders of the Veins and Arteries, Ulceration Resulting from Disorders of the Veins and Arteries, Disorders of the Lymphatic Vessels, Flushing and Blushing.

Unit X

Dermatoses of the Scalp, Dermatoses of the External Ear, Dermatoses of the Eye, Eyelids and Eyebrows, Dermatoses of the Oral Cavity and Lips, Dermatoses of the Male Genitalia, Dermatoses of the Female Genitalia, Dermatoses of Perineal and Perianal Skin, Cutaneous Complications of Stomas and Fistulae, Dermatoses of Pregnancy, Dermatoses of the Neonate, Dermatoses and Haemangiomas of Infancy.

Unit XI

Benign Cutaneous Adverse Reactions to Drugs, Severe Cutaneous Adverse Reactions to Drugs, Cutaneous Side Effects of Chemotherapy and



Radiotherapy, Dermatoses Induced by Illicit Drugs, Dermatological Manifestations of Metal Poisoning, Mechanical Injury to the Skin, Pressure Injury and Pressure Ulcers, Cutaneous Reactions to Cold and Heat, Burns and Heat Injury, Cutaneous Photosensitivity Diseases, Allergic Contact Dermatitis, Irritant Contact Dermatitis, Occupational Dermatology, Stings and Bites.

Unit XII

Benign Melanocytic Proliferations and Melanocytic Naevi, Benign Keratinocytic Acanthomas and Proliferations, Cutaneous Cysts, Lymphocytic Infiltrates, Cutaneous Histiocytoses, Soft-tissue Tumours and Tumour-like Conditions, Tumours of Skin Appendages, Kaposi Sarcoma, Cutaneous Lymphomas, Basal Cell Carcinoma, Squamous Cell Carcinoma and its Precursors, Melanoma, Melanoma Clinicopathology, Melanoma Surgery, Systemic Treatment of Melanoma, Dermoscopy of Melanoma and Naevi, Merkel Cell Carcinoma, Skin Cancer in the Immunocompromised Patient.

Unit XIII

Cutaneous Markers of Internal Malignancy, The Skin and Disorders of the Haematopoietic and Immune Systems, The Skin and Endocrine Disorders, The Skin and Disorders of the Heart, The Skin and Disorders of the Respiratory System, The Skin and Disorders of the Digestive System, The Skin and Disorders of the Kidney and Urinary Tract, The Skin and Disorders of the Musculoskeletal System.

Unit XIV

Skin Ageing, Cosmeceuticals, Soft Tissue Augmentation (Fillers), Aesthetic Uses of Botulinum Toxins, Chemical Peels, Lasers and Energy-based Devices, Platelet-rich plasma PRP and PRFM, Autoinoculation.

➤ **Recent advances and developments in the discipline.**

12-PSYCHIATRY

UNIT-I

Human Development throughout the Lifecycle

Death, Dying, and Bereavement. Concept of normality, Mind-the evolving concepts.

The Brain and Behavior

Functional and Behavioral Neuroanatomy, Neurophysiology and Neurochemistry, Neuroimaging, Electrophysiology, Psychoneuroendocrinology, Psychoneuroimmunology, Chronobiology and Neurogenetics.

Contributions of the Psychosocial Sciences

Jean Piaget, Attachment Theory, Learning Theory, Aggression, Sociology and Ethology, Anthropology and Cross-

Cultural Psychiatry, Memory, Epidemiology, Biostatistics and Research Methodology.

Clinical Neuropsychological

Testing. Theories of Personality and Psychopathology

Sigmund Freud: Founder of Classic Psychoanalysis, Erik Erikson, Schools derived from Psychoanalysis and Psychology.



UNIT-II

Clinical Examination of the Psychiatric patient. Signs and Symptoms in Psychiatry.

Symptoms

Classification in Psychiatry

Psychiatric Classification, DSM-V & ICD-10, ICD-11 (Draft).

UNIT-III

Delirium, Dementia, Amnesic and Other Cognitive Disorders. Mental Disorders Due to a General Medical Condition.

Cognitive Disorders Introduction and

Overview, Delirium, Dementia, Amnesic disorders, Other Cognitive Disorders and Mental Disorders Due to General Medical Condition.

Substance-Related Disorders

Substance-Related Disorders: Introduction and Overview.

UNIT-IV

Schizophrenia and Other Psychotic Disorders

Concept of Schizophrenia, Scope of the Problem, Genetics, Environmental Epidemiology, Developmental Models of Schizophrenia, Neuroimaging, Linking Neuropsychiatric Manifestations to Neurobiology and Neuropathology of Schizophrenia. Clinical Features and Psychopathology, Psychosocial, Somatic, Psychiatric Rehabilitation and Integrative

Treatment. Functional Outcomes, Schizophrenia Spectrum Pathology and Treatment, Other Psychotic Disorders, Acute and Transient Psychotic Disorders, Brief Psychotic Disorder,

Schizophreniform Disorder, Delusional Disorder and Shared Psychotic Disorder, Schizoaffective Disorder, Postpartum Psychosis, Culture-Bound Syndromes with Psychotic Features,

Psychosis N.O.S., Treatment of Other Psychotic Disorders. Special Issues in Early Detection and Intervention.

UNIT-V

Mood Disorders

Historical, Introduction, Conceptual Overview, Epidemiology, Genetics, Neurobiology, Intrapsychic and Interpersonal Aspects, Clinical Features. Management of Depression, Mania and Bipolar Disorders and Psychotherapy.

UNIT-VI

Anxiety Disorders (Including Panic disorder, Agoraphobia, Phobias, OCD, PTSD, Acute stress disorder, GAD etc.)

Somatoform Disorders. Factitious Disorders.

Dissociative Disorders.

UNIT-VII

Normal Human Sexuality and Sexual & Gender Identity Disorders. Eating Disorders.

Sleep Disorders.

Impulse-Control Disorders. Adjustment Disorders.

UNIT-VIII

Personality Disorders.

Psychological Factors Affecting Medical Conditions



History of Psychosomatic Medicine, Gastrointestinal Disorders, Obesity, Cardiovascular Disorders, Respiratory Disorders, Endocrine and Metabolic Disorders, Psychocutaneous Disorders, Musculoskeletal Disorders, Stress and Psychiatry, Psycho-Oncology, Consultation-Liaison Psychiatry.

Additional Conditions that may be a focus of clinical attention

Malingering, Adult Antisocial Behavior, Criminality, and Violence, Borderline Intellectual Functioning, Academic Problems and Other Additional Conditions that may be a focus of clinical attention.

UNIT-IX

Culture-Bound Syndromes. Special Areas of Interest

Psychiatry and Reproductive Medicine, Premenstrual Dysphoric Disorder, Genetic Counseling, End-of-Life and Palliative Care, Death, Dying, and Bereavement, Physical and Sexual Abuse of Adults, Survivors of Torture, Alternative and Complementary Health Practices, Military and Disaster Psychiatry, Famous Named Cases in Psychiatry, Relational Problems.

UNIT-X

Psychiatric Emergencies

Suicide, Other Psychiatric Emergencies

UNIT-XI

Psychotherapies. Biological Therapies

General Principles of Psychopharmacology, Pharmacokinetics and Drug Interactions, Drug Development and Approval Process. Medication-Induced Movement Disorders, Antihistamines, Barbiturates and Similarly Acting Substances, Benzodiazepine Receptor Agonists and Antagonists, Bupropion, Buspirone, Calcium Channel Inhibitors, Cholinesterase Inhibitors and Similarly Acting Compounds, Dopamine Receptor Antagonists (Typical Antipsychotics), Lithium, Mirtazapine, Monoamine Oxidase Inhibitors, Nefazodone, Opioid Receptor Agonists Methadone, Levomethadyl, and Buprenorphine, Opioid Receptor Antagonists Naltrexone and Nalmefene, Selective Serotonin Norepinephrine Reuptake Inhibitors, Selective Serotonin Reuptake Inhibitors, Serotonin-Dopamine Antagonists (Atypical or Second-Generation Antipsychotics), Sympathomimetics and Dopamine Receptor Agonists, Thyroid Hormones, Trazodone, Tricyclics and Tetracyclics, Electroconvulsive Therapy, Neurosurgical Treatments and Deep Brain Stimulation, Other Pharmacological and Biological Therapies, Drug Augmentation, Reproductive Hormonal Therapy Theory and Practice.

UNIT-XII

Child Psychiatry

Introduction and Overview, Normal Child Development, Normal Adolescence

Psychiatric Examination of the Infant, Child, and Adolescent. Mental Retardation.

Learning Disorders.

Pervasive Developmental Disorders. Attention-Deficit Disorders.

Disruptive Behavior Disorders.

Feeding and Eating Disorders of Infancy and Early Childhood. Tic Disorders.

Elimination Disorders.

Other Disorders of Infancy, Childhood, and Adolescence. Mood Disorders in Children and Adolescents.

Anxiety Disorders in Children. Early-Onset Schizophrenia.



UNIT-XIII

ChildPsychiatricTreatment

Individual Psychodynamic Psychotherapy, Short-Term Psychotherapies. Cognitive BehavioralPsychotherapy, Group Psychotherapy, Family Therapy, Pediatric Psychopharmacology, PartialHospitalandAmbulatoryBehavioralHealthServices,ResidentialandInpatientTreatment,Community-BasedTreatment and PsychiatricTreatmentofChildrenandAdolescents, etc.

ChildPsychiatrySpecialAreasofInterest

Psychiatric Aspects of Day Care , Adoption and Foster Care , Child Maltreatment , Children'sReactiontoIllnessandHospitalization,PsychiatricSequelofHIVandAIDS,ChildorAdolescentAntisocialBehavior,DissociativeDisorders,IdentityProblem andBorderlineDisorders,AdolescentSubstanceAbuse,ForensicPsychiatry,EthicalIssues,SchoolConsultation, Prevention of Psychiatric Disorders, Neuroimaging, Child Mental Health ServicesResearch,Impact ofTerrorism on Children etc.

UNIT-XIV

AdulthoodGeriatricPsychiatry

UNIT-XV

HospitalandCommunityPsychiatryPsychiatricEducation

EthicsandForensicPsychiatry

PsychiatryPastandFuture:BehavioralAddiction andMolecularPsychiatry

- **Recent advances and developments in the discipline.**

13A-PAEDIATRICS

1. GrowthandDevelopment:

- 1) Principlesofgrowthanddevelopment
- 2) Normalgrowthanddevelopmentinchildhoodandadolescence
- 3) AssessmentofGestationAge
- 4) GrowthPatterns
- 5) GrowthCharts
- 6) MamtaCard
- 7) AssymetricGrowth
- 8) SkeletalDysplasia
- 9) DevelopmentalDelayanditsassessment
- 10) AssessmentofAge
- 11) Sexualmaturationandits disturbance
- 12) Adolescentproblems

2. Neonatology:

- 1) Perinatalcare
- 2) Careinthelabourroom
- 3) Neonatalresuscitation
- 4) Prematurity
- 5) NormalNewborn



- 6) HighRiskNewborn
- 7) CareinHospitalandfollowupafterdischarge
- 8) NewbornScreening
- 9) PersistentPulmonaryHypertension
- 10) OxygenTherapy,HFNCandCPAP
- 11) NeonatalVentilation
- 12) Commontransientphenomena
- 13) LowBirth weightand SGA
- 14) NewbornfeedingandParenteralNutrition
- 15) HumanMilkBanking
- 16) Respiratorydistress
- 17) Apnea
- 18) AntenatalRiskFactorsandtheirimpactonFoetalOutcome
- 19) Antenatal diagnosisandFoetal Therapy
- 20) Infections
- 21) NeonatalJaundice
- 22) Neurologicdisorders
- 23) ThermoregulationanditsdisordersincludingKangarooMother Care
- 24) Anemiaandbleedingdisorders
- 25) Gastrointestinaldisorders
- 26) CongenitalMalformations
- 27) InbornErrors ofMetabolismandNewborn screening
- 28) NeonatalSeizures
- 29) DevelopmentallySupportive Care
- 30) Fluidand Electrolyteimbalanceinnewborn
- 31) AcutelifethreateningeventsandSIDS

3. Nutrition:

- 1) MaternalHealthanditsimpactonthehealthofchild
- 2) InfantandYoungChildNutrition
- 3) MAAProgram
- 4) ComplementaryFeeding
- 5) Proteinenergymalnutritionandsevereacutemalnutrition
- 6) Adolescentnutrition
- 7) Nutritional management of systemic illness (celiac disease, hepatobiliary disorders, nephriticsyndrome)
- 8) Nutritionforthelowbirthweight
- 9) Earlyinitiationandexclusivebreastfeeding
- 10) VitaminDeficiencydisorders
- 11) MicronutrientDeficiency
- 12) Obesityandmetabolicsyndromes
- 13) Parenteralandenteralnutritioninneonatesandchildren
- 14) Hyperlipidemiainchildren

4. Cardiovascular:

- 1) FoetalCirculation
- 2) AntenataldevelopmentofCVS
- 3) Congenitalheart diseases(cyanoticandacyanotic)
- 4) Infectiveendocarditis
- 5) Diseaseofmyocardium(cardiomyopathy,myocarditis)
- 6) RheumaticFeverandrheumaticheart disease
- 7) Arrhythmia
- 8) Diseasesofpericardium



- 9) Systemichypertension
- 10) Heartfailureanditsmanagement
- 11) BasicsofECG
- 12) Echocardiography

5. Respiratory:

- 1) Congenitalandacquireddisordersofnose
- 2) Tonsilsandadenoids
- 3) Congenitalanomaliesofupperandlowerrespiratorytract
- 4) Foreignbodyinlarynxtrachea&bronchus
- 5) Neoplasmof larynx and trachea
- 6) Bronchitis
- 7) Aspirationpneumonia
- 8) Acute pneumonia
- 9) Suppurativelungdisease
- 10) Atelectasis
- 11) Emphysemaandhyper-inflation
- 12) Pulmonaryedema
- 13) Infectionsofupperrespiratorytract
- 14) Obstructivesleepapnea
- 15) Acuteinflammatoryupperairwayobstruction
- 16) Subglotticstenosis(acuteandchronic)
- 17) Bronchiolitis
- 18) GER
- 19) Recurrentandinterstitialpneumonia
- 20) Lungcysts
- 21) Bronchialasthma
- 22) Bronchiectasis
- 23) PleuralEffusion
- 24) Mediastinalmass
- 25) Pulmonaryleaks
- 26) CysticFibrosis
- 27) PulmonaryFunctionTest

6. GastrointestinalandLiverDisease:

- 1) DiseaseofOral Cavity
- 2) Disordersofdeglutitionandesophagus
- 3) H.pyloriinfectionandPepticulcerdisease
- 4) Malabsorptionsyndromeandceliacdisease
- 5) IrritableBowelSyndrome
- 6) Hepatitis
- 7) Chronicliverdisease
- 8) Cirrhosisandportalhypertension
- 9) Pepticulcerdisease
- 10) Foreignbodyofoesophagusand stomach
- 11) Intestinalobstruction
- 12) Acute,Persistentandchronicdiarrhea
- 13) Inflammatoryboweldisease
- 14) Hepaticfailure
- 15) Wilson'sdisease
- 16) Metabolicdiseasesofliver
- 17) Livertransplant
- 18) Proteinlosingenteropathy



- 19) Infantilecholestasis
- 20) Liver abscess
- 21) PortalHypertension

7. Nephrologic&Urologic Disorders:

- 1) Acuteandchronicglomerulonephritis
- 2) Hemolyticuremicsyndrome
- 3) VURandrenal scarring
- 4) Renaltubulardisorders
- 5) Congenital andhereditaryrenal disorders
- 6) Posteriorurethralvalves
- 7) NephroticSyndrome
- 8) Urinarytractinfection
- 9) UndescendedTestes
- 10) Renalinvolvement insystemicdiseases
- 11) Renalandbladderstones
- 12) Hydronephrosis,VoidingDysfunction
- 13) Wilm'sTumor
- 14) Renaltransplant
- 15) Acuteandchronicrenal failure
- 16) Peritonealdialysis,HemodialysisandContinuousrenalreplacementtherapy

8. NeurologicDisorders:

- 1) Seizureandnon-seizureparoxysmal events
- 2) Meningitis
- 3) Brainabscess
- 4) Acuteencephalitisandfebrileencephalopathies
- 5) Neurocysticercosisandotherneuroinfestation
- 6) PediatricStroke
- 7) Neurometabolicandneurodegenerativedisorders
- 8) Neuromusculardisorders
- 9) Learningdisabilities
- 10) AcuteinflaccidparalysisandAFPsurveillance
- 11) Movementdisordersofchildhood
- 12) Malformations
- 13) Epilepsyandepilepticsyndromesof childhood
- 14) Coma
- 15) GuillainBarreSyndrome
- 16) Cerebralpalsy
- 17) Mentalretardation
- 18) Ataxia
- 19) CNStumors
- 20) Traumaticbrain and spinalcordinjury
- 21) AcquiredacuteandchronicdemyelinatingdisordersofNervoussystem
- 22) Hydrocephalus
- 23) Neuroimaging
- 24) Neuro-electrophysiology(EEG,EMG,Nerveconductionstudy,Evokedpotentials)

9. Hematology&Oncology:

- 1) Deficiencyanemias
- 2) Aplasticanemia
- 3) Thrombocytopenia
- 4) BloodComponent Therapy
- 5) Bonemarrowtrasnsplant/stemcelltransplant



- 6) Myelodysplastic syndrome
- 7) Hodgkin and Non-Hodgkin's lymphoma
- 8) Hypercoagulable states
- 9) Hemolytic anemias
- 10) Pancytopenia
- 11) Transfusion related infections
- 12) Acute and chronic leukemia
- 13) Hodgkin disease
- 14) Neuroblastoma
- 15) Febrile neutropenia
- 16) Disorders of Hemostasis
- 17) Flow Cytometry
- 18) Solid tumors of childhood

10. Endocrinology:

- 1) Hypopituitarism/hyperpituitarism
- 2) Pubertal disorders
- 3) Adrenal insufficiency
- 4) Adrenogenital syndromes
- 5) Hypoglycemia
- 6) Gonadal dysfunction and intersexuality
- 7) Diabetes insipidus
- 8) Hypo- and hyper-thyroidism
- 9) Cushing's Syndrome
- 10) Short stature
- 11) Obesity
- 12) Diabetes Mellitus

11. Infections:

- 1) Bacterial Infections
- 2) Fungal Infections
- 3) Rickettsial Infections
- 4) Protozoal and parasitic Infections
- 5) HIV
- 6) Control of epidemics and infection prevention
- 7) Viral Infections
- 8) Mycoplasma
- 9) Tuberculosis
- 10) Nosocomial infection
- 11) Childhood immunization
- 12) Biomedical waste

12. Emergency & Critical Care:

- 1) Emergency care of shock
- 2) Respiratory failure
- 3) Status epilepticus
- 4) Fluid and electrolyte disturbances and its therapy
- 5) Poisoning
- 6) Scorpion and snake bites
- 7) Cardio-respiratory arrest
- 8) Acute renal failure
- 9) Acute severe asthma
- 10) Acid base disturbances
- 11) Accidents
- 12) Ventilation (Invasive and Non-invasive)



13. Immunology & Rheumatology:

- 1) Arthritis (acute and chronic)
- 2) T and B cell disorders
- 3) Connective tissue disorders
- 4) Immuno-deficiency syndromes
- 5) Pediatric Autoimmune disorders

14. ENT:

- 1) Acute and chronic otitis media
- 2) Post-diphtheritic palatal palsy
- 3) Acute/chronic tonsillitis/adenoids
- 4) Foreign body
- 5) Conductive/sensorineural hearing loss
- 6) Allergic rhinitis/sinusitis
- 7) Cochlear implant
- 8) Assessment of Hearing

15. Skin Diseases:

- 1) Exanthematous illnesses
- 2) Pigment disorders
- 3) Pyogenic infections
- 4) Steven-Johnson syndrome
- 5) Seborrheic dermatitis
- 6) Urticaria
- 7) Ichthyosis
- 8) Vascular lesions
- 9) Vesicobullous disorders
- 10) Fungal and parasitic
- 11) Eczema
- 12) Drug rash
- 13) Alopecia

16. Eye Problems:

- 1) Refraction and accommodation
- 2) Night blindness
- 3) Strabismus
- 4) Retinopathy of prematurity
- 5) Optic atrophy
- 6) Partial/total loss of vision cataract
- 7) Chorioretinitis
- 8) Conjunctival and corneal disorders
- 9) Retinoblastoma
- 10) Papilledema
- 11) Cataract
- 12) Amaurosis

17. Behavioral & Developmental Disorders:

- 1) Rumination
- 2) Enuresis
- 3) Sleep disorders
- 4) Breath-holding spells
- 5) Mood disorders
- 6) Attention deficit hyperactivity disorders
- 7) Pica
- 8) Encopresis
- 9) Habit disorders



- 10) Anxiety disorders
- 11) Temper tantrums
- 12) Pervasive Development Disorders and Autistic Development Disorders

18. Social Pediatrics:

- 1) National health programs related to child health
- 2) Child labor
- 3) Disability and rehabilitation
- 4) National policy of child health and population
- 5) Child abuse and neglect
- 6) Adoption
- 7) Rights of the child
- 8) Juvenile delinquency
- 9) IMSA Act
- 10) Baby Friendly Hospital Initiative
- 11) Breast Feeding Policy
- 12) ICDS

19. Genetics:

- 1) Principles of inheritance
- 2) Chromosomal disorders
- 3) Multifactorial/polygenic disorders
- 4) Prenatal diagnosis
- 5) Pedigree drawing
- 6) Single gene disorders
- 7) Genetic diagnosis
- 8) Molecular genetics

20. Orthopedics:

- 1) Major congenital orthopedic deformities
- 2) Bone and joint infections: Pyogenic and Tubercular
- 3) Rickets
- 4) Common bone tumors

➤ **Recent advances and developments in the discipline.**

13B-CHILD PSYCHOLOGIST

(Psychosocial Foundations of Behavior)

Unit - I: Introduction: Overview of the profession and practice; history and growth; professional role and functions; current issues and trends; areas of specialization; ethical and legal issues; code of conduct.

Unit - II: Mental health and illness: Mental health care – past and present; stigma and attitude towards mental illness; concept of mental health and illness; perspectives – psychodynamic, behavioral, cognitive, humanistic, existential



and biological models of mental health/illness;

Unit - III: Epidemiology: Studies in Indian context; tools available/standardized for epidemiological surveys; socio-cultural correlates of mental illness; religion and mental health; psychological well-being and quality of life – measures and factors influencing.

Unit - IV: Self and relationships: Self-concept, self-image, self-perception and self-regulation in mental health and illness; learned helplessness and attribution theories; social skill model; interpersonal and communication models of mental illness; stress diathesis model, resilience, coping and social support.

Unit - V: Family influences: Early deprivation and trauma; neglect and abuse; attachment; separation; inadequate parenting styles; marital discord and divorce; maladaptive peer relationships; communication style; family burden; emotional adaptation; expressed emotions and relapse.

Unit - VI: Societal influences: Discrimination in race, gender and ethnicity; social class and structure, poverty and unemployment; prejudice, social change and uncertainty; crime and delinquency; social tension & violence; urban stressors; torture & terrorism; culture shock; migration; religion & gender related issues with reference to India.

Unit-

VII: Disability: Definition and classification of disability; psychosocial models of disability; impact, needs and problems; issues related to assessment/certification of disability – areas and measures.

Unit-VIII: Rehabilitation: Approaches to rehabilitation; interventions in the rehabilitation processes; models of adaptation to disability; family and caregivers issues; rights of mentally ill; empowerment issues; support to recovery.

Unit-

IX: Policies and Acts: Rehabilitation Policies and Acts; assistance, concessions, social benefits and support from government and voluntary organizations; contemporary challenges; rehabilitation ethics and professional code of conduct.

Part-B (Psychopathology)

Unit - X: Introduction to psychopathology: Definition; concepts of normality and abnormality; clinical criteria of abnormality; continuity (dimensional) versus discontinuity (categorical), and prototype models of psychopathology; classification and taxonomies – reliability and utility; classificatory systems, currently in use and their



advantages and limitations.

Unit-XI: Signs and symptoms: Disorders of consciousness, attention, motor behavior, orientation, experience of self, speech, thought, perception, emotion, and memory.

Unit-XII: Psychological theories: Psychodynamic; behavioral; cognitive; humanistic; interpersonal; psychosocial; and other prominent theories/models of principal clinical disorders and problems, viz. anxiety, obsessive-compulsive, somatoform, dissociative, adjustment, sexual, substance use, personality, suicide, childhood and adolescence, psychotic, mood disorders, and culture-specific disorders.

Unit - XIII: Indian thoughts: Concept of mental health and illness; nosology and taxonomy of mental illness; social identity and stratification (Varnashrama Vyavastha); concept of – cognition, emotion, personality, motivation and their disorders.

Biological Foundations of Behavior:

Part – A (Anatomy, Physiology and Biochemistry of CNS)

Unit-I: Anatomy of the brain: Major anatomical sub-

divisions of the human brain; the surface anatomy and interior structures of cortical and sub-cortical regions; anatomical connectivity among the various regions; blood supply to brain and the CSF system; cytoarchitecture and modular organization in the brain.

Unit – II: Structure and functions of cells: Cells of the nervous system (neurons, supporting cells, blood-brain barrier); communication within a neuron (membrane potential, action potential); communication between neurons (neurotransmitters, neuromodulators and hormones).

Unit – III: Biochemistry of the brain: Biochemical and metabolic aspects of Brain; medical genetics; structure and function of chromosomes; molecular methods in genetics; genetic variation; population genetics; single-gene inheritance; cytogenetic abnormalities; multifactorial inheritance; biochemistry of genetic diseases.

Unit – IV: Neurobiology of sensory and motor systems: Organization of sensory system in terms of receptors, relay neurons, thalamus and cortical processing of different sensations; principle motor mechanisms of the periphery (muscle spindle), thalamus, basal ganglia, brainstem, cerebellum and cerebral cortex.

Unit – V: Regulation of internal environment: Role of limbic, autonomic and the neuroendocrine system in regulating the internal environment;



reticular formation and other important neural substrates regulating the state of sleep/wakefulness.

Unit–

VI: Neurobiology of behavior: Neurobiological aspects of drives, motivation, hunger, thirst, sex, emotions, learning and memory;

Unit–VII: Psychopharmacology: Principles of psychopharmacology (pharmacokinetics, drug effectiveness, effect of repeated administration); sites of drug action (effects on production, storage, release, receptors, reuptake and destruction); neurotransmitters and neuromodulators (acetylcholine, monoamines, amino acids, peptides, lipids).

Part–B (Neuropsychology)

Unit - VIII: Introduction: Relationship between structure and function of the brain; the rise of neuropsychology as a distinct discipline, logic of cerebral organization; localization and lateralization of functions; approaches and methodologies of clinical and cognitive neuropsychologists.

Unit- IX: Frontal lobe syndrome: Disturbances of regulatory functions; attentional processes; emotions; memory and intellectual activity; language and motor functions.

Unit-X: Temporal lobe syndrome: Special senses–

hearing, vestibular functions and integrative functions; disturbances in learning and memory functions; language, emotions, time perception and consciousness.

Unit - XI: Parietal and occipital lobe syndromes: Disturbances in sensory functions and body schema perception; agnosias and apraxias; disturbances in visual space perception; color perception; writing and reading ability.

Unit–XII: Neuropsychological profile of various neurological and psychiatric conditions: Huntington's disease, Parkinson's disease, progressive supranuclear palsy, thalamic degenerative disease, multiple sclerosis, cortical and subcortical dementias, Alzheimer's dementia, AIDS dementia complex etc., and principal psychiatric syndromes such as psychosis, mood disorders, suicide, anxiety disorders, and other emotional and behavioral syndromes.

Unit - XIII: Functional human brain mapping: QEEG, EP & ERP, PET, SPECT, fMRI

Unit - XIV: Neuropsychological assessment: Introduction, principles, relevance, scope and indications for neuropsychological assessment and issues involved in neuropsychological assessment of children.



Unit–XV:Neuropsychologicalrehabilitation:Principles,objectivesandmethodsofneuro-rehabilitationoftraumaticbraininjuryandbraindiseased;scopeofcomputer-basedretraining,neurofeedback,cognitiveaidsetc.

Psychiatry:

Unit-I:Introduction:Approachtoclinicalinterviewinganddiagnosis;casehistory; mental status examination; organization and presentation of psychiatricinformation;diagnosticformulation;classificatorysystemin use.

Unit - II: Psychoses: Schizophrenia, affective disorders, delusional disorders andotherformsofpsychoticdisorders–types,clinicalfeatures,etiologyandmanagement.

Unit-III:Neurotic,stress-relatedandsomatoformdisorders:types,clinicalfeatures,etiologyandmanagement.

Unit - IV: Disorders of personality and behavior: Specific personality disorders;mental&behavioraldisordersduetopsychoactivesubstanceuse;habitandimpulsedisorders;sexualdisordersanddysfunctions–types,clinicalfeatures,etiologyandmanagement.

Unit-V:Organicmentaldisorders:Dementia,deliriumandotherrelatedconditions with neuralgic and systemic disorders – types, clinical features, etiologyandmanagement.

Unit - VI: Behavioral, emotional and developmental disorders of childhood andadolescence: types,clinicalfeatures,etiologyandmanagement.

Unit-VII:Mentalretardation:Classification,etiologyandmanagement.

Unit-VIII:Neurobiologyofmentaldisorders:Neurobiologicaltheoriesofpsychosis, mood disorders, suicide, anxiety disorders, substance use disorders andotheremotionaland behavioral syndromes.

Unit-IX: Therapeutic approaches:Drugs,ECT,psychosurgery,psychotherapy,and behavior therapy, preventive and rehabilitative strategies – half-way home,shelteredworkshop,daycare,andinstitutionalization.

Unit-X:Consultation-liaisonpsychiatry:Psychiatricconsultationingeneralhospital; primarycaresetting.

PsychotherapyAndCounseling:

Unit - I: Introduction to Psychotherapy: Definitions, objectives, issues related totaining professional therapists; ethical and legal issues involved in therapy work;rights andresponsibilities inpsychotherapy; issues related to consent (assent incase of minors); planning and recording of therapy sessions; structuring and



setting goals; pre- and post-assessment; practice of evidence-based therapies.

Unit- II: Therapeutic Relationship: Client and therapist characteristics; illness, technique and other factors influencing the relationship.

Unit - III: Interviewing: Objectives of interview, interviewing techniques, types of interview, characteristics of structured and unstructured interview, interviewing skills (micro skills), open-ended questions, clarification, reflection, facilitation and confrontation, silences in interviews, verbal and non-verbal components.

Unit-

IV: Affective psychotherapies: Origin, basis, formulation, procedures, techniques, stages, process, outcome, indications, and research & current status with respect to psychodynamic, brief psychotherapy, humanistic, existential, gestalt, person-centered, Adlerian, transactional analysis, reality therapy, supportive, clinical hypnotherapy, play therapy, psychodrama, and oriental approaches such as yoga, meditation, shavasana, pranic healing, reiki, taichi etc.

Unit - V: Behavior therapies: Origin, foundations, principles & methodologies, problems and criticisms, empirical status, behavioral assessment, formulations and treatment goals, Desensitization-(imaginal, in-vivo, enriched, assisted), Extinction - (graded exposure, flooding and response prevention, implosion, covert extinction, negative practice, stimulus satiation), Skill training- (assertiveness training, modeling, behavioral rehearsal), Operant procedures- (token economy, contingency management), Aversion- (faradic aversion therapy, covert sensitization, aversion relief procedure, anxiety relief procedure and avoidance conditioning), Self-control procedures- (thought stop, paradoxical intention, stimulus satiation), Biofeedback - (EMG, GSR, EEG, Temp., EKG), Behavioral counseling, Group behavioral approaches, Behavioral family/marital therapies.

Unit-

VI: Cognitive therapies: Cognitive model, principles and assumptions, techniques, indications and current status of rational emotive behavior therapy, cognitive behavior therapy, cognitive analytic therapy, dialectical behavior therapy, problem-solving therapy, mindfulness based cognitive therapy, schema focused therapy, cognitive restructuring, and other principal models of cognitive therapies.

Unit-

VII: Systemic therapies: Origin, theoretical models, formulation, procedures, techniques,



stages, process, outcome, indications, and research & current status with respect to family therapy, marital therapy, group therapy, sex therapy, interpersonal therapy and other prominent therapies.

Unit-VIII: Physiological therapies: Origin, basis, formulation, procedures, techniques, stages, process, outcome, indications, and current status with respect to progressive muscular relaxation, autogenic training, biofeedback, eye-movement desensitization and reprocessing, and other forms of evidence-based therapies.

Unit - IX: Counseling: Definition and goals, techniques, behavioral, cognitive and humanistic approaches, process, counseling theory and procedures to specific domains of counseling.

Unit-

X: Therapy in special conditions: Therapies and techniques in the management of deliberate self-harm, bereavement, traumatic, victims of man-made or natural disasters, in crisis, personality disorders, chronic mental illness, substance use, HIV/AIDS, learning disabilities, mental retardation, and such other conditions wherein integrative/eclectic approach is the basis of clinical intervention. Unit-XI: Therapy with children: Introduction to different approaches, psychoanalytic therapies (Anna Freud, Melanie Klein, Donald Winnicott); special techniques (behavioral and play) for developmental internalizing and externalizing disorders; therapy in special conditions such as psycho-physiological and chronic physical illness; parent and family counseling; therapy with adolescents.

Unit - XII: Psychoeducation (therapeutic education): Information and emotional support for family members and caregivers, models of therapeutic education, family counseling for a collaborative effort towards recovery, relapse-prevention and successful rehabilitation with regard to various debilitating mental disorders.

Unit-

XIII: Psychosocial rehabilitation: Rehabilitation services, resources, medical and psychosocial aspects of disability, assessment, group therapy, supportive therapy and other forms of empirically supported psychotherapies for core and peripheral members.

Unit-

XIV: Psychotherapy in the Indian Context: Historical perspective in psychological healing practices from the Vedic period and the systems of Ayurveda and Yoga, contemporary perspectives; socio-cultural issues in the



Indian context in practice of psychotherapy; ongoing research related to process and outcome.

Unit-XV: Contemporary issues and research: Issues related to evidence-based practice, managed care, and research related to process and outcome.

Behavioral Medicine:

Unit-

I: Introduction: Definition, boundary, psychological and behavioral influences on health and illness, neuroendocrine, neurotransmitter and neuroimmune responses to stress, negative affectivity, behavioral patterns, and coping styles, psychophysiological models of disease, theoretical models of health behavior, scope and application of psychological principles in health, illness and healthcare.

Unit - II: Central nervous system: Cognitive, personality, behavioral, emotional disturbances in major CNS diseases like cerebrovascular (stroke, vascular dementia etc.), developmental (cerebral palsy), degenerative (Parkinson's etc.), trauma (traumatic brain and spinal cord injury), convulsive (epilepsy), and infectious (AIDS dementia), assessment and methods for psychological intervention and rehabilitation with such patients.

Unit - III: Cardiovascular system: Psychosocial, personality, lifestyle, and health practice issues, psychobehavioral responses including coping with illness and functional loss in hypertension, MI, following CABG and other cardiovascular conditions, salient issues with regard to quality-of-life and well-being, empirically proven methods of psychological management of CVS diseases.

Unit - IV: Respiratory system: precipitants, such as emotional arousal, and other external stimuli, exacerbants such as anxiety and panic symptoms, effects, such as secondary gain, low self-esteem in asthma and other airway diseases, psychological, behavioral and biofeedback strategies as adjunct in the management.

Unit - V: Gastrointestinal system: Evaluation of psychological factors including personality characteristics and stress/coping style in functional GI disorders such as irritable bowel syndrome, inflammatory bowel disease, peptic ulcer disease, esophageal disorder etc., role of psychotherapy, behavior modification, cognitive restructuring, biofeedback and relaxation training.

Unit-

VI: Genitourinary/renal/reproductive system: Psychosocial issues in male/female sexual



dysfunctions, micturition/voiding problems including primary/secondary enuresis, end-stagerenal disease, dialysis treatment, primary and secondary infertility, empirically validated psychological and behavioral interventions in these conditions.

Unit–

VII: Dermatology: Role of stress and anxiety in psychodermatological conditions such as psoriasis, chronic urticaria, dermatitis, alopecia and the impact of these on self-esteem, body image and mood, role of psychological interventions such as relaxation, stress management, counseling and biofeedback strategies.

Unit – VIII: Oncology: Psychosocial issues associated with cancer - quality of life, denial, grief reaction to bodily changes, fear of treatment, side effects, abandonment, recurrence, resilience, assessment tools, and goals of interventions for individual and family, and therapy techniques.

Unit–IX: HIV/AIDS: Model of HIV disease service program in India, pre- and post-test counseling, psychosocial issues and their resolutions during HIV progress, psychological assessment and interventions in infected adults and children, and family members/caregivers, highly active anti-retroviral treatments (HAART), neuropsychological findings at different stages of infection, issues related to prevention/spreading awareness and interventions in at-risk populations. Unit–

X: Pain: Physiological and psychological processes involved in pain experience and behavior, assessment tools for acute and chronic pain intensity, behavior, and dysfunctions/disability related to pain, psychological interventions such as cognitive, behavioral, biofeedback and hypnotic therapies.

Unit – XI: Terminally ill: Medical, religious and spiritual definition of death and dying, psychology of dying and bereaved family, strategies of breaking bad news, bereavement and grief counseling, management of pain and other physical symptoms associated with end-of-life distress in patients with cancer, AIDS, and other terminal illness, professional issues related to working in hospice including working through one's own death anxiety, euthanasia – types, arguments for and against.

Unit–XII: Other general clinical conditions: Application of psychological techniques and their rationale in the clinical care of patients in general medical settings where psychological services appear to affect the outcome of medical management positively, for example in diabetes, sleep disorders, obesity, dental anxiety, burns injury, pre- and post-



surgery, preparing for amputation, evaluation of organ donors/recipient, pre-and post-transplantation, organ replacement, hemophiliacs, sensory impairment, rheumatic diseases, abnormal illness behavior, health anxiety etc.

Unit–

XIII: Contemporary Issues: Research and developments in health psychology, psychophysiology, psychoneuroimmunology, psychobiology, sociobiology and their implications, and effects of psychotherapy on the biology of brain.

Statistics

Unit - I: Introduction: Various methods to ascertain knowledge, scientific method and its features; problems in measurement in behavioral sciences; level of measurement of psychological variables – nominal, ordinal, interval and ratio scales; test construction – item analysis, concept and methods of establishing reliability, validity and norms.

Unit-II: Sampling: Probability and non-probability; various methods of sampling – simple random, stratified, systematic, cluster and multistage sampling; sampling and non-sampling errors and methods of minimizing these errors.

Unit-III: Concept of probability: Probability distribution – normal, poisson, binomial; descriptive statistics – central tendency, dispersion, skewness and kurtosis.

Unit - IV: Hypothesis testing: Formulation and types; null hypothesis, alternate hypothesis, type I and type II errors, level of significance, power of the test, p-value. Concept of standard error and confidence interval.

Unit - V: Tests of significance - Parametric tests: Requirements, "t" test, normal z-test, and "F" test including post-hoc tests, one-way and two-way analysis of variance, analysis of covariance, repeated measures analysis of variance, simple linear correlation and regression.

Unit - VI: Tests of significance - Non-parametric tests: Requirements, one-sample tests – sign test, sign rank test, median test, McNemar test; two-sample test – Mann Whitney U test, Wilcoxon rank sum test, Kolmogorov-Smirnov test, normal score test, chi-square test; k-sample tests – Kruskal Wallis test, and Friedman test, Anderson Darling test, Cramer-von Mises test.

Unit-VII: Experimental design: Randomization, replication, completely randomized design, randomized block design, factorial design, crossover design, single subject



design, non-experimental design.

Unit-VIII: Epidemiological studies: Prospective and retrospective studies, case control and cohort studies, rates, sensitivity, specificity, predictive values, Kappa statistics, odds ratio, relative risk, population attributable risk, Mantel-Haenszel test, prevalence, and incidence. Age specific, disease specific and adjusted rates, standardization of rates. Tests of association, 2x2 and row x column contingency tables.

Unit-IX: Multivariate analysis: Introduction, Multiple regression, logistic regression, factor analysis, cluster analysis, discriminant function analysis, path analysis, MANOVA, Canonical correlation, and Multidimensional scaling.

Unit- X: Sample size estimation: Sample size determination for estimation of mean, estimation of proportion, comparing two means and comparing two proportions.

Unit - XI: Qualitative analysis of data: Content analysis, qualitative methods of psychosocial research.

Unit - XII: Use of computers: Use of relevant statistical package in the field of behavioral science and their limitations.

14-GENERAL SURGERY

A. Surgical Anatomy

1. Head & Neck-

Parts of Brain including ventricles & intracranial vascular arrangement, Spinothalamic tracts. Anatomy of great vessels of neck. Neck triangles, Anatomy of Trachea, Parotid gland, Anatomy and relations of facial nerve. Anatomical distribution of cervical lymph nodes.

2. Thyroid gland - Anatomy

of Thyroid gland & parathyroid gland and Course of recurrent Laryngeal Nerve.

3. Breast-

Anatomy of breast, Lymphatic drainage of breast and arrangement of axillary lymph nodes.

4. Chest-

Anatomy of Chest wall, lungs, pleura, Heart & great vessels, Course of oesophagus and its relations with aorta and azygos vein and Thoracic duct.

5. Stomach - Blood supply & lymphatic drainage, course of vagus nerve.

6. Duodenum - Peritoneal reflections & relationship with head of Pancreas.

7. Small Intestine - Malrotation, vitellointestinal duct, urachus and Meckle's diverticulum.

8. Large Intestine - Appendix-

Various positions and its clinical relevance, peritoneal reflections, vascular supply and lymphatic drainage of large intestine.



9. **Rectum and anus-**
Peritoneal reflections, Vascular & Lymphatic arrangement, anal membrane, Hilton's lines and relationships with perineal muscles and developmental anomalies.
10. **Liver-**
Anatomical and surgical lobes of liver, vascular supply and intrahepatic ductal arrangement.
11. **Gall Bladder-**
Anatomical variations of the cystic duct and cystic artery (In relation to hepatic artery), anatomy of extrahepatic biliary system.
12. **Pancreas-**
Relation with portal vein, inferior mesenteric vein and IVC, Boundaries of lesser sac.
13. **Spleen-**
Vascular supply and its relation with tail of pancreas, Colon, Kidney, Diaphragm, stomach.
14. **Diaphragm-** Development, various hiatus & relationship with structures passing through them.
15. **Retroperitoneal Area-**
Lymphatic, Thoracic duct, lymph nodes, sympathetic chain and anatomy of great vessels.
16. **Kidney and Ureters** - Developmental anomalies, Blood supply, Course of Ureter.
17. **Suprarenal-** Blood supply, venous drainage and relations with kidney.
18. **Urinary Bladder & Prostate-** Anatomy & relations with rectum and Ureter.
19. **Urethra-** Length, Various parts and developmental anomalies.
20. **Penis-** Lymphatic drainage- Attachment of crura.
21. **Testis-** Developmental anomalies like UDT, MDT, etc.
22. **Extremities-** Upper limb-
Various muscular compartments of hand, forearm & arm. Course of various vessels & nerves, e.g. radial, median & ulnar.
Lower limb-
Arterial supply & venous drainage of lower limb, muscular compartment of foot, leg & thigh. (As per Head Department of Surgery this point may be included in the syllabus of Orthopedics instead of General Surgery)
23. **Surgical Anatomy** of inguinal Canal, Femoral canal, umbilicus & abdominal wall & its anatomy, various abdominal surgical incisions.

B. **Surgical Physiology**

1. **Thyroid-** Iodine Metabolism, Pituitary-Thyroid Hormone axis.
2. **Breast-** Effects of various hormones on breast.
3. **Chest-**
Mechanism of respiration, effect on Hemodynamics, Cardiac circulation, surgical causes of hypertension.
4. **Stomach-** Mechanism of acid production.
5. **Intestine-** Secretory and absorptive mechanism of small and large intestine.
6. **Rectum and Anus** - Mechanism of defecation.
7. **Liver-** Mechanism of bile secretion, Entero-hepatic circulation and various metabolic functions of liver.
8. **Gall Bladder-** Mechanism of gallstone formation.
9. **Pancreas-** Exocrine and Endocrine pancreatic secretion, Pathophysiology of pancreatitis.
10. **Spleen-** Functions of spleen.



11. **Diaphragm**-Gastro-oesophageal reflux.
12. **Kidney**-Mechanism of formation of urine in relation to acute and chronic renal failure.
13. **Suprarenal** -Physiology of various hormone production.
14. **Urinary Bladder**-Mechanism of micturition and vesico-uretric reflux.
15. **Testis**-Germinal and endocrinal functions of testis.

16. Critical Care

- Physiological response to trauma.
- Nutrition in surgical critically ill patients.
- Enteral and Parenteral nutrition.
- Shock.
- Burns.
- Blood transfusion.
- Fluid and Electrolyte Balance. Acid-Base Balance.
- ARDS, SIRS, multiple organ failure.
- Physiology of wound healing.
- Mechanism of clotting.
- Abdominal compartment syndrome.

C. Surgical Pathology

1. Various types of biopsies, preservation of specimens.
2. Formation of Tumors, Well differentiated cells, Totipotent cells, Histopathological features of Neoplasm. Stem cell therapy.
3. Benign and malignant tumors, Genetic therapy and Tumor Markers.
4. Grading & Staging of tumors.
5. Disturbed wound healing, Necrotising-fascitis, Gangrene and sequestrum.
6. Pathology of Benign Tumor like Lipoma, Fibroma, Osteoma, Adenoma, Papilloma, etc.
7. Various primary malignant tumor and secondary tumors.

D. Clinical Surgical Problems

(Various clinical presentations, diagnosis, complications & treatment)

1. Head & Neck-

Hydrocephalus, Meningocele, Encephalocle, intracranial injury (contusion, concussion, laceration, extradural and subdural hemorrhage, Middle meningeal hemorrhage, Lucid interval), cervical spine fracture, Brain tumors in general. Cleft Lip, Cleft palate, thyroglossal Cyst, Branchial Cyst, Branchial fistula and Pharyngeal pouch, Lymph node enlargement-Inflammatory, Tubercular and malignant. Indications/contraindications of lymph node biopsy in neck, Diseases of Salivary glands and diseases of lymphatic system.

2. **Thyroid** - Various types of thyroiditis, thyrotoxicosis, myxoedema, cretinism, solitary thyroid nodule, goiters-simple and multi nodular goiter, thyroid malignancy controversies in management of carcinoma of thyroid.

3. **Parathyroid**-Adenoma, hyperparathyroidism and malignancy, MEN.

Breast – Investigation of breast, ANDI, duct ectasia, galactocoele, periperal abscess, congenital disorders, fat necrosis, acute & subacute inflammation of breast, abnormal discharges from nipple, tuberculosis, actinomycosis, Mondor's disease, phyllodes tumours, carcinoma of breast (pathology, etiological factors, staging, clinical presentation, treatment which includes surgical, radiotherapy, systemic therapy, hormonal therapy & it should include recent trends in management. Gynaecomastia, carcinoma of male breast, lipoma, sarcoma, metastases.

See

4. **Chest** - Fracture ribs, Flail chest, Haemo-pneumothorax, Lungs injuries, Injures to great vessels, Surgical emphysema, Cardiac tamponade, Tension pneumothorax, pleural effusion, Empyema, Apical shadow in lungs, Bronchogenic carcinoma and secondaries of the lungs.
5. **Oesophagus** - Corrosive strictures, malignancy of oesophagus, Boerhaave's syndrome. Variceal Bleeding.
6. **Stomach** - Hypertrophic pyloric stenosis, peptic ulcer & perforation, Gastric outlet obstruction, Benign & malignant tumor of stomach, Zollinger - Ellison syndrome Type I & II, H-Pylori role in APD & Carcinoma of stomach. Upper GI Bleeding.
7. **Intestine** - Intestinal atresia, exomphalos major, patent vitello - intestinal duct & various clinical manifestations, Meckle's diverticulum, Intestinal obstruction, small gut tumors, Tuberculosis of intestine, caecum and large intestine, malignancy of Caecum and Large intestine, Ulcerative colitis & Crohn's disease, surgical management, Short gut syndrome, intussusception, Gastrojejunal bypass, Bariatric surgery & metabolic surgery, familial adenomatous polyposis. Lower GI Bleeding, Mesenteric ischaemia, intestinal failure and intestinal transplantation.
8. **Rectum & Anus** - Imperforated Anus, Hirschsprung's disease, Piles, fistula in ano, fissure in ano, polyp and adenomas, Ano rectal carcinoma with Special reference to modern management, Low anterior resection, value of circular staplers.
9. **Liver** - Liver injuries, Liver abscess, Hydatid disease, Hepatic Tumors - Benign and malignant, secondaries, Portal Hypertension, liver resection and Hepatic transplantation.
10. **Gall Bladder** - Gallstones, acute and chronic cholecystitis, Complications of Gallstones, malignancy of gall bladder, Post operative bile leaks.
11. **Common bile duct** - Bilioma, Haemobilia, Biliary structures, cholangitis, cholangio-carcinoma, obstructive jaundice and peri ampullary carcinoma.
12. **Pancreas** - Pancreatic injury, acute and chronic pancreatitis (Recent Management), Endocrine, Tumours of Pancreas, Recent Pathogenesis of acute pancreatitis, cysts of pancreas, malignancy of pancreas and pancreatic transplantation.
13. **Spleen** - Splenic abscess, Hyper splenism, splenic injury, splenomegaly, tumors of spleen, portal hypertension and splenic auto transplantation, Splenorrhaphy. Opportunistic post-splenectomy infections (OPSI).
14. **Diaphragm** - Diaphragmatic hernia, Eventration, diaphragmatic injuries, Penetrating thoraco abdominal injuries.
15. **Retroperitoneal tumors** - retroperitoneal fibrosis, peritonitis, intraabdominal abscess, burst abdomen, mesenteric cyst, pseudomyxoma peritonei, peritoneal neoplasm, acute mesenteric lymphadenitis.
16. **Kidney** - Congenital anomalies, renal trauma, renal stone, hydronephrosis, pyonephrosis, perinephric abscess, tuberculosis of the kidney, renal tumors and para-malignant Adenomas Renal transplantation & Donor Nephrectomy.
17. **Ureter** - Ureteric stones & ureteric transplantation, PUJ obstructions Ureteric injury, URS (Ur



- etoro-Reno-Scopy).
18. **Suprarenal** – Phaeochromocytoma, Incidentaloma, Adrenocortical Carcinoma, Neuroblastoma and its surgical management.
 19. **Urinary bladder & Prostate** - Exstrophy bladder, posterior urethral valves, Bladder injury, stones, hematuria, cystitis, Tuberculosis, diverticulum, Benign & malignant tumors, acute & chronic prostatitis, BHP, malignancy of prostate, retention of urine, incontinence and urgency.
 20. **Urethra**- Urethral injuries, stricture, stone and hypospadias, epispadias.
 21. **Penis**- Phimosis, meatal stenosis, paraphimosis, balanitis, ulcers and malignancy, Priapism, Erectile dysfunctions.
 22. **Testis** - Undescended testis, Ectopic testis, Acute Orchitis, Chronic epididymo-orchitis, Torsion testis, Hydrocele, Varicocele, Hematocele and Tumors of the testis, Recent trends in management of testicular tumors.
 23. **Upper Extremities**- Soft tissue injuries including nerve, muscles, vessels, cervical rib and Raynaud's disease.
 24. **Skin**- Ulcers, Tumors, S.C.C., B.C.C., Sarcoma & Melanoma, Kaposi's sarcoma. Wound management.
 25. **Lower Limb** - Varicose veins, DVT, Soft tissue injury, muscles, vessels, nerves & Peripheral vascular disease, compartment syndrome, Endoscopic ligation of subfacial perforators.
 26. **Hernia** - Definition, classification, Internal hernia (diaphragmatic, paraduodenal, transmesenteric, External hernia (inguinal, femoral, epigastric, umbilical, paraumbilical and incisional), Laparoscopic anatomy of inguinal region.
 27. **General**-
 - (a) Trauma- polytrauma, resuscitation, Triage.
 - (b) Radiotherapy & Chemotherapy & immunotherapy and Tumor Markers for various malignancies.
 - (c) Laparoscopic surgery- Basic & advanced.
 - (d) Robotic surgery & Tele-surgery.
 - (e) Anaesthesia- Endotracheal intubation, Tracheostomy, Cardiac arrest, Resuscitation & Death on table, Epidural, Spinal anaesthesia.
 - (f) Operation Theatre- Theatre safety, design and layout. Techniques including autoclave & sterilization, Plasma sterilization.
 - (g) Infective surgical diseases- Gangrene, Tetanus, Necrotising fasciitis, Diabetic foot, Carbuncle etc., surgical site infection- types, preventions & use of antibiotics.
 - (h) AIDS, universal precautions.
 - (i) Diagnostic procedures- IVP, Barium studies, MRI, CT-Scan, PET Scan, Virtual endoscopy, Doppler, USG.
 - (j) Endoscopic procedures- like Gastroscopy, ERCP, Oesophagoscopy, Colonoscopy & capsule endoscopy, cystoscopy & ureteric catheterization.
 - (k) NOTES- (natural orifice transabdominal endosurgery)
 - (l) Recent advances in surgery latest at the time of examination & interview.
 - (m) Fundamentals of plastic surgery, neurosurgery, urology, pediatric surgery, gastro-intestinal surgery, etc.

- (n) Various operative procedures.
- (o) Biomedical waste management.
- (p) Lasers in surgery.
- (q) Surgical Audit.
- (r) Evidence based surgery.
- (s) Day care surgery.
- (t) Research methodology.
- (u) Types of teaching.

➤ **Recent advances and developments in the discipline.**

15-ORTHOPAEDICS

Unit I

Applied and Basic Medical Sciences including Anatomy, Physiology, Biochemistry, Pharmacology, Pathology and Microbiology in relation to orthopaedics.

Unit II

BONE & JOINT- Infections (Pyogenic, Tuberculosis, Syphilis, Mycotic, Salmonella, Brucella, HIV & Virus etc.)

Unit III

Congenital anomalies and developmental deformities, their diagnosis and management in Orthopaedics.

Unit IV

TRAUMATOLOGY in general and in reference to Locomotor system. Principles of Treatment in Trauma. Peripheral Nerve Injuries. Principles of Ilizarov and its application.

Unit V

Diseases, anomalies and injuries of spine.

Unit VI

Metabolic Bone Disorders. Autoimmune Bone and Joint Disorders like Rheumatoid Arthritis, Ankylosing Spondylitis, Fluorosis, etc.

Unit VII

Bone Tumours in orthopaedics. Recent trends in limb salvage, chemo and radiotherapy.

Unit VIII

Amputations & Disarticulation through Bones & Joints of Limbs.

Unit IX

Degenerative disorders of the Extremities like Osteoarthritis of Hip & Knee Joints and



Spine(DiagnosisandManagement).

UnitX

Recent Advances : Arthroscopic Surgery, Joint Replacement, Spine Surgery, CT Scan,MRI, Bone Scan, PET Scan, Bone Bank.Role of stem cells in orthopaedics. Minimalinvasivetechniquein orthopaedics.Microscopicsurgeryin orthopaedics.

UnitXI

Physical Medicine and Rehabilitation including occupational Therapy, Electro-diagnosis,Electromyography.Totalconceptof ProsthesisandOrthoticsPhysicaldisabilityassessment.

UnitXII

Disastermanagement.Polytraumamangement.

➤ **Recent advances and developments in the discipline.**

16-OTO- RHINO- LARYNGOLOGY (ENT)

Applied Embryology and Applied Anatomy of Nose and paranasal sinuses, mandible, Ear, Vestibularsystem, Temporal bone, Oral cavity, Pharynx, Larynx, tracheobronchial tree, oesophagus, Neck (including salivary glands, thyroid, parathyroids, neck spaces etc.), orbit, skull base including related meningeal systemand brain, Central Auditory/Speech/Language/Vestibular areas, cranial nerves, related lymphovascular andneural systems.

Applied Physiology of phonation, speech & language, breathing, respiration, lacrimation, sound and hearing,balance system including peripheral and central vestibular pathways, smell, taste, mastication, swallowing,CSFphysiology,cranialnerve functions.

ClinicalMethodsforassessmentandevaluationofstructure/function/pathologyofNose andparanasalsinuses,mandible,Ear,Temporalbone,Face,Oralcavity,Pharynx,Larynx,tacheobronchialtree,oesophagus,Neck(includingsalivaryglands,thyroid,parathyroids ,neckspacesetc.),orbit,skullbase(includingrelated meningealsystemandbrain, cranialnervesetc.),Speech &Language etc.

Applied physics, equipment, methodology, interpretation of various tests for**Audiological**evaluation andtheirapplication indifferentclinicalscenariosand differentagegroups.

Applied physics, equipment, methodology, interpretation of various tests of **Vestibular** evaluation and theirapplicationindifferentclinicalscenarios anddifferentage groups.



Medical Education Technology including (but not limited to) competence based medical education, integrated teaching, new teaching tools and methods etc.

Research Methodology including (but not limited to) various research designs, biostatistics and related factors like sampling, bias etc.

Basics of Evidence based Medicine and Good Clinical Practice.

Principles, technique and clinical applications of various **facial aesthetic, plastic** (including but not limited to Rhinoplasty, Otoplasty, Pinna reconstruction) and **reconstructive** procedures and newer advancements in E.N.T., Head-Neck and Skull Base pathologies.

General pathologic aspects such as wound healing and also Pathology and Pathogenesis of E.N.T. diseases, Pharmacology, genetics, cytology, haematology, blood transfusion and immunology as applicable to otolaryngology.

Principles, techniques and clinical applications of various **targeted therapies** for various Otorhinolaryngologic, Skull Base and Head & Neck tumours including (but not limited to) Gene therapy, molecular biology and immunotherapy etc.

Principles, techniques and applications of various **chemotherapeutic agents** related to Otorhinolaryngologic, Skull Base and Head & Neck tumours.

Principles, techniques and newer modalities of management of **trauma and emergency** in Otorhinolaryngologic, Skull Base and Head & Neck (including but not limited to fractures, CSF leaks, foreign bodies, airway obstructions, bleeding, face and neck injuries, hearing loss, vertigo etc.).

Principles and techniques of **Anaesthesia** in Otorhinolaryngologic, Skull Base and Head & Neck procedures/surgeries including newer modalities.

Pathology, clinical presentation, diagnosis and medical /surgical /rehabilitative management of various diseases of ear, nose, throat, Head-neck, skull base region, larynx, trachea, oesophagus (including but not limited to congenital, developmental, inflammatory, infectious, neoplastic, traumatic, neurological, immune and idiopathic disorders).

Evaluation and management of various **Skull Base Disorders** (including but not limited to Pituitary, orbit, CPA angle, various cranial fossa, Infratemporal/pterygopalatine fossa, clivus etc.).

Principles of management of ear, nose, throat, Head-neck, skull base region disorders **in pediatric and geriatric** population.

Principles of **Preventive and Community Medicine** related to ear, nose, throat, Head-neck, skull base region disorders.

Principles of diagnosis, evaluation and management of **Sleep Disorders**.

Recent advances in the field with relevant technological concepts and their



clinical applications. It includes (but not limited to) computers, lasers, powered instrumentations, energy delivery devices, navigations, endoscopes, hearing aids and implants, cochlear and brain stem implants, stereotactic radiosurgery, gammaknife, cyber knife, robotics, various ultrasonic devices for surgery, Optical Fluorescence, Microscopes etc.

Concepts, technique, clinical applications and interpretations of various related **Radiological** investigations, radiological interventions and newer modalities in E.N.T., Head-Neck and Skull Base pathologies.

Concepts, technique and clinical applications of various related **Radiotherapeutic** modalities and newer advancements in E.N.T., Head-Neck and Skull Base pathologies.

Concepts, technique, clinical applications and interpretations of various related **Nuclear Medicine** modalities and newer advancements in E.N.T., Head-Neck and Skull Base pathologies.

Principles of medical **Jurisprudence and Ethics** in clinical practice.

➤ **Recent advances and developments in the discipline.**

17-OPHTHALMOLOGY

1. Basic Anatomy of Eye. 2. Physiology of Eye.

3. Optics and Refraction of Eye.

4. Eyelids-

Benign nodules and cysts, benign epidermal tumors, benign pigmented lesions, benign adnexal tumors, miscellaneous benign tumors, malignant tumors, disorders of lashes, allergic disorders, bacterial infections, viral infections, blepharitis, ptosis, ectropion, entropion, miscellaneous acquired disorders, cosmetic eyelid and periocular surgery, congenital malformations.

5. Lacrimal Drainage System-

Physiology, causes of watering eye, evaluation, acquired obstruction, congenital obstruction, lacrimal surgery, chronic canaliculitis, dacryocystitis.

6. Orbit- Thyroid eye disease, infections, non-infective inflammatory disease, vascular malformations, carotico-cavernous fistula, cystic lesions, tumors, the anophthalmic socket, craniosynostoses.

7. Dry Eye Disorders- Definitions, physiology, classification, Sjögren's syndrome, clinical features, special investigations, treatment.

8. Conjunctiva-

Bacterial conjunctivitis, viral conjunctivitis, allergic conjunctivitis, conjunctivitis in blistering mucocutaneous disease, miscellaneous conjunctivitis, degenerations.

9. Episclera and Sclera- Episcleritis, immune-mediated scleritis,



infectious scleritis, scleral discoloration, blue sclera, miscellaneous conditions.

10. Lens- Acquired cataract, management of age-

related cataract, new techniques of cataract surgeries, congenital cataract, ectopia lentis, abnormalities of shape, latest development of IOL designs.

11. Glaucoma- Tonometry, gonioscopy, evaluation of the optic nerve, imaging in glaucoma, perimetry, ocular hypertension, primary open-angle glaucoma, normal-pressure glaucoma, primary angle-closure glaucoma, classification of secondary glaucoma, pseudoexfoliation, pigment dispersion,

neovascular glaucoma, inflammatory glaucoma, lens-related glaucoma, traumatic glaucoma, iridocorneal endothelial syndrome, glaucoma in intraocular tumors, glaucoma in epithelial growth, glaucoma in iridodysplasia, primary congenital glaucoma, iridocorneal dysgenesis, glaucoma in phacomatosis, glaucoma medications, newer anti-glaucoma drugs, laser therapy, trabeculectomy, non-penetrating surgery, antimetabolite infiltrations, surgery, drainage shunts.

12. Cornea- The cornea: basic structure and function, limbal stem cell and its clinical application, ocular surface rehabilitation, examination and evaluation techniques of cornea, corneal blindness, epidemiology, infectious diseases of cornea, immunologic diseases of cornea, metabolic and congenital diseases of cornea, conjunctival corneal dysplasia and malignancy, corneal dystrophies and degeneration, corneal surgeries including emerging innovation, modern eye banking : Advances and challenges.

13. Retina- Retinal imaging and diagnosis, basic sciences related to retina, genetics in relation to retina, hereditary retinal and choroidal disease, macular dystrophies, retinal vascular diseases, age-related macular disease, inflammatory and infective diseases of retina and choroid, retinal detachment including newer treatment modalities, surgeries of vitreous and retina, tumors of retina and choroid, endophthalmitis, artificial vision.

14. Uveal Tissue-

Classification of uveitis, immune mechanism in eyes, clinical features, special investigations, principles of treatment, role of immunosuppressants in uveitis, intermediate uveitis, uveitis in spondyloarthropathies, uveitis in juvenile arthritis, uveitis in bowel

disease, uveitis in renal disease, sarcoidosis, Behçet's syndrome, toxoplasmosis, toxocariasis, miscellaneous parasitic uveitis, uveitis in immunodeficiency syndrome, miscellaneous viral uveitis, fungal uveitis, bacterial uveitis, white dot syndromes, primary stromal choroiditis, miscellaneous anterior uveitis, miscellaneous posterior uveitis.

15. Ocular Tumors - Benign epibulbar tumors, malignant and premalignant epibulbar tumors, iris tumors, iris cysts, ciliary body tumors, tumors of

the choroid, neural retinal tumors, vascular retinal tumors, primary intraocular lymphoma, tumors of the retinal pigment epithelium, paraneoplastic syndromes.

16. Strabismus-

Amblyopia, clinical evaluation, heterophoria, vergence abnormalities, esotropia, exotropia, special syndromes, alphabet patterns, surgery.

17. Neuro-Ophthalmology- Neuroimaging, optic nerve, pupillary reactions, chiasma, retrochiasmal pathways, ocular motor nerves, supranuclear disorders of ocular motility, nystagmus, carotid stenosis, intracranial aneurysms, ocular myopathies, neurofibromatosis, migraine, facial spasm.

18. Ocular Pharmacology.

19. Trauma-Eyelid trauma, orbital fractures, trauma to the globe, chemical injuries.

20. Causes and Prevention of Blindness including NPCB & Vision 2020.

21. Ocular manifestations of Systemic diseases eg. Diabetes Mellitus, Hypertension, AIDS, Renal Disorders, Thyroid, Diseases and others.

22. Clinical methods and recent advances in Ophthalmology.

- **Recent advances and developments in the discipline.**
- **Proptosis-Causes and management**
- **Ocular Microbiology**

18A-OBSTETRICS AND GYNAECOLOGY

1. **BASIC SCIENCES:-** Applied and basic of anatomy, physiology, Bio-Chemistry, Pharmacology, Pathology, Microbiology, Endocrine and Genetics in relation to obstetrics & Gynaecology.

2. **OBSTETRICS:-**

- (i) Normal Obstetrics.
- (ii) High Risk & critical Obstetrics.
- (iii) Operative Obstetrics & Applied Anesthesia.
- (iv) Imaging in Obstetrics.
- (v) Prenatal Diagnostics & fetal medicine.
- (vi) Neonatology.
- (vii) Social Obstetrics

3. **GYNAECOLOGY:-**

- (i) Full range of Gynaecological conditions, their diagnostic workup and management.
- (ii) All aspects of operative Gynaecology.
- (iii) Reproductive endocrinology and infertility.
- (iv) Gynaecological Oncology.
- (v) Adolescent & Geriatric Health and Gynaecology.
- (vi) Breast Diseases.
- (vii) Medicolegal aspects in Obst & Gynaecology and examination of victims of Sexual assault.
- (viii) Reproductive Tract Infections.

4. **CONTRACEPTION:-**

- (i) Population Control & Family Welfare and Planning.
- (ii) Statistical Demography.
- (iii) MTP and Comprehensive abortion care.

5. **RECENT ADVANCES**

6. **HEALTH PROGRAMMES & POLICIES [NATIONAL & STATE (Rajasthan)]**

7. **BIOMEDICAL RESEARCH & MEDICAL EDUCATION TECHNOLOGY**

8. **BASIC COMMUNICATIONS SKILLS & COUNSELLING.**

- **Recent advances and developments in the discipline.**



18B-OBSTETRICS AND GYNAECOLOGY(ASSISTANT PROFESSOR/ANTENATAL CARE INCHARGE) AND (MATERNITY AND CHILD WELFARE OFFICER) [Level-11]

1.

BASIC SCIENCES:-Applied and basic of anatomy, physiology, Bio-Chemistry, Pharmacology, Pathology, Microbiology, Endocrine and Genetics in relation to obstetrics & Gynaecology.

2. OBSTETRICS:-

(iv) Normal Obstetrics.

(v) High Risk & critical Obstetrics.

(vi) Operative Obstetrics & Applied Anesthesia. (iv) Imaging in Obstetrics.

(v) Prenatal Diagnostics & fetal medicine.

(vi) Neonatology.

(vii) Social Obstetrics

3. GYNAECOLOGY:-

(iv) Full range of Gynaecological conditions, their diagnostic workup and management.

(v) All aspects of operative Gynaecology.

(vi) Reproductive endocrinology and infertility. (iv) Gynaecology.

(v) Adolescent & Geriatric Health and Gynaecology. (vi) Breast Diseases.

(ix) Medico-legal aspects in Obst & Gynaecology and examination of victims of Sexual assault.

(x) Reproductive Tract Infections.

4. CONTRACEPTION:-

(i) Population Control & Family Welfare and Planning. (ii) Statistical Demography.

(iii) MTP and Comprehensive abortion care.

5. RECENT ADVANCES

6. HEALTH PROGRAMMES & POLICIES [NATIONAL & STATE (Rajasthan)]

7. BIOMEDICAL RESEARCH & MEDICAL EDUCATION TECHNOLOGY

8. BASIC COMMUNICATIONS SKILLS & COUNSELLING.

➤ **Recent advances and developments in the discipline.**

19-RADIO DIAGNOSIS

Unit: I Basic Science

- A. **Anatomy**—Embryology, Gross and cross sectional anatomy of all the body systems of human.
- C. **Pathology**—Gross morphology of pathological conditions of systemic diseases affecting all organs and systems.
- D. **Human Physiology**—Basic human physiology of all systems & organs.

Unit: II Clinical Radio-diagnosis

This would cover imaging and interpretation of diseases affecting all the body systems:

1. **Musculo-skeletal System**— Interpretation of diseases of muscles, soft tissue, bones and joints including congenital, inflammatory, traumatic, endocrine and metabolic, neoplastic and miscellaneous conditions.
2. **Respiratory System**— Interpretation of diseases of the chest wall, diaphragm, pleura and airway; pulmonary infections, pulmonary vasculature; pulmonary neoplasm; diffuse lung disease; mediastinal disease, chest trauma; post-operative lung and X-ray in intensive care.
3. **Cardiovascular System**— Interpretation of diseases and disorders of cardiovascular system (congenital and acquired conditions) and the role of imaging by conventional radiology, ultrasound, colour Doppler, CT, MRI, Angiography and Isotopes Studies.
4. **Gastro-intestinal tract and hepato-biliary pancreatic system**— Interpretation of diseases and disorders of mouth, pharynx, salivary glands, esophagus, stomach, small intestine, large intestine, diseases of omentum, peritoneum and mesentery: acute abdomen, abdominal trauma. Diseases and disorders of liver, biliary system and pancreas.
5. **Urogenital System**— Interpretation of various diseases and disorders of genitorurinary system. These include: congenital, inflammatory, traumatic, neoplastic, calculus disease and miscellaneous conditions.
6. **Central Nervous System (C.N.S.)**— Interpretation of diseases and disorders of the head, neck and spine covering, congenital, infective, vascular, traumatic neoplastic degeneration metabolic and miscellaneous condition.
7. Imaging in Emergency Medicine.
8. Imaging in Obstetrics and Gynecology.
9. Imaging of Breast and interventional procedures.
10. ENT, EYE and Dental Imaging.
11. Imaging of endocrine glands and those involved with metabolic diseases.
12. Clinical applied radionuclide imaging.
13. Interventional Radiology.

Unit: III Radiological Physics

1. Introduction of general properties of radiation and matter: Fundamentals of nuclear physics and radioactivity.
2. Interaction of x-rays and gamma rays with matter and their effects on irradiated materials.



3. X-rayGenerating Apparatus.
4. Screen-filmradiography.
5. Filmprocessing: Dark room, dryprocessing, laser /drychemistrycameras, artifacts.
6. Fluoroscopy: IITV, Digital including flat panel units and fluoroscopy cum radiography units.
7. Digital radiography: Computed Radiography, Flat panel radiography.
8. Other equipments: Ultrasound including Doppler, CT, DEXA, MRI, and DSA.
9. Contrast Media (Barium, Iodinated, MR & Ultrasound contrast) - types, chemical composition, mechanism of action, dose schedule, route of administration, adverse reaction and their management.
10. Nuclear Medicine: Equipments including scintigraphy, Bone scan, SPECT & PET. Isotopes in various organ systems and recent advances.
11. Radiation biology & Hazards, Radiation protection and dosimetry.
12. Image quality and Quality Assurance (QA).
13. Regulatory control for radiation in India & abroad - e-LORA, AERB, ICRP.

Unit: IV General & Specialized Radiography and processing techniques

1. Processing techniques: includes darkroom and dry processing.
2. Radiography of the musculo-skeletal system including extremities.
3. Radiography of the chest, spine, abdomen and pelvic girdle.
4. Radiography of the skull, orbit, sinuses.
5. Contrast techniques and interpretation of GI tract, hepato-biliary tract, pancreas etc.
6. Contrast techniques and interpretation of the Central Nervous system.
7. Contrast techniques and interpretation of the cardiovascular system including chest.
8. Contrast techniques and interpretation of the genito - urinary system including Obstetrics and Gynaecology.
9. Paediatric radiology including MCU, genitogram, bone age.
10. Dental, portable and emergency (casualty) radiography.

Unit: V Recent advances in radio-diagnosis and imaging & its clinical applications

1. Ultrasound elastography, 3-D printing, 3-D & 4-D Ultrasonography.
2. Digital Mammography & tomosynthesis, Stereotactic Biopsy.
3. Dual energy CT scanner, CT fluoroscopy, CT angiography, MDCT.
4. Functional MRI, DTI & advanced MR sequences.
5. PET-CT, PET-MR.
6. Evidence based radiology.
7. Artificial Intelligence in Radio-diagnosis.
8. Nuclear Molecular imaging.
9. Various Diagnostic & therapeutic interventions in Radio-diagnosis and their tools.
10. Picture Archiving and Communication System (PACS) and Radiology Information System (RIS) to make a film-less department and for Teleradiology.
11. Planning a Modern imaging Department.

Unit: VI Ethical & Medico-legal Issues in Radio-diagnosis

1. Medico-legal imaging reporting, PC-PNDT Act with amendments, Consumer protection act.
2. Ethical issues, Doctor patient relationship, Image interpretation & reporting issues.

➤ **Recent advances and developments in the discipline.**

20-RADIOTHERAPY

Unit-I-BASIC SCIENCES:

- **Anatomy** - Anatomy pertaining to Oncology, Cross-sectional anatomy, Relationship of vital structures.
- **Pathology**-General Pathology pertaining to oncology- Malignant transformation, Criteria for tumor diagnosis, macroscopic, histological & cytological uses & value of biopsy material, Tumor Markers, Cytogenetics, Molecular Pathology, and Immunohistochemistry, Classification of tumors - histogenic, histological, behavioral & immunological. Nomenclature - solid tumors, lymphomas, leukemias Endocrine aspects of malignancy :- production of hormones by tumors, the effect of hormones on tumors, paracrine effects of tumors. Paraneoplastic syndromes, Etiology of cancer, Tumor immunology.
- **Radiation Oncology Physics** -
 - *Structure of Matter* : Constituent of atoms, Atomic and mass numbers, Atomic and mass-energy units, Electron shells, Atomic energy levels, Nuclear forces, Nuclear energy levels, Nuclear binding energy. Electromagnetic radiation, Electromagnetic spectrum, Energy-quantization, Relationship between Wavelength, Frequency, Energy.
 - *Nuclear Transformations* : Natural and artificial radioactivity, Alpha and Beta decay, Decay constant, Activity, Physical, Biological and Effective half-lives, Mean life, Decay processes, Radioactive series, Radioactive equilibrium.
 - *Production of X-rays* : The X-ray tube, X-ray circuits, Physics of X-ray production, Continuous spectrum, Characteristic spectrum, Efficiency of X-ray production, Distribution of X-rays in space, Specifications of beam quality, Measurement of beam quality, Filters, and filtration.
 - *Interaction of radiation with matter*: Attenuation, Scattering, Absorption, Transmission, Attenuation coefficient, Half Value Layer (HVL), Energy transfer, Absorption, and their coefficients. Photoelectric effect, Compton Effect, Pair-production, Relative importance of different attenuation processes at various photon energies. Electron interactions with matter: Energy loss mechanisms- Collisional losses, Radiative losses, Ionization, Excitation, Heat production, Delta rays, Polarization effects, Scattering, Stopping power, Absorbed dose, secondary electrons. Interactions of charged particles: Ionization vs. Energy, Stopping power, Linear Energy Transfer (LET), Bragg curve, Definition of particle range.
 - *Measurement of radiation* : Radiation Detectors : Gas, Solid-state, Scintillation, Thermoluminescence, Visual Imaging (Film, Fluorescent screens), and their examples. *Exposure, Dose, Kerma* : Definitions, Units (Old, New), Inter-relationships between units, Variation with energy

See

and material. Measurement of exposure (Free air chamber, Thimble chamber), Calibration of therapy beams: Concepts, Phantoms.

Quality assurance checks on radiation therapy units.

Protocols (TG21, IAEA TRS-277, TG51) Dose determination in practice (brief outline only, details not required)

- *Radiotherapy Equipment:* Grenz ray, Contact, Superficial, Orthovoltage or Deep therapy, Supervoltage, Megavoltage therapy. Therapy and diagnostic X-ray units – comparison. Filters, factors affecting output, principles of cooling. Betatrons.

Co-

60 units: Comprehensive description of the unit, Safety mechanisms, Source capsule.

Linear accelerators: History, Development, Detailed description of a modern, dual model linear accelerator, Linac head, and its constituents, Safety mechanisms, Computer-controlled linacs, Record and Verify systems, Relative merits and demerits of Co-60 and linac units,

Betatrons, Cyclotrons: for neutron therapy, *Simulators:* Need for them, Detailed description of a typical unit, Simulator CT.

- *Basic ratios, Factors, Dose distributions, Beam modifications and Shaping in Teletherapy beams.*

Characteristics of photon beams: Quality of beams, Difference between MV and MeV, Primary and scattered radiation.

Percentage depth dose, Tissue-Air Ratio, Scatter Air Ratio, Tissue-Phantom Ratio, Tissue Maximum Ratio, Scatter Maximum Ratio, Back Scatter Factor, Peak Scatter Factor, Off-Axis Ratio, Variation of these parameters with depth, field size, source-skin distance, beam quality or energy, beam flattening filter, target material. Central, axis depth dose profiles for various energies.

Equivalent square concept, Surface dose (entrance and exit), Skin sparing effect, Output factors.

Practical applications: Co-

60 calculations (SSD, and SAD technique), Accelerator calculations (SSD, and SAD technique)

Beam profiles, Isodose curves, Charts, Flatness, Symmetry, Penumbra (Geometric, Transmission and Physical), Field size definition.

Body inhomogeneities: Effects of patient contour, Bone, Lung cavities, Prosthesis on dose distribution. Dose within bone / lung cavities, Interface effects,

Electronic Disequilibrium, Wedge filters and their use, Wedge angle, Wedge Factors, Wedge systems (External, In-built Universal, Dynamic / Virtual), Wedge isodose curves Other beam modifying and shaping devices: Methods of compensation for patient contour variation

and/or tissue inhomogeneity- Bolus, Build up material, Compensators, Merits and Demerits.

Shielding of dose-limiting tissue: Non-divergent and Divergent.

beam blocks, Independent jaws, Multileaf collimators, Merits and Demerits.

See

- *Principles of Treatment Planning-I*
Treatment planning for photon beams: ICRU 50 and relevant ICRU reports and NACP terminologies. Determination of body contour and localization: Plain film, Fluoroscopy, CT, MRI, Ultrasonography, Simulator based Methods of correction for beam's oblique incidence, and body inhomogeneities. SSD technique and isocentric (SAD) technique: Descriptions and advantages of SAD technique. Combination of fields: Methods of field addition, Parallel opposed fields, Patient thickness vs. Dose uniformity for different energies in a parallel opposed setup, Multiple fields (3 fields, 4 field box, and other techniques). Examples of above arrangements of fields in SSD and SAD techniques, Integral Dose, Wedge field technique, Rotation Therapy (Arc, and Skip), Tangential fields. Beam balancing by weighting. Total and Hemi-body irradiation. Field junctions.
- *Principles of treatment planning -II*
Limitations of manual planning. Description of a treatment planning system (TPS): 2D and 3D TPS. Beam data input, Patient data input (simple contour, CT, MR data, Advantages of transfer through media), Input devices (Digitizer, floppy es, DAT devices, Magneto-optical disks, direct link with CT, MR). Beam selection and placement, Beam's Eye View (BEV), Dose calculation and display (Point dose, Isodose curves, Isodose surfaces, Color wash). Plan optimization, Plan evaluation tools: Dose-Volume Histograms (Cumulative and Differential), Hard copy output, Storage and retrieval of plans.
Alignment and Immobilization: External and internal reference marks, Importance of immobilization in radiotherapy, Immobilization methods (Plaster of Paris casts, Perspex casts, bite block, shells, headrests, neck rolls, Alpha-Cradles, Thermoplastic materials, polyurethane foams), Methods of beam alignment (isocentric marks, laser marks, and front/back pointers).
Treatment execution: Light field, Crosshair, ODI, Scales in treatment machines. *Treatment verification*: Port films, Electronic portal imaging devices, In-vivo patient dosimetry (TLD, diode detectors, MOSFET, Film, etc) Changes in patient position, target volume, and critical volume during the course of treatment.
- *Electron Beam Therapy*
Production of electron beams: Production using accelerators, Characteristics of electrons. Surface dose, percentage depth dose, beam profiles, Isodose curves and charts, Flatness and Symmetry. Beam collimation, the variation of percentage depth dose and output with field size, and SSD, photon contamination. Energy spectrum, Energy specification, the variation of mean energy with depth. Suitability of measuring instruments for electron beam dosimetry.
Treatment planning: Energy and field size choice, air gaps, and obliquity, Tissue inhomogeneity - lung, bone, air-filled cavities. Field junctions (with either electron or photon beam). External and internal shielding. Arc therapy, Use of the bolus in electron beam. Total Skin Electron Irradiation, Intraoperative Radiation Therapy.
- *Physical Principles of Brachytherapy*: Properties of an ideal brachytherapy source, Sources used in brachytherapy: Ra-226, Cs-

See

137, Ir-192, Au-198, Co-60, I-125, Sr-90, Yt-90, Ru-106, Ta-182, and other new radionuclides. They're complete physical properties, Radium hazards. Source construction including filtration, comparative advantages of these radionuclides. Historical background. Radiation and Dose units: Activity used, Exposure, Absorbed Dose, mg-hr, curie, millicurie, destroyed, milligram Radium equivalent, roentgen, rad, gray. Sources strength specification, Brachytherapy Dose calibrator.

Techniques: Pre-loaded, Afterloading (manual and remote), Merits and Demerits. Surface, Interstitial, Intracavitary, Intraluminal, Intravascular brachytherapy.

Low, Medium, High and Pulsed dose rates. Remote afterloading machines, Detailed description of any one unit.

Dosage systems: Manchester System (outline only), Paris System (working knowledge).

Treatment Planning: Patient selection, Volume specification, Geometry of implant, Number, Strength, and Distribution of radioactive sources, Source localization, Dose calculation, Dose rate specification, Record keeping. ICRU 38.

Radiation Safety: Planning of brachytherapy facility, Rooms, and equipment, Storage and Movement control, Source inventory, Disposal, Regulatory requirements, Beta-ray brachytherapy including methods of use, inspection, storage and transport of sources, dose distribution.

Unsealed radionuclides: Concepts of uptake, distribution, and elimination, Activities used in clinical practice, Estimation of dose to target tissues, and critical organs, Procedures for administering radionuclides to patients.

- *Quality Assurance in radiotherapy (QART)*

Overview of ESTRO QART: Need for a quality system in Radiotherapy,

Quality System: Definition and practical advantages, Construction, Development, and Implementation of a Quality System.

Quality Assurance of Simulator, TPS, Co-60, linear accelerator. Acceptance testing of Simulator, TPS, Co-60, linear accelerator.

- *Radiation Protection from External and Internal sources and Regulatory Aspects* : Statutory Framework –

Principles underlying International Commission on Radiation.

Protection (ICRP) recommendations. ICRP and National radiation protection

i.e. Atomic Energy Regulatory Board (AERB) standards. Effective dose limits (ICRP and AERB).

Protection mechanisms : Time, Distance and Shielding. Concept of "As Low As Reasonably Achievable" (ALARA).

Personnel and Area Monitoring : Need for personnel monitoring, Principles of film badge, TLD badge used for personnel monitoring. Pocket dosimeter. Need for area monitoring, Gamma Zone monitors, Survey meters.

Regulatory aspects : Procedural steps for installation and commissioning of a new radiotherapy facility (Teletherapy and Brachytherapy). Approval of the Standing Committee on Radiotherapy Development Programme. Type approval of unit. Site plan, Layout of installation/Associated facility: Primary, Secondary barriers,



leakage, and scattered radiation. The regulatory requirement in the procurement of teletherapy/Brachytherapy source(s). Construction of the building, Qualified staff, Procurement of instruments, and accessories, Installation of unit and performance tests, Calibration of the unit, RP&AD approval for clinic and commissioning of the unit.

Other regulatory requirements: Regulatory consent, NOCs, Periodical reports to AERB and Radiological Physics and Advisory Division (RP&AD), Bhaba Atomic Research Centre (BARC).

▪ **Advancements in Radiation Oncology:**

Virtual Simulation: Principle, CT-

Simulation, TPS based virtual simulation, Differences, Merits and Demerits, Practical considerations.

Conformal radiotherapy (CRT): Principles, Advantages over conventional methods, Essential requirements for conformal radiotherapy.

Various methods of CRT:

1. With customized field-shaping using conventional coplanar beams

2. Multiple non-coplanar MLC beams conforming to target shape

3. Stereotactic radiotherapy

4. Principle of

Inverse planning and Intensity Modulated Radiation Therapy (IMRT)

– Using 3D compensators

– Static IMRT (Step and shoot technique)

– Dynamic IMRT (sliding window technique)

– Dynamic arc IMRT

– Micro-MLC

– Tomotherapy methods

5. Time gated (4D) radiotherapy, Merits and demerits of IMRT, Stereotactic irradiation methods: Physics principles, Techniques, Description of Units (Gamma Knife and Linac based-Cyber Knife, Tomotherapy), Merits and demerits, Stereotactic Radiosurgery (SRS) and Stereotactic Radiotherapy (SRT), Whole body stereotactic frame.

Networking in radiotherapy: Networking of planning and treatment units in a radiotherapy department including Picture Archival Communication System (PACS), Advantages, Patient, Data Management.

▪ **Planning of a Radiotherapy Department**

Building designs, Choice of various types of equipment and sources, Acceptance and Calibration Tests, Various maintenance steps and procedures.

• **Radiobiology**

☐ Introduction to Radiation Biology.

☐ Radiation interaction with matter.

☐ Introduction to factors influencing radiation response.

☐ The relevance of radiation biology to radiotherapy.

☐ Interaction of ionizing radiation on mammalian cells.

☐ Organ radiosensitivity and radioresponsiveness, the concept of therapeutic index.

☐ Acute effects on Radiation.

☐ Radiation Effects on Major Organs/tissues.

☐ Late effects of radiation (somatic).

☐ Late Effects of Radiation (Genetic).

- ☐ Effects of Radiation on Human Embryo & Fetus.
- ☐ Biology and Radiation Response of Tumors.
- **Applied Radiobiology**
 - Fractionation: rationale, factors involved (4R's).
 - Time, dose, and fractionation relationship: isoeffect curves, isoeffect relationships, e.g. NSD, CRE formalisms and their limitations, partial tolerance, means of summing partial tolerance, steepness of dose-response curves.
 - Multi-target, two-component and linear-quadratic model. a/b ratios for acute and late effects and means of deriving these values. Isoeffective formulae. Clinical applications of the LQ model, hyperfractionation, accelerated fractionation, hypofractionation, CHART, split dose treatments.
 - Brachytherapy-low dose rate, high dose rate, and pulsed treatments.
 - Introduction to new techniques to optimize radio-curability; combination therapy (adjuvant surgery or chemotherapy), hyperthermia, hypoxic cell radio-sensitizers, high LET radiation. Photodynamic therapy.
 - The volume effect, general principles, and current hypotheses. Shrinking Field technique.
 - Combination Radiation-Surgery*
 - Pre-, post- and intra-operative radiation.
 - Rationale, radiobiological factors, current clinical results.
 - Irradiation of sub-clinical disease, debulking surgery, the importance of clonogenic numbers.
 - Combination Radiation-Chemotherapy*
 - Definitions of radio sensitizer, synergism, potentiation, antagonism. Radiosensitizers: types, mechanism.
 - Hyperthermia Sources, the rationale (historical examples), advantages and disadvantages, thermo tolerance.
 - Cellular damage: comparison and contrast with radiation, thermal and non-thermal effects of ultrasound, microwaves, radiofrequency, etc.
 - General host responses (immunology, metastases).
 - Use along with radiotherapy and chemotherapy: optimum sequencing of combined modalities. Current limitations to the clinical use of hyperthermia.
- **High LET Radiation**
 - Comparison and contrast with low LET radiation.
 - Neutrons: source (including ^{252}Cf) and boron neutron capture (outline only). Advantages and disadvantages of neutrons, RBE values, hazards of low dose and low energy neutron, use in radiotherapy, combination with low LET, current clinical results. Other high LET particles: protons, mesons, high-energy heavy nuclei, application to radiotherapy, current clinical results.
- **Nuclear Medicine**
 - ☐ **Radiopharmaceuticals**
 - (a) Physical and Chemical Characteristics of radionuclide used in Nuclear Medicine.
 - (b) Radiopharmacy generator produced radiopharmaceutical.
 - (c) Criteria for selection of radionuclide.
 - (d) The biological behavior of radiopharmaceuticals.
 - (e) Quality control.



- (f) Mechanism of localization.
- (g) Radiopharmaceuticals for therapy.
- (h) Positron Emission radio-nuclide their preparation, various modules of nuclear reactions, target reactions, and chemistry.
- (i) Specific topics on Bone seeking Radiopharmaceutical, Hepatobiliary, Tumor seeking, Cardiac Imaging, Radiopharmaceuticals for Research, etc.

- **Therapeutic uses of Radionuclide**

Application of isotope in Therapy in the following areas:

- 1) Thyrotoxicosis
- 2) Cancer Thyroid – both low dose & high dose
- 3) Bone Palliation using P32, Sr 89 & Sm153.
- 4) I-131 Lipidol for Hepatic cancer

- **Clinical trials - Statistical basis for planning & interpretation**

Clinical Trials.

- Advantages & disadvantages
- Retrospective & prospective studies
- Controlled & uncontrolled trials
- Single-blind & double-blind studies
- Phase I, II & III trials
- Ethics (Helsinki declaration).

Unit-II-CLINICAL RADIOTHERAPY:

- **Cancer Epidemiology & Etiology**

- Cancer Statistics - worldwide & India
- Cancer Registries & National Cancer Control Programme.
- Analysis of data in cancer registries.
- Regional Cancer Centers
- Cancer Screening & Prevention.

- **Patient Care**

- Assessment & referral systems for radiotherapy
- Diagnosis & workup.
- Staging.
- Care & evaluation during & after treatment.
- Emergencies in Oncology.
- Management of different malignancies i.e.
 - Skin Cancer, Central Nervous System Tumor/Orbital Tumors/Spinal Tumors, Head and Neck Tumors, Thoracic Tumors, Breast Tumors, Gastrointestinal Tumor, Liver, Gallbladder, bile duct, and pancreatic tumors, Pediatric Tumors, Gynecologic Tumors, Male Genitourinary Tumors, Urinary Tract Tumors, Endocrine Tumors, Hematological Malignancies – Leukemias, lymphomas and Plasma cell. Neoplasm Sarcomas of Bone and Soft tissues. Metastasis of Unknown Origin, AIDS-related Malignancies, Oncologic Emergencies.
- Endocrine aspects of malignancy :- production of hormones by tumors, effect of hormones on tumors, paracrine effect of tumors Paraneoplastic syndromes, Benign Diseases, Hereditary cancer syndromes.

- **Techniques of Radiotherapy**

- Small field beam directed therapy
- Extended and irregular field therapy



- Beam modification therapy
- Rotation arc therapy
- Intracavitary, interstitial and mold application
- **Treatment planning and presentation**
 - Mold room practices
 - Simulation
 - The computerized treatment planning system
 - Clinical dosimetry
 - Prescription and execution
- **Treatment Response & Result**
 - Guidelines for treatment response assessment - Complete Response, Partial Response, No Response, and Stable disease.
 - Endpoints of treatment results: Local control, recurrence, metastasis, survival, quality of life.
 - Treatment-related morbidity assessment
 - (i) Radiation morbidity (early & late)
 - (ii) Morbidities of combined treatment
 - (iii) Grading Systems.

Unit-III-CLINICAL CHEMOTHERAPY:

- **Basic principles and clinical practice of chemotherapy**
 - Classification of Chemotherapy drugs.
 - Newer chemotherapeutic agents.
 - Clinical application of
 - Single drug therapy
 - Polychemotherapy and various combinations
 - Adjuvant therapy
 - Prophylactic therapy
 - Chemotherapy practice in various malignancies.
 - Chemotherapy practice & results/toxicities in sequential & concomitant Chemoradiotherapy.
 - Supportive care for chemotherapy.
 - The basic principles underlying the use of chemotherapeutic agents.
 - (i) Classification and mode of action of cytotoxic drugs. The principles of cell kill by chemotherapeutic agents, drug resistance, phase-specific, and cycle-specific action.
 - (ii) Drug administration. The general principles of pharmacokinetics; factors affecting drug concentration, „in vivo“ including route and timing of administration, drug activation, plasma concentration, metabolism, and clearance.
 - (iii) Principles of combinations of therapy, dose-response curves, adjuvant and neoadjuvant chemotherapy, sanctuary sites, high dose chemotherapy, and regional chemotherapy.
 - (iv) Toxicity of drugs. Early, intermediate and late genetic and somatic effects of common classes of anticancer drugs. Precautions in the safe handling of cytotoxic drugs.
 - (v) Endocrine manipulation and biological response modifiers. An understanding of the mode of action and side effects of common hormonal preparations used in cancer therapy (including

See

corticosteroids). Use of the major biological response modifiers such as interferons, interleukins, and growth factors and knowledge of their side effects.

(vi) Assessment of New Agents. Principles of phase I, II, and III studies.

(vii) Gene Therapy

- Immunotherapy - Clinical application and uses in various malignant conditions, toxicity and toxicity management.

Unit-IV-Other Disciplines Allied to Radiotherapy and Oncology :

- **Principles and Practice** of general surgery, gynecology and pediatric Surgery as related to cancer.
- Basic principles of surgical oncology, biopsy, conservation surgery, radical surgery, palliative surgery.
- Methods of Clinical staging and TNM classification.
- Basics of surgical techniques - head & neck, breast, thorax, abdomen, gynecological, genitourinary, musculoskeletal, CNS.
- Combined treatments: with radiotherapy, chemotherapy, and hormonal therapy.
- Preventive oncology
- Prevention and early detection of cancer.

Unit-V-PALLIATIVE CARE:

- Guidelines for palliative care
- Symptoms of advanced cancer
- Management of terminally ill patients.
- Different pharmacologic & non-pharmacologic methods
- Pain control, WHO guidelines for adults & children.
- Palliative radiotherapy
- Palliative chemotherapy
- Home care
- Hospice care
- Physical, social, spiritual & other aspects.

Unit-VI-Research, Training and Administration:

• Research in Oncology

- How to conduct research
- Guidelines for biomedical research: Animal studies, drug studies, human trial.
- Cancer clinical trials. Phase I/II/III
- Ethics of clinical research
- Evidence-based medicine.

• Administration Radiotherapy and Oncology.

- Clinical Oncologists' role as an administrator.
- How to set up a Radiotherapy and Oncology department, planning of infrastructure & Equipment.
- Cancer registry and epidemiology
- Role in the cancer control program, Cancer screening programs
- Responsibilities towards safety & quality assurance.

• Special topics

- ☐ Oncological Emergencies
- ☐ TLI, Extracorporeal irradiation (ECI) and TBI - Role and Techniques



- ☐ Radiation treatment of benign diseases and tumor-like conditions
- ☐ Preventive Oncology
- **New Radiation Modalities**
 - ☐ Protons therapy
 - ☐ Neutron therapy
 - ☐ Pion therapy
 - ☐ High energy heavy ions (Carbon and others) therapy
 - ☐ Hyperthermia

➤ **Recent advances and developments in the discipline.**

21-ANAESTHESIOLOGY

1. Basic Sciences as Applied to Anaesthesiology including Anatomy, Physiology, Biochemistry, Pharmacology and Physics, Chemistry.
2. Principles and practice of Anaesthesia and analgesia with Anaesthetic Management. Clinical Science in relation to Anaesthesiology (This will include essentials of Internal Medicine and Surgery).
3. Pre-anaesthetic evaluation, treatment and Anaesthetic implications of concurrent diseases, Anaesthetic Complications, Post-operative management, Post Anaesthesia care unit.
4. Specialities of:
 - Paediatric Anaesthesia.
 - Cardio-Vascular and thoracic Anaesthesia.
 - Neurosurgical Anaesthesia.
 - General and Orthopaedic Surgery, Minimal Invasive Surgery, Day Care Surgery.
 - E.N.T., Ophthalmic Surgery, Dental Surgery, Anaesthesia for Neurological and Psychiatric diseases.
 - Obstetrics & Gynaecology, Labour Analgesia.
 - Geriatric Anaesthesia and others.
5. Regional Anaesthesia.
6. Anaesthesia for organ transplantation, Laser Surgery, Endoscopic Surgery. Anaesthesia outside the operating room.
7. Anaesthesiology and Pain management, Critical Care Medicine, Ventilators, Polytrauma, Disaster Medicine.
8. Monitoring in Anaesthesiology. Use of Electronics and Computer devices in Anaesthesia. Awareness during Anaesthesia.
9. Recent Advances and current concepts in Anaesthesia and Analgesia.
10. Medical legal aspects in relation to Anaesthesiology. Anaesthesia record keeping and quality assurance.
11. Basic and advanced Life Supports.



12. Basics of Research methodology and statistics.
- **Recent advances and developments in the discipline.**

22-PHYSICAL MEDICINE & REHABILITATION

Unit: I

- Basic Anatomy and Physiology of the Musculoskeletal (including Biomechanics), Urogenital, Cardio-pulmonary and nervous systems, etc.
- Basic Pathological processes causing diseases and disabilities, healing etc.
- Basic principles of Pharmacology as applied to the conditions encountered in Physical Medicine and Rehabilitation.
- Philosophy, history, scope and need of Physical Medicine and Rehabilitation.
- Basic concepts in Physical Medicine and Rehabilitation- definitions, rehabilitation team, team members, scope, role and responsibilities of different members etc.
- Organisation and Administration of Physical Medicine and Rehabilitation Services.
- Disability process. Impairment, disability, International Classifications.
- Disability Prevention- levels and examples.

Unit: II

- Basics of biochemical aspects of Calcium and Vit. D metabolism, osteoporosis, diabetes mellitus etc.
- Basic principles of diagnostic modalities as applied to Physical Medicine and Rehabilitation (Laboratory, radiological etc.)
- Principles of evaluation and rehabilitation management of social problems.
- Principles of evaluation and rehabilitation management of vocational problems.
- Gait Analysis- Terminology, types, Clinical Applications.
- Electrodiagnostic Medicine - basic principles, clinical methods, interpretation etc.
- Outcome Measures in Physical Medicine and Rehabilitation.
- Impairment Rating and Disability Evaluation.
- Community based Rehabilitation.
- Rehabilitation Nursing, Principal and management.



Unit: III

- Therapeutic exercises-principles, types, indications, contraindications.
- Physical agents/modalities - principles, types, indications, contraindications, precautions.
- Manipulation, traction, massage-principles, types, indications, contraindications, precautions.
- Electrical stimulation-principles, types, indications, contraindications, precautions.

Unit: IV

- Principles and scope of Occupational Therapy.
- Rationale of A.D.L. (Activities of Daily Living) in various conditions.
- Integrative Medicine and Physical Medicine and Rehabilitation.
- Mobility aids, wheelchairs and seating systems.

Unit: V

- Upper limb orthotic devices including splints- principles, types, materials and indications.
- Lower limb orthotic devices including footwear modifications- principles, types, materials and indications.
- Spinal orthoses-principles, types, materials and indications.
- Upper limb prosthetics and amputee rehabilitation.
- Lower limb prosthetics and amputee rehabilitation.

Unit: VI

- Low back pain and Physical Medicine and Rehabilitation.
- Neck pain and shoulder pain.
- Various musculoskeletal disorders, evaluation, diagnosis, management and rehabilitation in Physical Medicine and Rehabilitation.
- Pain (acute/chronic), pathophysiology, pathway, evaluation, management and Rehabilitation.

Unit: VII

- Holistic management and Rehabilitation of persons suffering from : Arthritis, including Rheumatoid Arthritis, Osteoarthritis, Ankylosing Spondylitis etc. Spinal deformity, Osteoporosis, Burns Injury, Haemophilia.

Unit: VIII

- Spinal Cord Injury (traumatic and non-traumatic), Etiology, Pathophysiology, Mechanism of injury, Radiology imaging, Evaluation, Various acute/chronic complications and their management/Rehab. Management Rehabilitation.

Unit: IX

- Various types of wounds, their management and rehabilitations.
 - Rehabilitation of persons with : - Obesity, dyslipidemia etc.
- After arthroplasty, after POP cast, fracture treatment, surgical intervention.
- Principles of Sports Medicine, diagnosis, evaluation, prevention,



and
management of sports injuries.

- Basic principles of rehabilitative surgeries such as deformity correction in poliomyelitis, cerebral palsy, clubfoot, contractures, revision of amputation stump, pressure sore, tendon transfers etc.

Unit :X

- Various joint and soft tissue injection techniques (with or without image guided) in Physical medicine and Rehabilitation, Indications/contraindications Principles, Procedures, Advantage/disadvantage, Rationale of procedure.
- Various nerve blocks and myoneural blocks in Rehabilitation Medicine.
- Botulinum injection in Rehabilitation Medicine.
- Various plaster techniques in PMR.

Unit: XI

- ☐ Holistic Rehabilitation of persons suffering from : Plexus or Nerve Injury, Traumatic Brain Injury, Stroke, Parkinsonism, Multiple sclerosis, Ataxia, and other movement disorders, neurodegenerative disorders, Epilepsy, Autonomic disorders etc., Neuropathy, Bell's Palsy etc., Hansen's Disease, Diseases of Muscle e.g. myopathy, motor-neuron disease, myasthenia gravis etc., Cerebral Palsy, Spasticity, Poliomyelitis and its sequelae, Cardiovascular Disease e.g. CAD, MI, CABG Surgery, Angioplasty, Cardiac transplantation etc., Peripheral vascular disease, Pulmonary Disease e.g. COPD, Bronchiectasis, Cystic fibrosis etc., Obstetrics and gynaecological disorders, Cancer, Swallowing disorder, Bladder dysfunction, Bowel dysfunction, Vertigo, HIV/AIDS, Chronic Pain, Neural tube defects like meningocele and hydrocephalus etc.

Unit: XII

- ☐ Pediatric Rehabilitation including children with Autism Spectrum Disorders, learning disabilities, multiple disabilities etc.
- ☐ Geriatric Rehabilitation.
- ☐ Principles of evaluation and rehabilitation management of persons with : Visual impairment, Mental retardation, Hearing/speech impairment, Psychological problems or mental illness.

Unit: XIII

- ☐ Medical/Surgical Emergencies in Physical Medicine and Rehabilitation
- ☐ Sexuality and Disability
- ☐ Rehabilitation of persons: After Organ Transplantation, In ICU setting.

Unit: XIV

- Evidence-based Medicine and Physical Medicine and Rehabilitation.
- Legislation in relation to disability - National and International.
- Functional evaluation, Impairment rating, disability evaluation and certification including guidelines for these
- Schemes and Benefits extended to persons with disabilities by the Govt.

Unit: XV

- Barrier-free Environment and access related issues.
- Computers in Physical Medicine and Rehabilitation.
- Assistive Technology related to Physical Medicine and Rehabilitation.



- RecentAdvancesrelatedtoPhysicalMedicineandRehabilitation.
- Ethicalaspectsinrehabilitation.
- Researchmethodology

➤ **Recent advances and developments in the discipline.**

23-DENTISTRY

Unit-I-Anatomy:

- Detailed Anatomy&OsteologyofHead& Neck.
- Studyof cranial nerves–in detail extracranialcourse5th, 7th

Unit-II-Biochemistry:

- BiochemistryappliedtoDentalScience.
- Basicchemistry&fateofhaemoglobin,bloodgroups,WBCtypes,number,variations,function,formation, circulation.
- Vitamins.

Unit-III-Physiology:

- Pituitarygland -Hormones,actions& abnormalfunction.
- Inflammation-Acute &chronicinflammation,repairofwound.
- Hemorrhage,Shock,Syncope.
- Circulatorydisturbance &Hypertension.
- Medicaemergenciesin Dentalpractice.
- Congenital&rheumaticheartdisease.
- Anaemia,coagulationdefects,bleedingdiseases.
- Allergy, Drugreactions.



Unit-IV– Microbiology:

- Introduction to Bacteriology with special reference to medical & Dental Bacteriology.
- Immunity & immunizing agents.

Unit-V-Pharmacology:

- Cardiovascular Drugs - Vasopressor agents & treatment of shock.
- Drugs acting on blood - anticoagulants, coagulants & hematinic.
- Antiseptics, astringents.
- Antibiotics & Anti-inflammatory.

Unit-VI–Prosthodontics:

- Principles and techniques of impression making in Complete Dentures, RPD & FPD. Principle of retention & stability.
- Jaw Relations & methods of registration.
- Processing & finishing of Complete Dentures.
- Immediate complete & partial dentures.
- Components of removable partial denture & their functions.
- Surveyors & mouth preparation.
- Designing of removable partial dentures.
- Acrylic partial denture.
- Principle of tooth reduction.
- Surgical Retractors.
- Selection and fabrication of pontic & retainer.
- Aims & scope of the science of Dental materials.
- Important physical properties applicable to Dental Materials including their biological considerations.

Unit-VII-Conservative Dentistry&Endodontics:

- Filling materials both adults & children.
- Rationale, care & sterilization of Endodontic instruments.
- Treatment of vital & nonvital pulp Surgical treatment in endodontics.
- Bleaching of teeth.

Unit-VIII-Oral Surgery:

- Local Anaesthetic Drugs
- Uses of Antibiotics in Oral surgery.
- Open and Closed Reduction of Fractures.
- Dental Impaction.
- Dental Implants.
- Impacted teeth & fracture of jaws.
- Oral Surgical Complications & their management.

Unit-IX-Oral Medicine, Radiology&Oral Pathology:

- Salivary glands and its Diseases.
- Dental Anatomy.
- Developmental disturbances of oral structures.
- Osteomyelitis.
- Dental caries & sequelae.



- Enamel,Dentin, Pulp, Cementum,PDL&bone.
- BacterialandFungal Infection.
- AIDS.
- Basicsoforalradiology.
- Effectsofnutritionaldisturbances oforal structures.
- OralMucousMembrane.
- Infectionsoforal¶ oralstructures.
- Cysts&Neoplasmsforalcavity.
- Precancerouslesions& etiology,pathology&treatment.
- TMJdiseases&management
- Effectsofradiationonorale ¶oralstructures.
- Oralmicrobiology.
- Blooddyscrasias&their management.
- Forensicodontology.
- Impactedteeth&fractureofjaws.
- OralSurgicalComplications&theirmanagement.

Unit-X-Orthodontics:

- Normalocclusion&itscharacteristics.
- Malocclusion-Type,classification&etiology.

Unit-XI–Pedodontics:

- DevelopmentofJaws and its growth.Developmentofteeth and surrounding structuresandcalcification (including Theories) ofhardtissues.
- Eruptionandsheddingof teeth.
- AgechangesinTeethassurroundingstonestructures.
- Psychology - Psychological development from birth to adolescence. Management ofchildin the dental office.
- TreatmentoftraumatizedTeeth.
- Mouthhabitsandtheirmanagement.
- Importanceoffirstpermanentmolarandsplints.

Unit-XII-PublicHealthDentistry:

- Normsforpotabilitypurificationofwater anddisposal ofwastes.
- Introductiondefinition, objectivesandfunctionsofpublicHealthdentist.
- Schoolanddentalpublic healthprogramme.
- EthicsinDentalCouncilofIndia. IndiansDental Association.

Unit-XIII-Periodontics:

- ClassificationofgingivalandPeriodontaldisturbances.
- Gingivalenlargement.
- Localand systemicfactorsin the causationofgingival and periodontallesions.
- Periodontitisandsequelae.
- Prognosis and Treatment of all gingival and periodontal. disturbanes. Treatmentplanning,phasesandrationale.DifferentavailableTherapeuticmeasures. PreventivePeriodontics,Conceptoffocalinfections

➤ **Recent advances and developments in the discipline.**



24- BLOOD BANK

I. HISTORY OF TRANSFUSION MEDICINE

Scientific landmarks in its development
Impact of world war on its development
Development of PVC bags.

II. SCIENTIFIC BASIS OF TRANSFUSION

A. Biochemistry & physiology of elements of blood

Process of cell production and lifespan

red cells

white blood cells

platelets

Red cells

Hemoglobin structure & function

Metabolic pathways

Membrane structure & function

White cells

Structure, function & kinetics

Platelets

Structure, function & kinetics

Physiology of haemostasis

Role of platelets

Coagulation pathways

Fibrinolysis

Hemodynamic of blood flow & volume

Iron metabolism

Bilirubin metabolism

B. Immunology

Principles of basic immunology

Antigen, antibody, complement, immunoglobulin

Antigen-antibody reaction

Lymphocytes in humoral & cellular immunity

Role of hybridoma technology in immunohematology

Immunology of transplantation

HLA and genetic control of immune response

C. Genetics

Principles of basic genetics

11. Genetics of blood groups

Phenotype & genotype

Principles of blood group inheritance

Population genetics of blood groups



III. ANTIGEN SYSTEMS INFORMED ELEMENTS OF

- Red cell antigens
- Leucocyte antigens
- Platelet antigens

IV. BLOOD COLLECTION, PROCESSING, COMPONENT PREPARATION

A. Management of blood donation

- Donor recruitment

- Voluntary blood donation systems
 - Categories of blood donors
 - Education, awareness & information of prospective donor
 - Use of Information Technology for donor recruitment
 - Donor information programmes

- Acceptability criteria of blood donor

- Care of blood donor

- Pre-donation
 - Mid-donation
 - Post-donation
 - Prevention & management of complications of blood donation

- Blood collection

- Anticoagulants & preservatives
 - Procedure
 - Blood donation camps

B. Blood components

- Components

- Types
 - Methods of preparation
 - Indications, dosage & administration
 - Leucodepletion
 - Various methods
 - Quality control

- Storage of blood & components

- Whole blood

- Red cell concentrate
 - Plasma
 - Granulocyte
 - Cryoprecipitate
 - Stem cells
 - Peripheral blood stem cell
 - Cord blood
 - Dendritic cell

- Plasma fractionation

- Viral inactivation
 - Singledonor
 - Pooling



V. PRE-TRANSFUSION TESTING

Compatibility testing

- ABO grouping & Rh typing
- Antibody screening
- Cross matching methods
- Newer methods of cross matching
- Solid phase
- Gel technology

Screening for transfusion transmitted infections

- Methodology
- Nucleic acid amplification techniques
- Newer emerging pathogens
- Selection of blood, components & plasma products for transfusion

VI. ADVERSE EFFECTS OF BLOOD TRANSFUSION

Clinical presentation, pathophysiology, investigations, management

- Haemolytic transfusion reaction
- Non-Haemolytic transfusion reaction
- Allergic, anaphylactoid and anaphylactic reactions
- Alloimmunization to various elements of blood

Transfusion transmitted infections

- Bacterial
- Viral
- Parasitic

Transfusion associated graft versus host disease

Transfusion related acute lung injury

Others

- Hemosiderosis
- Volume overload
- Posttransfusion purpura

VII. APHERESIS

Technology of apheresis, various equipment & disposables

Haemapheresis (platelets, granulocytes, plasma, stem cells)

- Donor selection
- Procedure
- Complications

Therapeutic apheresis

- Indication, procedure & complications
- Plasma exchange, red cell exchange
- Newer methods for immunoadsorption

VIII. Autologous transfusion

Basic principles, indication & contraindications



- Pre-deposit
- Haemodilution
- Intraoperative blood salvage including equipment
- Post-operative blood salvage
- Directed donation

IX. ANTENATAL AND NEONATAL TRANSFUSION PRACTICE

- Pathophysiology, diagnosis & management
 - Rh incompatibility
 - ABO & other blood group incompatibility

- Exchange transfusion
 - Indications, methodology & complications

- Neonatal transfusion practice
 - Strategies to reduce donor exposure
 - Organised donor selection
 - Intrauterine transfusion

X. IMMUNOHAEMATOLOGY

- Classification, diagnosis & management
 - Immune hemolytic anemia
 - Immune thrombocytopenia
 - Immune neutropenia

- Immunohaematological problems in multi-transfused patients.

XI. HEMOTHERAPY

- Pathophysiology, diagnosis & management of anemia

- Anemia
 - Iron deficiency anemia
 - Megaloblastic anemia
 - Aplastic anemia
 - Anemia of chronic diseases
 - Neonatal anemia
- Hereditary anemia
 - Thalassemia
 - Sickle cell anemia
 - Enzymeopathy
 - Others

- Pathophysiology, diagnosis and management of hemostatic disorders

- Hemophilia 4.2 Von Willebrand disease
- Platelet disorders
 - Qualitative disorders
 - Quantitative disorders
- DIC/TTP/HIT
- Acquired disorders

Others

- Pathophysiology, diagnosis and transfusion support in acute blood loss



Shock
Massive transfusion

Transfusion support in surgery
General surgery
Specialised surgery – Cardiopulmonary bypass/hemodialysis

Classification, diagnosis & transfusion support in oncology
Hemopoietic malignancy
Non-hemopoietic malignancy

XII. TRANSPLANTATION

Transfusion support in transplantation
Stem cell transplantation
Harvesting
Cryopreservation
CD34 counting & quality control
Infusion
Bone marrow transplantation
Harvesting
Processing
Immunohaematological problems in ABO mismatched BMT
Transfusion support BMT patients
Transfusion support in specialized conditions
Renal transplantation
Liver transplantation
Others

Irradiation of blood products
Indications, dosage, adverse effects

Tissue centre
Cord blood centre

XIII. BLOOD SUBSTITUTES AND HEMOPOIETIC AGENTS

Crystalloids & colloids
Oxygen carrying compounds
Use of hematinics
Hemopoietic growth factors
Plasma products

XIV. MEDICOLEGAL CONSIDERATIONS IN TRANSFUSION MEDICINE

Ethical and legal considerations pertaining to transfusion practice
Identification of blood stains
Paternity testing
Donor notification & counselling
Lookback programme
Drugs & Cosmetics Act, Accreditation
Consumer protection Act
Others

XV. TOTAL QUALITY MANAGEMENT

Development of Standard Operating Procedures (SOP) manual.



- Qualitycontrol
 - Reagents&diagnostickits
 - Instruments
 - Personnel
 - Blood&components

- Qualityassurance
 - Internalqualitycontrol
 - Externalqualitycontrol

- Proficiencytesting
 - HospitalTransfusionCommittee
 - Medicalaudit
 - Turnaroundtime
 - ISOcertification/GMP

XVI. ORGANIZATION&MANAGEMENTOFTRANSFUSIONSERVICES

- Organisation&functionofbloodservices&hospitaltransfusionpractice
 - Recruitment&motivation
 - Operationofbloodmobile
 - Developmentoftransfusionservice
 - Inventorycontrol
 - Developmentofforms,labels,records,etc.

XVII. BIOSAFETY

- Personnel
- Laboratory
- Equipment
- Sterilization
- Disposalofwastematerial

XVIII. MODERNBIOLOGICALTECHNIQUES

- Principle,methods,relevanceintransfusionmedicine
 - Westernblot
 - Polymerasechainreaction
 - SSCP
 - SSOP
 - Dotblothybridization
 - Others–Animalexperiments,museumtechniques
 - Microarrays
 - Proteomics
 - OthernewtechniqueinTransfusionmedicine

XIX. AUTOMATION&COMPUTERISATION

- Instrumentation
- Automatedbloodgroup&processing
- Automatedinfectiousscreening
- Useofbarcodes
- Useofcomputer
- Laboratoryandhospitalinformationsystem



➤ **Recent advances and developments in the discipline.**

25- HOSPITAL ADMINISTRATION

I -GeneralAdministrationandManagement

Sl	Topic	Contents
1.	Development of Management Concept	• History and growth of Management science • Traditional vs. modern management • Evolution of management theory • Management as a profession • Ethics in management
2.	Management Function & Tools	• Management levels and skills • Functions & Principles of management • Challenges to a manager • Systems Approach • Role of the executive • Management tools • Styles of management • Committees
3.	Fundamentals of Planning and Decision Making	• Hierarchy and Types of Plans • Steps in planning • Managerial decision making
4.	Organisation Structure	• Organisational design and function • Hospital Organisation • Matching structure and strategy • Functional organization • Line and staff authority • Delegation/Decentralisation
5.	Office procedure and Disciplinary proceedings	• Definition of Office & office procedures • Drafting official letters • Service rules & procedure • Conduct rules • Disciplinary proceedings
6.	Communication	• Basic concepts • Types of communication • Barriers of communication • Principles of good communication • Communication in Healthcare



7.	Personnel Management & Human Resource Development	• Definition & Importance • Work study & Method study • Manpower planning • Recruitment & selection • Job analysis • Job description • Job evaluation • Job enrichment • Training & development • Performance appraisal • Grievance redressal • Absenteeism
8.	Organisational Behavior and Group Dynamics	• Basics of sociology, anthropology, psychology • Characteristics of work groups • OB labs • Dynamics of organizational behavior • Motivation & Leadership • Conflict management • Transactional analysis • Team building • Change Management • Johari Window • Grievance redressal systems
9.	Financial Management	• GDP, GNP, National Economic Policies • Budgeting, types of budget • Working Capital, Cash flow analysis • Financial Statement and Ratios • Balance Sheets • Elements of cost, cost accounting • Fixed assets and Depreciation • Break even analysis, Cost effectiveness, Cost benefit analysis • Financial Management in hospitals • Cost containment in hospitals
10.	Material Management	• Importance of Material Management • Theory of Demand and Supply • Inventory control • Purchase cycle • Tender System • Economic order quantity, Safety stock, Lead time • Receipt and Inspection of Stores • Distribution, Standardisation, Codification • Condemnation and Disposal • Stores documentation • Equipment audit • Logistics and Supply chain management • Role of computers in Stores Management
11.	Risk Management	• Ergonomics and its application in hospitals • Occupational hazards • Workman Compensation Act • Definition, scope and importance of industrial relations



12.	Information System	• Information system analysis and design • HMIS a tool to managerial control
13.	Modern Management Techniques	• Quantitative methods of Management • OR techniques and their application in healthcare • Management by objective
14.	Marketing Management	• Concept of Marketing • Marketing strategies, evaluation and control • Marketing Information & research • Market & medical ethics • Social Aspects of marketing • Privatization of Health • Public Private Partnership (PPP) • Outsourcing • Medical Tourism • Corporate Social Responsibility

II - Healthcare and Health Administration

Sl	Topic	Contents
1.	Development of Health Services in India	• Evaluation of health care services • Definition & dimensions of health • Review of different reports on Healthcare
2.	Medical Sociology	• Sociological perspectives of Health, illness and healing
3.	Health & Disease	• Concept of health & disease • Concept of wellbeing • Natural history of disease and role of hospitals in various levels of prevention
4.	Research Methodology in Health and Hospital Administration	• Concept of health indicators • Types of surveys • Selecting a problem, making hypothesis • Research Protocol writing • Determining objectives • Bibliographical data • Sample size determination • Data collection techniques and tools • Questionnaires and Interview techniques • Observation technique • Analysis of data • Report writing • Errors of Measurement
5.	National Health Policy	• National Health Policy - 2017 • Role of Health education and communication • Health Committees • National Health Programmes • Millennium Developmental Goals and Sustainable development goals

6.	Biostatistics	• Concept of Biostatistics • Presentation of data • Frequency of distribution • Measurements of central tendency • Measurement of dispersion • Sampling & Sampling error • Testing of hypothesis • Tests of significance
7.	Epidemiology	• Evolution and uses of epidemiology • Definitions and terminology • Natural history of disease and role of hospital in various levels of preventions • Types of epidemiology • Methods of epidemiological studies • Socio-economic status and occupation as determinant in disease distribution • Cause and effect relationship • Epidemiology of hospital infection • Epidemiology of • Non-Communicable diseases • Trauma and RTA • Diabetes • Coronary Artery Disease (CAD) • How to investigate an epidemic and role of the hospital in its control • Common diseases in India - their epidemiology and prevention
		• Screening and surveys • Concept of health indicators • Disability adjusted life years (DALY's) • Quality adjusted life years (QALY's) • Disability adjusted life expectancy (DALE) • Physical quality of life index (PQLI) etc
8.	Health Statistics and Health Information System in India	• Need • Common rates & ratio • Incidence & prevalence rates and • Morbidity • Mortality • Health reports • Notifiable Diseases • Healthcare Delivery system • ICD-10 & ICD-11
9.	Hospital Utilization Statistics	• Community Indices: Bed population ratio, Hospital admission rate, Per capita Hospitalisation rate • Hospital utilisation Indices: Average daily census, Bed occupancy rate, bed turnover rate, bed turn over interval, Average length of stay
10.	Medical Records	• Definition, historical background, types of medical records, retention of records, computerisation of medical records, medical record



		audit,MRDepartment
11.	HealthEconomics	• Basicsofhealththeconomics • Analysisofdemandandsupply • HealthInsuranceSchemesandsocial • SecurityschemelikeCGHS,ESIinIndia • Medicalcaresystem&Health • InsuranceSystemindifferentcountries
12.	PopulationDynamics	• Demographyandfamilyplanning
13.	EthicsLawsandActs	• CodeofMedicalEthicsanddutiesofphysicians • LegalissuesinHospitaladministration • LawsandActsapplicabletohospitals • MedicolegalCases • Industrialrelationsandlaws • Patient'srights&provider'sresponsibility-MedicalMalpractice • Medicaleticsandethicalissuesinendoflifedecisions • DyingDeclaration • Importance(section32&157)ofIndianEvidence ActandDeathCertificate-

III -HospitalPlanningandHospitalAdministration

SI	Topic	Contents
1.	Hospital	• Historyanddevelopmentofhospitals • Definition,types,control,roleandfunctions • HospitalsinIndiatoday,theirnumber,types,size,distribution, ownership,utilization,issues&trends
2.	NursingAdminist ration	• IntroductiontoNursingprofession • Nursingorganizationstructure • Nurseasasocialandprofessionalentity • Staffingnormsinvarioustypesofhospitalsandd ifferentdepartments. • Recenttrendsinnursingprofessionandnursing
3.	PublicRelationsi n Hospital	• Publicrelations
4.	EmployeesWelf are	• Welfareschemes • Occupationalsafety • Conflictmanagement • Stressmanagement • Counseling

5.	Quality in Health Services	• Quality concept • Verifiable standards and parameter • Various Quality Models • Total Quality management • Kaizen • Lean management • Six Sigma in healthcare • Hospital and Healthcare Accreditation
6.	Future of Hospital Administration	• Performance Review • Hospital statistics & quality control • Recent trends in hospital • Challenges to administrators • Reengineering • Telemedicine • Artificial intelligence
7.	Hospital Planning - General consideration	• Changing system of Health Services concept in planning, designing and space • Site surveys for planning a hospital • Planning for hospitals macro and micro aspects • Hospital building an overview • External architectural aspects and landscaping • Internal arrangements • Hospital hygiene and sanitation • Lighting & HVAC • Design considerations including evidence based design and Architect Brief • Planning and design of specialised hospitals • Taking over and commissioning a new hospital • Alteration and additions in an existing hospital • Planning the Hospital Engineering Services • Repair and maintenance schedule • Equipment planning for a new hospital • Green buildings

IV. Administration of Clinical and Non Clinical Services and Administrative Procedures

	Topic	Contents
1.	Clinical Services	☐ Outpatient services ☐ Surgical services ☐ Operating department ☐ Paediatric services ☐ Dental services & Maxillo-facial Surgery ☐ Psychiatric services ☐ Radiodiagnosis ☐ Radiotherapy services ☐ Accident and Emergency services ☐ Hospital Laboratory services ☐ Obstetrics and Gynecology services ☐ Intensive care unit ☐ Dialysis unit ☐ Day care units ☐ Bone marrow transplant unit (BMT) ☐ Nuclear medicine ☐ Lithotripsy centre ☐ Physiotherapy centre ☐ Burns centre ☐ Malignant Diseases Treatment Centre ☐ Trauma centre ☐ Geriatric services ☐ Antibiotic Policy ☐ Standard Precautions ☐ Spill Management ☐ Occupational hazards and safety in healthcare



	Non-Clinical services and Administrative procedure	• Enquiry&registration • Admissionoffice • Inspection,MedicalSuperintendent'srounds • HospitalStandingOrders • HospitalWelfareServices • IndianRedCrosssocietyandhospitals • Nursingservices • Wardmanagementincludingwelfareandrecreational facilities • House-keepingincludingPestcontrol • MedicalstoresandPharmacyservices • BloodBankandTransfusion-services • CentralSterileSupplyDepartment(CSSD) • Dietaryservice • Linenandlaundryservices • Hospitalengineeringservices • FireFightingservices • Ambulanceservices • Fataldocuments • Mortuary • Equipmentmanagement • Transportationinhospitals(Intramural,Extramural) • Biomedicalwastemanagement • Solidwastemanagement • HospitalInformationssystem(HIS) • Structuralrequirementforinfectioncontrolinhospitals • Hospitalformulary • Essentialdruglist(EDL) • Patientfeedback&Dischargeprocedure • DisasterManagement
		• FireSafetyinHospitals • HospitalSafetyandSecurity • EnterpriseResourcePlanning(ERP) • HospitalMediaRelations&MarketingNon-ProfitOrganizations

➤ **Recent advances and developments in the discipline.**



26- MEDICAL RECORD OFFICER

A. ANATOMY

1. General Introduction
 - Definition of Anatomy & Physiology
 - Types of Anatomy (including systemic)
 - Definition of topographic term/term used to describe the body
 - Description of various regions of the body
2. Cells and tissues of body and general histology
3. Anatomical description of the following
 - Skin and Breast -Lymphatic system
 - Osteology
 - Blood and blood forming organs
 - Joints
 - Ligaments
 - Fasciae and Bursae
 - Urogenital system
 - Endocrine system
 - Organs of special senses
 - Musculoskeletal system
 - Cardiovascular system
 - Respiratory system
 - Digestive system
 - Embryology

B. PHYSIOLOGY

1. Introductory lectures on specialization of tissues
2. Homeostasis and its importance in mammals
3. Blood and lymphatic system
4. Cardiovascular system
5. Excretory system, skin and temperature regulation
6. Respiratory system
7. Digestive system and metabolism
8. Endocrinology
9. Reproductive system
10. Nervous system
11. Special senses
12. Muscles

C. PATHOLOGY:

1. Introduction of clinical pathology, definition and classification of diseases.
2. Classification of various types of clinical lesions/tumors (Benign and malignant).

D. MICROBIOLOGY:

1. Introduction to subject of microbiology.
2. Modes of transmission of diseases.
3. Principle of immunodiagnosis.
4. Principles of Lab diagnosis of bacterial infection, parasitic infection, viral and fungal infection.

E. BIOCHEMISTRY:

1. Definition of biochemistry.
2. Elementary ideas/overview of the following: Sugar, proteins and



- lipids and their metabolism
- 3. Constituents in blood including enzymes and their variations in diseases
Composition of CSF, ascitic fluid and pleural fluid in diseases
- 4. Functional test like LFT, GTT, AHT and clearance tests for kidney function tests.
- 5. Investigations like Radio-active iodine uptake, Radio-immuno-assay, protein bound iodine and PH₂, PO₂ and PCO₂.
- 6. Basic knowledge of vitamin deficiency diseases and endocrine diseases
Normal and abnormal constituents of urine
- 7.

F. MEDICAL CODING

- i. Meaning and definition of coding.
- ii. Structure of ICD 10th, volume 1st, 2nd, 3rd.
- iii. Proper use of index, Difference between ICD 9th and 10th.
- iv. Family of classification and health classifications.
- v. History of development of ICD.
- vi. Rules for mortality coding and morbidity coding.

G. MEDICAL TERMINOLOGY

- 1. Definition, objectives and values of medical terminology
- 2. Color symbols, numeral etc.
- 3. Prefixes, suffixes and roots
- 4. Origin of terms: anatomical, diagnostic, operative, radiology and clinical terms and abbreviation in respect of the following: Musculoskeletal system, integumentary system, Circulatory and lymphatic system and Respiratory system, digestive system, Genitourinary, Endocrine system, Neurological and psychiatric disorders, Obstetrics and gynecology and special senses (eye and ear).

Meaning & Definition of Coding

Structure of ICD -10

Structure of Volume-I

Structure of Volume-II

-Dual codes for dagger & Asterisk

-Conventions used in ICD-10

-Proper use of the index

(How to use coding books)

Structure of Volume -III

Difference between ICD-9th and ICD- 10th revision

Family of classification

- Internal classification of Functioning,

Disability and Health (ICF)

Rules for mortality coding

-Modification rules

Rules for Morbidity Coding

Coding Rules Summary

Coding exercises

Summary of ICD-10 Coding Notes

History of development of ICD

ICF - Introduction

Internal classification of Functioning.

Disability and Health (ICF)

Brief history of Medical Record.
 Definition of Medical Record.
 Characteristics of Medical Record.
 Values of Medical Record.
 Contents and components of Medical Record.
 Need for the Medical Record Department and its functions.
 Responsibility for Medical Record, Hospital Hospital Administrator, Doctors, Nurses, Para-Medicals.
 Organisation and management of Medical Record Department, Medical Record Committees, Medical Audit Committees.
 Origin and development of Medical Record including organisation of admission office.
 Control and quantitative and qualitative analysis of discharged inpatients records.
 Numbering, filing retrieval and storing of records.
 Indexes and Indexing control.
 Legal aspects of Medical Records.
 Introduction, Legal procedures, medical law and ethics identification, medical autopsy, death and postmortem change external and causes, effects and medico legal aspect (case studies).

Retention, preservation and destruction of Medical Records.
 Organisation of outpatients Medical Record Services.

HOSPITAL ADMINISTRATION

1. Definition, functions and types of hospitals.
2. Function of management (POSDCORB).
3. Introduction of various hospital services, i.e. (patient care services, support services, peri-institutional services and community services).

GENERAL STATISTICS FOR MEDICAL RECORD OFFICER

1. Introduction to statistics.
2. Methods of collection of data
3. Measures of central tendency (simple average, G.M, H.M, Mode and Median).
4. Measures of Dispersion (standard deviation, range, variance, average deviation).
5. Sampling: Definition, methods of sampling (Random, Systematic, Stratified, Cluster).
6. Correlation and regression: Significance, linear correlation, correlation coefficient and linear regression.
7. Time series analysis-concept and its utility, component of time series.
8. Test of significance .
9. Graphical presentation of data.
10. Probability-concept and definition .
11. Uses of statistics.



27- LIBRARIAN

PAPER-1.: GENERAL STUDIES MENTAL ABILITY

1. General Science – Contemporary developments in Science and Technology and their implications including matters of every day observation and experience, as may be expected of a well-educated person who has not made a special study of any scientific discipline.
2. Current events of national and international importance.
3. History of India – emphasis will be on broad general understanding of the subject in its social, economic, cultural and political aspects with a focus on AP Indian National Movement.
4. World Geography and Geography of India with a focus on AP.
5. Indian polity and Economy – including the country's political system- rural development – Planning and economic reforms in India.
6. Mental ability reasoning and inferences

LIBRARY, INFORMATION AND SOCIETY

Philosophy and Ethics of Librarianship. Ancient and Modern Libraries. Library as a Social Institution: Functions of the Library. Role of the Library in Formal and Informal Education. User Studies and User Education.

Professional Education and Librarianship. Library Education in India.
Five Laws of Library Science.

Types of Libraries : National, Public, Academic, and Special. National Library, Kolkata; National Science Library; State Central Library.

Library Movement in India. Library Movement in Andhra Pradesh.

Library Cooperation / Resource sharing: Resource sharing programmes.

Library Consortia in India.

Professional Associations: IFLA, ALA, ILA, IASLIC, IATLIS, APLA, ALSD: Objectives, Functions, Activities.

Organizations: NASSDOC, DESIDOC, UNESCO, NISCAIR -- Objectives, Programmes and activities.

Legislation – Need, Purpose and Advantages.

Library Legislation in India. Detailed Study of A. P. Public Library Act. Overview of Library Acts in India.

Intellectual Property Rights(IPR). Copyright Act.



Nature of Information:

- o Data, Information & Knowledge.
- o Information : Nature, Types, Characteristics, Properties, Use and Value.
- o Information Explosion.
- o Information Society.
- o Information Science.
- o Information Industry.

Information Communication:

- o Information Cycle.
- o Types of Communication, Communication Models (Theories).
- o Scientific Communication.
- o Formal and Informal Channels of Communication.
- o Barriers of Communication of Information.
- o Information Literacy

Economics of Information:

- o Information needs. Information Seeking Behaviour.
- o Marketing of Information.

Knowledge Management & Digital Library:

- o Knowledge Management.
- o Document Management.
- o Content Management.
- o Digital libraries; Institutional Repositories.
- o e-learning.
- o Virtual Library.

Informetrics:

- o Citation: Citation Analysis.
- o Librametry, Bibliometrics and Scientometrics, Webometrics.
- o Bibliometric Laws. Zipf's Law, Bradford's Law, Lotka's Law.

LIBRARY CLASSIFICATION

Library Classification – Meaning, Need and purpose of classification.

Normative Principles.

Five Laws of Library Science.

Formation, Structure and Development of Subjects:

Brief study of major schemes viz: Decimal Classification (DC); Universal Decimal Classification (UDC).

General Theory of Classification. Ranganathan's contribution.

Main Class – Canonical Class and Basic Class.

Five Fundamental Categories : PMEST.

Isolates -- -- Common Isolates – Kinds of Common Isolates, Special Isolates, Auxiliary

Schedules.

Principles of Helpful Sequence

Notation: Types

Canons for Classification

Call Number -- Class Number, Book Number – Types of Book Numbers, Collection Number.

LIBRARY CATALOGUING

Library Catalogue: Objectives and functions.

Types of Library Catalogues: Physical and Inner Forms

Different Types of Catalogue Entries and their Functions

Subject Cataloguing: Lists of Subject Headings – LCSH and SLSH

Centralised Cataloguing:

Union Catalogues: Definition, use and functions.

OPAC. Web Based Catalogues.

Use of Internet in Cataloguing.

OCLC and WorldCat.

Standardization in Cataloguing.

Standards -- ISBD (M), ISBD (S) and ISBD (G).

Filing and Arrangement of Catalogue Entries.

MANAGEMENT OF LIBRARY & INFORMATION CENTRES

Management:

Functions and Principles of Management and their applications in Libraries. Scientific Management.

Routine & workflow in different libraries / sections. Principles and theories of book selection.

Selection and Acquisition. Book Selection Tools.

Online Bookshops.

Technical Processing – Classification & Cataloguing.

Open Access Vs Closed Access. Principles of Stacking.

Circulation: Charging and discharging methods; Day-Book System, Ledger System, Browne System, Newark System, etc.

Library Buildings – Planning.

Reference & Information Services.

Serials Management. Methods of Recording. Problems in Serials Acquisition.

Methods of Stock verification.

Types of Library Records.

Library Statistics : Purpose and Types.

Types of Library Committees and their Functions.

Library Rules & Regulations.

Public Relations. Publicity & Extension Activities.

Schools of management. Management Styles.

Planning Library and Information Centres: Planning process, SWOT Analysis.

Performance Evaluation of Library and Information Centres.

Management Information Systems (MIS).

Project Management, Organisational Planning.

Gantt Charts. PERT / CPM.



Management by Objectives: (MbO):

Decision making: Decision Process.

Delegation of Authority:

Authority, Responsibility and Accountability – Guidelines and barriers.

Human Resource Management:

H R Planning, staffing, job analysis, job description, job evaluation, staff recruitment;

selection, training and development. Inter personal relations.

Motivation : Concept, Theories.

Management of Change: Impact, Strategies, Organisation Culture.

Financial Management:

Resource Mobilisation.

Budgeting Methods: PPBS and Zero-based. Budgetary Control.

Cost Effectiveness and Cost Benefit Analysis.

Cost Accounting: Concept and Use.

Outsourcing.

Quality Management:

Application in LICs. Quality Audit, Customer Satisfaction Vs Quality Management.

ISO-9000. TQM its Application in Libraries.

REFERENCE & INFORMATION SOURCES AND SERVICES

Reference Service:

Types of reference service – Ready Reference Service and Long Range Reference Service. Reference Process. Reference service vis-à-vis Information Service. Current Awareness Service, SDI and Referral service. Information Sources. Evaluation of reference sources.

Reference Sources:

Dictionaries, Encyclopedias, Almanacs, Yearbooks, Directories, Handbooks, Manuals,

News-Summaries, Concordances, Biographical, Geographical Information Sources, Electronic Resources

Bibliography:

General, Special, National (INB and BNB), Trade, subject. Preparation of bibliographies.

Bibliographic Control: UBC and UAP.

Abstracting Services: Types and Parts of an Abstract.

Indexing Services: Index, Indexing Services / Products – Citation Indexes.

INFORMATION TECHNOLOGY

Information Technology:

- o Components of IT

- o Hardware – Developments.

- o Software – Operating Systems – Single User, Multi User. Types of Application Software.

- o Client -- Server Technology: Different types of Servers.

Communication Technology:

- o Telecommunications. Modem.

- o Switching Systems: Circular, Message and PSS. Gateways, Ethernet, Hub/Switches.



- o Communication Media.
- o Bandwidth, Multiplexing.
- o ISDN.

Electronic Information:

- o Electronic / Digital Information.
- o Digital Collection, Digital Rights Management.
- o Digitization.
- o Software & hardware used for digitization. Image Formats (JPEG, GIF / BMP). Audio Formats (MPEG, MP3, WAV). e-documents.
- o Preservation and archiving of e-resources.
- o Weblogs. Wikis, Wikipedia.

Communication Tools and Techniques:

- o Fax, E-mail, Tele Conferencing, Video Conferencing, Voice Mail. Hyper Text and Hyper Media. List Serve / Electronic groups.
- o Open Source and Proprietary Software.
- o Digital Standards – Standards, Protocols and Formats. Interoperability.
- o Wireless Communication: Networking, WAP / Wireless Internet, WLL, Cellular Communication.
- o Data Communication Concepts – Parallel & Serial; Simplex, Half Duplex and Full Duplex.
- Internet Communication.
- o Internet Communication.
- o Features and Developments.
- o Internet Connectivity: Types.
- o Data Security: Virus – Security Methods.

INFORMATION RETRIEVAL SYSTEMS

Information Storage and Retrieval (IR) Systems:

Components, IR tools. Information Analysis, repackaging and consolidation. Content Creation / Content Development.

Indexing: Principles / general theory of indexing. Content Analysis. Indexing Languages, Types, Characteristics.

Thesaurus. Pre and post-coordinate indexing.

Chain Indexing, PRECIS. Uniterm, Keyword and Citation Indexing.

Computer based indexing systems.

Standards for Bibliographic Description: ISBDs, MARC, CCF and MARC 21.

Metadata: Features of MARC, Dublin Core.

Data Mining, Data Warehousing.

Digital Object Identifier (DOI)

Information Retrieval: Methods – manual and automated. Search processes and

strategies. Boolean Logic. Preparation of query. Search tools – search engines, meta-

search engines. Subject directories, subject guides. Criteria for evaluation of IR

Systems.

Computerized Information Services: Machine Translation. Computerized Abstracting.

Natural Language Processing.



RESEARCH METHODOLOGY

Research: Basic Concepts -- Validity, Reliability, Objectivity, Subjectivity and Variables. Logic and Intuition.

Basic and applied research, Team Research, Relay Research.

Scientific method. LIS Research in India.

Research Design: Problem identification, formulation.

Hypothesis: Formulation, Types, Verification of Hypothesis.

Methods of Research: Survey, descriptive, comparative, historical, experimental, case study and Delphi technique.

Types of data – Primary and Secondary.

Data Collection Methods: Questionnaire, Interview and Observation. Secondary data – Historical / recorded. Sampling methods and techniques:

Probability sample, Simple Random sampling, Systematic, Stratified. Non-probability

sample: Quota, Accidental, Purposive, Incomplete. Cluster and Multi-State sampling.

Sample size.

Methods and Tools of Data Analysis:

Problem measure, reliability, validity, Descriptive Statistics – Measures of Central Tendency : Mean, Median, Mode. Measure of Central distendency : Standard Deviation.

Graphical Presentation of data : Bar diagrams, Pie-chart, Line Graphics, Histograms,

Inferential Statistics, Measure of Association, Co-efficient of Correlation. Testing of Hypothesis : Chi-square test & T-test.

Writing research report: Contents of report, presentation of findings. Style Sheets, Citation of Print, Electronic and Internet Resources.

INFORMATION SYSTEMS AND PROGRAMMES

Information Organisation as a System:

Basic concepts, Components, Types, Characteristics of an Information System.

Kinds of Information Systems:

Libraries, Documentation Centres, Information Centres, Data Banks, Information Analysis Centres, Referral Centres, Clearing Houses, Archives, Reprographic and Translation Centres – their functions and services.

Planning and Design of a National Information System:

NAPLIS (National Policy on Library & Information Systems), NATIS, National Information Policy (NIP).

Planning Design of National Information System (NATIS).

National Information Systems:

NISCAIR, DESIDOC, NASSDOC, SENDOC, CORD, NCSI, NISSAT, ENVIS.

Regional Information Systems:

ASTINFO, APINESS and SAARC (SDC).

Global Information Systems:

UNESCO-PGI, INIS, AGRIS, INSPEC, MEDLARS.

Information Products and Services:

Types with examples.

Information Products Vs Services.

Information Services – Bibliographic, Document Delivery, Alert.



Information Providers (Vendors): DIALOG, STN, Derwent, UMI, BLDSC, ISI.

LIBRARY AUTOMATION AND NETWORKING

Computers: Functions, and how a computer works.

General computer terminology.

Communication : Analog & Digital Signals. Transmission Media.

Types of Computers. Generations of computers.

Data and Information. Data Representation and File Organization

Components of Computers:

Hardware – Input – Output devices. Storage devices, Ports.

Types of software, Program, Algorithm, Flow Charting.

Optical Storage Devices: CD and DVD.

Multimedia.

Data Processing – Batch, Online and Time Sharing.

Programming Languages : Machine, Assembly and Higher level.

Algorithm, Programme. Flow Charting

Operating Systems: DOS and Windows.

Application Software: MS-Word, MS-Access.

Networking: Concept and Types.

Internet – Browsing. Browsers. Services, Facilities. WWW, URL.

Computers in Library & Information Centres.

Library Automation: Areas of Automation.

Hardware and Software selection and Implementation.

Barcode Technology.: Types of barcodes : Dumb / Generic barcode and smart barcode

– their application. Code 39.

RFID (Radio Frequency Identification)

Networking: Concept, need and advantages. Basic components of network.

Network Topologies – Star, Ring, Bus, Hierarchical, Tree and Complete. Wireless

Networking.

Types of Networks – LAN, MAN, WAN.

Networks: General – ERNET, NICNET, INFONET. Library Networks: OCLC, INFLIBNET.

Internet: Concept, Features, Services.

Search Engines and Meta Search Engines.

Internet: Internet Searching. Web Browsers. Internet Security.

Internet Reference Resources

Evaluation of Internet Information Sources.

Protocols: TCP / IP, OSI. Other Protocols: Telnet, FTP, HTTP, Z39.50.

Hypertext, Hypermedia. Markup Languages – HTML, XML.

Web Content Development / Content Creation for Web.

Web Design. Software – Flash, Macromedia, MS-Frontpage, Dreamweaver.



1. General Surgery Including Orthopaedics:

1. Wound healing
2. Fluid and electrolytes
3. Nutritional Support
4. Wound infection, special infections, AIDs
5. Sterilization, methods and precautions
6. Transplantation
7. Tumors
8. Skin diseases and Plastic surgery. Burns.
9. Arterial disorders and venous disorders, Lymphatics
10. Accident and emergency Surgery
11. Cleft lip and palate
12. Disorders of salivary gland
13. Sutures
14. Thyroid
15. Parathyroid and Adrenal glands
16. Breast
17. Thorax – Injuries and diseases of Lung, Diaphragm
18. Heart
19. Liver
20. Spleen
21. Gall bladder and Bile ducts
22. Pancreas
23. Peritoneum, Omentum, Mesentery and Retroperitoneal spaces.
24. Small and large intestine
25. Intestinal obstruction
26. Appendix
27. Rectum
28. Anus and Anal Canal
29. Hernias
30. Urology
31. Fractures
32. Tumors of Bone, Benign and Malignant
33. Metabolic and Non infection disorders of bones and joints.
34. Infection of Joints, Pyogenic, Tuberculosis
35. Injuries of spine and pelvis & their management.

2. Medicine:

1. Cardinal manifestations and presentation of diseases.
2. Genetics.
3. Nutritional diseases
4. Hematology
5. Infectious diseases
6. Disease of Cardio Vascular system
7. Diseases of Respiratory system
8. Diseases of Kidney and Urinary tract



9. Diseases of Gastro Intestinal system.
10. Diseases of Immune system, connective tissue and joints
11. Endocrinology & Metabolism.
12. Neurologic disorders.
13. Environment and occupational hazards.
3. Obstetrics And Gynaecology:
 1. Introduction to Obstetrics
 2. Development of human placenta and embryo, anomalies of placenta and coord.
 3. Formation of liquor amni and its circulation.
 4. Anatomical and physiological changes during pregnancy.
 5. Diagnosis of pregnancy
 6. Methods of Obstetrical and Pelvic examination and special investigations.
 7. Role of USG and Radiology in Obstetrics.
 8. Antenatal care including use of drugs during pregnancy.
 9. Antepartum, foetal surveillance in high risk pregnancies.
 10. Social Obstetrics
 11. Anemia in pregnancy
 12. Heart diseases in pregnancy.
 13. Diabetes, prediabetic state, glycosuria in pregnancy
 14. Respiratory diseases in pregnancy.
 15. Psychiatric disorders in pregnancy and purperium
 16. Jaundice in pregnancy
 17. Skin diseases in pregnancy
 18. Urinary Tract infection in pregnancy including Asymptomaticbacteruria, chronic renal infection in pregnancy, renal failure in pregnancy.
 19. Hypertensive disorders in pregnancy.
 20. APH-placentalprevia accidental haemorrhage and extra placental causeshypofibrinogenemis,diagnosis and management, DUC annuria.
 21. Rh factor Pathology Rh testing and management of pregnancy and new born.
 22. Multiple pregnancy
 23. Postmaturity
 24. Intrauterine growth retardation
 25. Intrauterine death.
 26. Recurrent pregnancy - wastages
 27. Surgical Gynecological conditions with pregnancy
 28. Abnormal position and presentations
 29. Special cases
 30. Normal Labour
 31. Preterm Labour
 32. Abnormal Uterine action
 33. Prolonged labour
 34. Normal Pelvis and foetal skull
 35. Contracted Pelvis, CPD, Pelvic assessment
 36. Obstructed Labour
 37. Injuries of Genital Tract
 38. Injury of the Urinary System
 39. Obstetrical Palsy
 40. Postpartum Collapse.
 41. Normal Pueperium
 42. Puerperal infection
 43. Neonatology
 44. Obstetrical procedure.



45. Anatomy of Uro Genital tract
46. Development of Urogenital tract.
47. Physiology of Menstruation, ovulation and Normal Control.
48. Gynaecological History taking, examination and investigation.
49. Sex differentiation, asexuality & Intersexuality.
50. Amenorrhoea causes, Diagnosis and Management.
51. Infertility Male & Female causes, Diagnosis with investigation and management with newer modalities.
52. Dysmenorrhoea
53. Abnormal uterine bleeding
54. Abortions.
55. Trophoblastic tumors
56. Ectopic pregnancy
57. Infections of Genital tract.
58. Genital prolapse Retroversion
59. Urinary Incontinence
60. Rectal incontinence
61. Endometriosis and Adenomyosis.
62. Benign conditions and benign tumors.
63. Pruritis
64. Chronic Vulval Dysplasias
65. Tumors of Uterus
66. Ovarian Tumors
67. Genital Cancers
68. Menopause
69. Role of USG & Radiology in Gynae
70. Preoperative and postoperative management & complications of major Gynae surgery.
71. Gynaecological surgery
72. MTP 1st and 2nd Trimester
73. Contraceptions including Voluntary surgical contraception.
74. Demography

3. Pediatrics:

1. Basic sciences as applied to paediatrics
2. Growth and development.
3. Adolescence
4. Clinical biostatistics
5. Community paediatrics, including National Programmes.
6. Immunization
7. Nutritional requirements and nutritional disorders.
8. Infectious disease, including parasitic infestations
9. Infections- Respiratory, G.I, CNS, Genito-Urinary, Hematopoietic infections in neonates, infants, children and adolescents.
10. Systemic diseases.
11. Neonatology including antenatal paediatrics.

4. Preventive and Social Medicine:

1. History of Preventive and Social Medicine.
2. Concepts of Health and Diseases.



3. Nutrition and Health
4. Social Science and Health
5. Environment & Health
6. Occupational Health
7. Genetics and Health
8. Public Health Administration
9. Demography and Family Planning
10. Maternal and Child Health
11. Immunity and Immunization
12. Epidemiology of communicable and non-communicable diseases.
13. National Control/Eradication programmes relevant to specific diseases.
14. Health Information systems for the routine and vital health statistics
15. Primary Health care-Principles, components and levels of practice in the health care infrastructure.
16. Health Education
17. International Health.

5. Forensic Medicine & Toxicology:

1. Medicolegal examination of injured person
2. Medicolegal examination of Rape victim
3. Medicolegal examination of Sodomy
4. Examination of accused of Rape
5. Medicolegal Examination of Intoxicated person
6. Procedure for conducting Medicolegal Post-mortem
7. Essential requirements for conduct of Medicolegal Post-mortem
8. Autopsy of Foetus
9. To calculate time since death on post-mortem
10. Examination of Skeletal remains
11. Technique of Viscera Preservation on post-mortem examination
12. Exhumation & Post-mortem
13. Medicolegal duties of Doctor in Poisoned Patients
14. Duties of a R.M.P
15. Procedure of recording Evidence
16. Recording of Firearm injuries
17. Forensic Science Laboratory
18. Post-mortem in case of Hanging and strangulation
19. Age Certification
20. Medical Jurisprudence
21. Forensic psychiatry
22. Thanatology
23. Deliriant poisons
24. Fire arm & bomb blast injury

7. Anatomy:

- a. Cardiovascular system and lymphatic system-Blood supply of heart +lymphatic drainage of heart.
- b. Thoracic outlet syndrome
- c. Abdominal quadrants
- d. Vermiform appendix-Positions of appendix
- e. Difference between male and female pelvis
- f. Layers of Scalp



- g. Triangles of neck, contents of anterior triangle
- h. Paranasal sinuses with applied anatomy
- i. Cartilages of larynx
- j. Names of Cranial Nerves
- k. Pharyngeal arches
- l. History of cardiac muscles
- m. Difference between thick and thin Skin
- n. Annual pancreas

8. Physiology:

Nerve Muscles

- a. Neuromuscular transmission
- b. Muscle proteins(Biochemistry)
- c. Excitation-Contraction coupling

Blood

- a. Anemia
- b. Hemostasis

Respiratory System

- a. Mechanics of respiration-I
- b. Mechanics of respiration-II

Cardiovascular System

- a. ECG
 - b. Exercise physiology
 - c. Cardiovascular reflexes
 - d. Special features of circulation in skeletal muscles and skin
- Gastrointestinal System**
- a. Introduction of G.I. Physiology: General organization of G.I. tract
 - b. Pathophysiology of diarrheal disease

Nutrition

- a. Diet during pregnancy and lactation
- b. Diet during infancy and childhood

Environmental Physiology

- a. Man in cold environment
- b. Man in hot environment

Reproduction

- a. Introduction to reproductive system

Kidney

- a. Renal Tubular function-I
- b. Renal tubular function-II
- c. Micturition

General

- a. CSF
- b. Physiology of pain
- c. Brain stem reflexes, stretch reflexes and tendon reflexes
- d. Basal ganglia
- e. Speech
- f. Functional anatomy of eye
- g. Functional anatomy of ear: impedance matching
- h. Auditory pathway



- i. Olfaction
- j. Physiology of taste

9. Biochemistry:

a. Molecular Biology-its role in Clinical Biochemistry

Structure, biochemical role of DNA and RNA, Genomes, Basic concepts of DNA & RNA

metabolism Replication, Transcription and Translation-importance of their inhibitors,

Recombinant DNA technology and polymerase chain reaction-their role in medicine, Gene

therapy, Genomics and Bioinformatics, their relevance to medicine.

b. Biochemical basis of Hormone action

Communication among cells and tissues, Molecular mechanism of action of Steroid hormones,

hormones of pancreas, thyroid and parathyroid, Signal transduction, G-Proteins coupled

receptors and second messengers, Role of leptins and adipocytokines.

c. Clinical Biochemistry

Organ function tests: Liver function tests, Kidney function tests, Thyroid function tests, Adrenal

and Pancreatic function tests, Tumor markers and growth factors, Biochemical changes in

pregnancy and lactation, Water and electrolytes balance and imbalance, Acid-base balance and

disorders. Total Quality Management of Laboratories, Internal quality control, External quality

control, Accreditation of laboratories.

10. Microbiology:

a. General Bacteriology

i. Sterilization/disinfection

ii. Culture media

iii. Antimicrobial sensitivity

iv. Bacterial genetics

b. System Bacteriology

i. Gram positive bacteria

ii. Gram Negative bacteria

iii. Mycobacteria

c. Immunology

i. Innate and Adaptive immune responses

ii. Hypersensitivity

iii. Autoimmunity

d. Virology

i. DNA/RNA viruses

ii. HIV

iii. Herpes viruses



11. Pharmacology:

- i. General Pharmacology
- ii. Autonomic nervous system
- iii. Cardiovascular system
- iv. Central Nervous
- v. Antibiotics and chemotherapy

12. ENT:

- 1. Complications of Otitis media
- 2. Otosclerosis and tympanoplasty
- 3. BERA
- 4. Acoustic neuroma (tumors of ear)
- 5. FESS/ESS
- 6. Neurological affections of larynx
- 7. Hoarseness and tumors
- 8. Tracheostomy
- 9. Diseases and tumors of thyroid
- 10. ENT manifestation of AIDS

13. Ophthalmology:

1 Lids:

- I. Entropion
- II. Ectropion
- III. Ptosis
- 2. Cornea

- I. Corneal ulcer
- II. Keratoconus
- III. Lasik laser

3. Lens

- I. Senile cataract
- II. Subluxated lens
- III. Multifocal iol

4. Retina

- I. Diabetic Retinopathy
- II. Macular hole
- III. Retinal detachment

5. Optic nerve

- I. Optic atrophy
- II. Pappilledema
- III. Dilated pupil



14. Radiology:

- I. Radiation Protection and hazards
- II. Basics of x-ray, ultrasound, CT and MRI
- III. Basics of PET & SPECT
- IV. Clinical indications/contraindications of CT, MRI and PET
- V. Contrast media and their adverse reactions and their management
- VI. Radiological investigations like IVP, HSG, Barium studies
- VII. Ultrasonography and Doppler.

