BLDE

(DEEMED TO BE UNIVERSITY)

Declared as Deemed to be University u/s 3 of UGC Act, 1956

Accredited with 'A' Grade by NAAC (Cycle-2)

CURRICULUM FOR PH.D. PROGRAMME ENTRANCE EXAMINATION 2025-26 (Batch – II)

BLDE
(DEEMED TO BE UNIVERSITY)
Declared as Deemed to be University u/s 3 of UGC Act, 1956
The Constituent College
SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL AND RESEARCH CENTRE

BLDE(DU)/REG/Ph.D./2019-20/331 , May 18, 2019

NOTIFICATION

Sub: Syllabus for Ph.D. Entrance Examination

Ref: 1. UGC (Minimum Standards and Procedures for Award of M.Phil./Ph.D. Degree) Regulations, 2016.
2. Minutes of the 29th meeting of the Ph.D. Committee of the University held on 14-02-2019.
3. Minutes of the meeting of the 28th Academic Council of the University held on 26-04-2019.
4. Minutes of the meeting of the 47th BoM of the University held on 04-05-2019.

The Board of Management of the Deemed to be University is pleased to approve the Syllabus for Ph.D. Entrance Examination at its 47th meeting held on May 04, 2019.

The Syllabus for Ph.D. Entrance Examination shall be effective from the Academic Session 2019-20 onwards, in the Constituent College of the University viz. Shri B. M. Patil Medical College, Hospital and Research Centre, Vijayapura.

REGISTRAR
REGISTRAR
BLDE (Deemed to be University)
Vijayapura-586103. Karnataka

To,
The Dean, Faculty of Medicine and Principal
Shri B. M. Patil Medical College,
Hospital and Research Centre,
Vijayapura

Copy to:
- The Secretary, UGC, New Delhi
- The Controller of Examinations
- The Chairperson, Ph.D. Committee
- The Prof. & HoDs of Pre, Para and Clinical Departments
- The Coordinator, IQAC
- PS to the Hon'ble Chancellor
- PS to the Hon'ble Vice-Chancellor

INDEX

ANATOMY

1. History of Anatomy
2. General Anatomy
3. Gross Anatomy with applied aspects

   Region wise- Upper limb
   Lower Limb
   Thorax
   Abdomen
   Head and Neck Brain
4. Embryology: General and systemic embryology including growth, development and Teratology.
5. Histology: - General and systemic and principles of Microscopy.
6. Neuroanatomy: Central and peripheral nervous system with applied aspects.
7. Radiological anatomy: Principles of newer imaging techniques (USG, CT SCAN, MRI, etc) and their applications.
8. Genetics: Chromosomes Anomalies- Numerical and structural.
   Disorders –Down' syndrome, Patau syndrome, Turner syndrome, frazile syndrome, cry do, chat Syndrome,

PHYSIOLOGY

1) General Physiology Including Biophysics: Homeostasis, Concepts of Physiological norms range and variations, Transport across Cell membrane, relationship between stimulus and response. Structure of cell membrane, RMP, Cellular receptors, Intercellular communications. Body Fluids Compartments and changes in Body Fluid Compartments and Measurements, Hypoproteinemia.

   Biological membranes with details of membrane receptors, Physiology of growth and aging and Principles and applications of genetics.

2) Environmental Physiology : Physiology of deep sea diving, Space physiology, High altitude Physiology, Hyperbaric oxygen therapy, Structure and functions of skin, temperature regulation, Hypothermia and Hyperthermia, Air and Noise Pollution and Radiation Physiology.

   Nerve Muscle Physiology: Classification of Nerves and Muscle, Structure of skeletal muscle. Types of muscle fibers. Mechanism of contraction and its molecular basis. Thermal and chemical changes during muscle contraction. Oxygen debt. Neuromuscular Transmission. Neuromuscular blocking drugs. Pathophysiology of muscle disorders. Pathophysiology of Myasthenia Gravis.

   Experimental techniques to study bioelectrical phenomena (Voltage clamp technique, cathode ray oscilloscope, S.D. curve, nerve conduction studies), EMG,

3) Blood: Blood composition; cellular elements of blood their formation and regulation. Hemoglobin: Synthesis and functions Jaundice, Anemia & their Classification, Hemostatic mechanisms, Anticoagulants, Blood groups, Rh- incompatibility Blood transfusion, ESR, Basic Mechanisms of Immunity & Function of WBCs, Lymph : Composition Circulation and functions.

   Plasmin system and Tissue typing.

4) Cardio Vascular System: Functional anatomy of heart, properties of cardiac muscle Principles of Electro cardiography, Electrical and Mechanical changes in cardiac cycle, Conducting system of Heart Normal ECG, Cardiac output: Measurement in Man, Physiological Variations.

   Regulatory mechanisms of Heart rate and Blood pressure. Regional Circulations Normal values, Physical Principles governing flow of blood in Heart and blood vessels, Measurement and regulation of coronary blood flow, changes in CVS during muscular exercise, Postural changes, Hypovolemia, Hypoxia, and cardio pulmonary resuscitation. Microcirculation. Hemodynamics, Pathophysiology of Hypertension, Shock, Cardiac Failure and Coronary Artery Disease.

   Echocardiography and vector cardiogrphy, ECG, Stress test, CT scan, Cardiac catheterization , Flow meters and Ultrasonograhpy .

5) Respiratory System : Functional anatomy of Respiratory systems, Mechanics of Normal respiration, Physical Principles of governing flow of air in respiratory passages, Lung Compliance, Alveolar ventilation, ventilation perfusion Ratio, Oxygen and (O2) transport, Diffusing capacity, pulmonary function Tests.

   Regulation of respiration, Respiratory acidosis and alkalosis, Pulmonary blood flow, Hypoxia, Cyanosis, Asphyxia, Respiratory adjustments during muscle exercise, Hyperbaric conditions, Principles of Oxygen therapy, Artificial respiration, Cardiopulmonary resuscitation Hyaline Membrane disease, Pathophysiology of Restrictive and obstructive lung diseases, Pulmonary edema and Dyspnoea. Lung function tests, Blood gas analysis.

   Exercise Physiology: Concept of physical fitness, Its components and evaluation, Adaptations.

6) Endocrine System: General Principles of Regulation of Endocrine glands. Hormones functions, cellular mechanism of hormone action, regulation of secretion.

   Experimental and clinical disorders of Anterior and Posterior Pituitary, Thyroid, Parathyroid, Adrenal Cortex and Medulla and Endocrine Pancreas. Stress and Hormones. Minor Endocrine glands: Pineal Body, Heart and Kidney. Radio immuno assay.

7) Reproductive system: Sex determination and differentiation Male Reproduction; Functions of Testes, Constituents of Semen, Testicular hormones, Spermatogenesis and regulation. Female Reproduction: Menstrual Cycle: Changes in ovary, uterus, Cervix, vagina and hormonal regulation. Ovulation and Its detection. Fertilization, Implantation, Physiological changes during pregnancy Fetoplacental Unit, Nutritional needs of mother during pregnancy, Parturition, Lactation, composition of breast milk, Placental and Fetal Circulation Menopause, Physiology of Newborn, Family planning & welfare, Physiological basis of Contraception, safe period rhythm and other methods of contraception. Invitro fertilization,

8) Alimentary System: Functional Morphology Smooth Muscle: Structure Mechanism of Contraction. Nerve supply and Nerve transmitters. Composition Function and regulation of secretion of Salivary glands, Stomach, Small Intestine and large Intestine.

   Regulation of gastrointestinal Movements, Functions of Gall bladder, liver. Site of production and action of GI Hormones. Mechanism of Absorption of food.

   Physiological basis of Peptic ulcer, Diarrhoea and Constipation. Motility disorders: Achalasia, Hirschsprung disease. Gastro intestinal hormones and Absorption of nutrients, Relationship of diet and diseases, Starvation and obesity.

9) Renal Physiology: Functions of different parts of Nephron urine formation. Role of Kidney in water and Electrolyte balance. Acidification of urine. Diuresis, Kidney function tests. Juxtaglomerular apparatus. Renin - Angiotensin system, Renal blood flow. Structure and its and measurement regulation. Innervation of bladder, Micturition,

Cystometrogram, Disorders of Micturition and Principles of Artificial kidney and Dialysis.

10) Central Nervous System: Organisation of Central Nervous system Functions and Neuronal organisation at spinal cord level, synaptic transmission, motor and sensory systems and their lesions, Reticular system in brain stem, sleep, wakefulness, EEG waves and Physiological changes in EEG, clinical lesions and Experimental sections at spinal cord, brain stem and sub cortial levels, Physiology of Basal Ganglia, Cerebellum, Thalamus, Hypothalamus limbic system, Pre frontal lobe and cerebral cortex, speech and its disorders, Autonomic Nervous system, Formation, circulation and functions of CSF, Blood Brain Barrier, Central Neuro transmitters. Cerebral blood flow and its measurements. Neuroglia, Methods to study the functions with diagnostic techniques and Physiological basis of features of diseases of Cerebellum, Basal Ganglia, Thalamus, Cerebral Cortex, Reticular formation, Hypothalamus, ANS and Limbic system, CT Scan and MRI Techniques.

    Special Senses : Eye : Functional anatomy of Eye, image formation on Retina, Structure of photoreceptors, Electrical activity of photoreceptors, Errors of Refraction, Functions of Aqueous humour, Intraocular tension. Mechanisms of Accommodation Dark adaptation, pupillary reflexes functions of Retina optic pathway and lesions. Role of visual cortex in perception. Field of vision. Colour vision, Acuity of vision, Photochemistry of vision, Electrophysiology of Retina and Nutritional deficiency blindness,

    Auditory Apparatus : Functional anatomy of Ear, Physics of sound , Role of Tympanic Membrane, Middle ear and cochlea in hearing , Auditory Receptors and Pathway, Electrophysiology of cochlea, Deafness and its causes, Principles of Audiometry, Tuning fork tests & Interpretation. Vestibular apparatus: Structure and Functions, Connections and lesions of vestibular apparatus. Taste and Smell: Modalities, Receptors, pathway, Cortical and limbic areas associated with taste and smell.

    Stress Relaxation Technique: Principles of Yoga, Breathing exercise, Meditation and Bio feedback techniques.

BIOCHEMISTRY

COURSE CONTENT:

1) CELL BIOLOGY

   i. Structure of cell, general and specific features, cytoskeleton, nucleus, nucleolus, mitochondria and plasmic reticulum, ribosomes, golgi complex, lysosomes, plasma membranes, gap junctions,– mitosis and meiosis.
   ii. Ultra centrifugation, cell fractionation and differentiation of cellular and subcellular organelles.
   iii. Biomembranes, receptors, membrane bound substance mechanisms of transport across the cell membranes.
   iv. Cell, cycle, regulation of cell cycle, apoptosis, biochemistry of aging.
   v. Cytogenetics.

2) BIOPHYSICAL, ORGANIC ASPECTS OF BIOCHEMISTRY AND BIOCHEMICAL TECHNIQUES

   i. Electrolytes, pH buffer system, colloids, law of mass action, surface tension, osmosis, diffusion, and molecular weight determination

   ii. Analytical Biochemistry & Instrumentation: Principles & application of colorimetry, fluorometry, spectrophotometry, Radioactive isotopes and its applications in medicine, atomic absorption spectrophotometry, spectroscopy, osmometry, centrifugation, nephelometry and chemiluminescence, Flame Photometry, ISE, Semiautoanalyzer, autoanalyzer, ELISA, RIA, PCR and turbidimetry

   iii. Bioseparative techniques:

   Chromatography- Column, Paper, TLC, GLC, HPLC, Affinity
   Electrophoresis- Paper, Cellulose Acetate, Agarose, SDS, PAGE, Cell culture techniques, Microscopy-light, electron, fluorescent, Mass spectrometry, Flow cytometry, Bioinformatics and computational biology – Basics, application in medicine and research, Nanotechnology and Nanoparticles – Basics, application in medicine and research.

   iv. Structure, physical & chemical properties of the following are required.
      a) Ribose, xylose, mannose, galactose, fructose, deoxy sugars, aminosugars, uronic acids, lactose, maltose, sucrose, starch, inulin, glycogen, cellulose, glycoaminoglycans.
      b) Saturated & unsaturated fatty acids, their derivatives, triacyl glycerol, phospholipids, glycolipids, sterols, lipoproteins.

c) Amino acids, peptides, polypeptides, hemoglobin, immunoglobulin, collagen and proteoglycans, levels of organization of proteins with reference to insulin & Hb. Protein conformation, interaction and structure activity relationship.
d) Purine, pyrimidine, their derivatives, nucleic acids, nucleotide & polynucleotides.

3) ENYMES, INTERMEDIARY METABOLISM, INBORN ERRORS OF ETABOLISM.

A. ENYMES

i. General properties, classification and nomenclature, kinetic model, Km value factors influencing enzyme action, specificity, mechanism of enzyme action, enzyme kinetics, regulation of enzyme action, isolation, isoenzymes, coenzymes, clinical enzymology, Immobilized enzymes – application, Factors affecting enzyme catalyzed reactions, Michaelis-Menten constant, Lineweaver-Burk plot, Edee-Hofstee plot.
ii. Biological oxidation and reduction, bioenergetics.
iii. Digestion and absorption of food and other nutrients
iv. Detoxication / xenobiotics
v. Chemical anatomy of human body

B. INTERMEDIARY METABOLISM

i. Methods of studying intermediary metabolism
ii. Intermediary metabolism of carbohydrates, lipids, proteins and amino acids, Nucleic acids in human system
iii. Muscular contraction, nerve conduction, coagulation of blood
iv. Metabolism in specialized tissues like erythrocytes, lens, nervous tissue, adipose tissue, connective tissue, collagen, boneetc
v. Metabolic interrelationships and metabolism in starvation

C. INBORN ERRORS OF METABOLISM

Inborn errors of carbohydrates, lipids amino acids, protein nucleic acids, mineral metabolism.

4) ENDOCRINOLOGY

i. Classification and general mechanism of action of hormones
ii. Secretion, control, transport and mode of action of following hormones hypothalamic peptides, adrenohypophyseal,neurohypophyseal, thyroid, parathyroid calcitonin, pancreatic, adrenocortical, medullary, gonadal, gastrointestinal, opioid peptides, endorphins.
iii. Biochemistry of conception, reproduction and contraception
iv. Endocrine interrelationship and their involvement in metabolic regulation
v. Neuromodulators and their mechanism of action, physiological significance.

5) VITAMINS

i. Structure, source, daily requirements, physiological role and deficiency manifestations of vitamins, hypo and hypervitaminosis and antivitamins
ii. Mechanisms of action of coenzymes
iii. Mineral metabolism and role of micro and macronutrients

6) HUMAN NUTRITION.

Principal food components, general nutritional requirements, energy requirements, biological value of proteins, specify dynamic action, balanced diet, diet formulation in health and disease, mixed diet, nutritional supplements, food toxins and additives, parentral nutrition, disorders of nutrition, obesity, protein energy malnutrition, dietary fibers, under- nutrition, laboratory diagnosis of nutritional disorders, Biochemistry of Ageing, National Nutritional programmes.

7) MOLECULAR BIOLOGY

i. DNA & RNA as genetic materials, duplication of RNA and DNA, transcription, messenger, transfer and ribosomes their structure and function regulation and expression of genes, regulation of translation, genetic engineering, molecular biology and viruses, molecular basis of cancer.
ii. Mechanism of action of cytotoxic drugs and antibiotics.
iii. Immunogenetics, cytogenetics, genetic counseling, Basics of Bioinformatics.

8) IMMUNOLOGY

Concepts of immunity. Antigen, Antibodies, Ag-Ab reaction, complement system, Structure & functions of immune system, Immune response of the body, immune deficiency diseases, hypersensitivity, autoimmunity, immunology of transplantation & malignancy, immunological disorders.

9) CLINICAL BIOCHEMISTRY ALONG WITH INVESTIGATIVE ASPECT

i. Diabetes mellitus and secondary degenerative changes associated with diabetes mellitus, glycogenesis, galactosemia, mucopolysaccharidosis, reducing substances in urine and aids to laboratory diagnosis of these disorders.
ii. Ketosis, atherosclerosis, fatty liver, lipidosis, hyperlipoproteinemias, hypolipoproteinemias and laboratory diagnosis
iii. Aminoacidurias, uremia, phenylketonuria, hemoglobinopathies, immunoglobulinopathies, porphyrias laboratory diagnosis
iv. Malabsorption syndromes and their laboratory diagnosis
v. Gastric and pancreatic function tests
vi. Acid base balance, fluid and electrolyte balance and related disorders; renal function tests
vii. CSF in health and disease
viii. Hepatobiliary function tests and jaundice
ix. Clinical enzymology

x. Endocrinal disorders and laboratory diagnosis
xi. Diseases of circulatory system, hemopoietic system
xii. Diseases of heart, kidneys- principles of peritoneal and hemodialysis
xiii. Diseases of digestive systems and related organs like liver, pancreas etc.
xiv. Diseases of lungs, musculoskeleton system
xv. Disease of central nervous system
xvi. Hereditary disorders
xvii. Radioimmunoassay and enzyme immunoassay and their clinical application
xviii. Biochemistry of Aids and Cancer.
xix. Disorders of Calcium and Phosphorus metabolism.
xx. Investigative aspects of all diseases mentioned above in the course content

10) LABORATORY MANAGEMENT AND BASIC CONCEPTS OF QUALITY CONTROL.

i. Method Evaluation: Analytical goals, precision and accuracy,bias,sensitivity and specificity, selection of method and evaluation.
ii. Total Quality Control: Fundamental concepts, control of preanalytical, analytical and post analytical variables, internal and external quality control programmes, Accreditation programmes.
iii. Automation: Definition, instrumental concepts, types of analyzers, trends in automation in Biochemistry laboratory, Laboratory information system.
iv. Laboratory safety measures.

11) Therapeutic drug monitoring.

12) Clinical Toxicology-Pathomechanisms and symptoms of most important types of toxic syndromes (anticholinergic, cholinergic, opioid, sedative, sympathomimetic), Pharmacology and analysis of specific drugs and toxins.

PHARMACOLOGY

COURSE CONTENT:

Study of Pharmacology should include all aspects of Pharmacology as encompassed in branches of General and Systemic Pharmacology.

1. **General Pharmacological Principles and Applied Sciences**
   i. History of pharmacology, sources of drug information and use of Information Technology.
   ii. Theories and mechanism of drug action, Pharmaco-kinetic principles and parameters, Factors modifying drug action.
   iii. Pharmaco-genetics, Chrono-pharmacology, Basic microbiology, immunology and molecular biology Dose-response relationships, structure-activity relationships, Physiological and biochemical basis of drug action, Etiopathogenesis of diseases relevant to therapeutic use of drugs,.
   iv. Adverse effects of drugs, Drug dependence, Toxicology,

2. **Systemic Pharmacology:**
   i. **ANS Pharmacology** -Neurotransmission: the autonomic and somatic motor nervous systems, Muscarinic receptor agonist and antagonists, Anticholinesterase agents, Nicotine and agents acting at the neuromuscular junction & autonomic ganglia Adrenergic agonists and antagonists, 5- Hydroxytryptamine (serotonin) & Dopamine.
   ii. **CNS Pharmacology-** Neurotransmission in the central nervous system, Drug therapy of depression and anxiety disorders, Pharmacotherapy of psychosis and mania, Pharmacotherapy of the epilepsies, Treatment of central nervous system degenerative disorders, Hypnotics and sedatives, Opioids, analgesia, and pain management, General Anesthetics & therapeutic gases, Local Anesthetics, Ethanol, Drug use disorders and addiction,
   iii. **Renal Pharmacology-** Drugs affecting renal excretory function, Renin and angiotensin,
   iv. **Cardiovascular Pharmacology-** Treatment of hypertension, Therapy of heart failure, Anti-arrhythmic drugs, Treatment of pulmonary arterial hypertension, Blood coagulation and anticoagulant, Fibrinolytic, and antiplatelet drugs, Drug therapy of dyslipidemia.
   v. **Immunopharmacology-**Treatment of ischemic heart disease, Introduction to immunity and inflammation, Immunosuppressant and tolerogens, Immunglobulins and vaccines.
   vi. **Autocoids and Pharmacotherapy of inflammation-** Lipid derived autacoids: eicosanoids and platelet activating factor, Pharmacotherapy of inflammation, fever, pain & gout, Histamine, bradykinin & their antagonists.
   vii. **Pulmonary pharmacology**- Treatment of Cough, Bronchial asthma, COPD.

viii. **Hematopoietic agents**- Iron salts growth factors, minerals, & vitamins.

ix. **Endocrine Pharmacology**-The hypothalamic pituitary axis, Thyroid and antithyroid drugs, Estrogens, progestins & the female reproductive tract, Androgens & the male reproductive tract, ACTH, adrenal steroids and the adrenal cortex, Endocrine pancreas and pharmacotherapy of diabetes mellitus & hypoglycemia, Agents affecting mineral ion homeostasis and bone turnover.

x. **Gastrointestinal Pharmacology**- Pharmacotherapy- for gastric acidity, peptic ulcers and gastroesophageal reflux disease, gastrointestinal motility and water flux, emesis and Biliary and pancreatic diseases, Pharmacotherapy of inflammatory bowel diseases.

xi. **Chemotherapy** - General principles of antimicrobial therapy, Chemotherapy of malaria, Chemotherapy of protozoal infections. Ameobiasis, giardiasis, trichomoniasis, trypanosomiasis, leishminiasis and other protozoal infections Chemotherapy of helminth infections, Sulfonamides, trimethoprim-sulfamethoxazole quinolones, and agents for urinary tract infections, Penicillins, cephalosporins & other beta lactam antibiotics, Aminoglycosides,Protein synthesis inhibitors and miscellaneous antibacterial agents, Chemotherapy of tuberculosis, mycobacterium avium complex disease and leprosy, Antifungal agents, Antiviral agents (non retroviral), Treatment of viral hepatitis (HBV/HCV), Antiretroviral agents and treatment of HIV infection.

xii. Cancer therapy-General principles in the pharmacotherapy of cancer, Cytotoxic drugs, Pathway-targeted therapies: monoclonal antibodies, protein kinase inhibitors and various small molecules, Hormones and related agents in the therapy of cancer.

xiii. **Ocular pharmacology**-Pharmacokinetics and toxicology of ocular therapeutic agents. Therapeutic and diagnostic drugs in ophthalmology.

xiv. **Dermatological pharmacology**-Drug delivery in dermatological diseases, photo chemotherapy, Drug therapy of dermatological infections and infestations, cytotoxic and immunosuppressant drugs in dermatological disorders, biological agents, Sunscreens.

xv. **Environmental toxicology**-carcinogens and heavy metals, & chelating agents.

xvi. **Pharmacogenomic Pharmacovigilance** (ADR reporting), Pharmacoeconomics (cost-effectiveness study) and pharmaco-epidemiology

xvii. Over the counter drugs,

xviii. **Dietary supplements and herbal medicines**.

xix. Pharmacometrics-methods of drug evaluation.

Experimental Pharmacology, Bioassay and Statistics:

Experimental methodologies involved in the discovery of drugs (in vivo, in vitro/ex vivo). Animal handling. Animal care. Methods of anaesthetizing animals and methods of euthanasia. Restraining and blood collection methods. Drug screening methods involved in the evaluation of **A**nalgesics, Anti-pyretics, Anti-convulsants, Anti-inflammatory drugs, Antidepressants, Anti-anxiety and Antipsychotics, Sedatives, Muscle Relaxants, Anti-

hypertensives, Hypocholesterolaemic agents, Anti-arrhythmics, Diuretics, Drugs for heart failure Adrenergic blocking drugs, Drugs used in peptic ulcer diseases/Prokinetic agents/ anti-emetics, Anti-tussives, /anti-asthma agents, Local Anaesthetics, Oxytocics, Anti-fertility agents, Anti-diabetics Chemotherapeutic agents, Anti-malarial drugs , Anti- TB drugs, Anti-cancer drugs.

Clinical Pharmacology and Recent advances:

Development of new drugs, protocol designing, methodology and ethics of clinical trials, Clinical Pharmaco-kinetics and Pharmaco-dynamic studies in post marketing surveillance, Therapeutic drug monitoring Pharmaco-vigilance, drug utilization studies, essential drug concept and rational prescribing, GLP and GMP concepts.

Recent advances in understanding of mechanism of drug action and treatment of diseases; New drugs and new uses of old drugs.

PATHOLOGY

COURSE CONTENT:

A. GENERAL PATHOLOGY

1. The Cell as a Unit of Health and Disease:

i. The Genome- Noncoding DNA, Histone Organization, Micro-RNA and Long Noncoding RNA, Micro-RNA (miRNA), Long Noncoding RNA (lncRNA).
ii. Cellular Housekeeping-Plasma Membrane: Protection and Nutrient, Acquisition, Cytoskeleton and Cell-Cell Interactions, Biosynthetic Machinery: Endoplasmic Reticulum and Golgi, Waste Disposal: Lysosomes and Proteasomes
iii. Cellular Metabolism and Mitochondrial Function
iv. Cellular Activation- Cell Signaling
v. Signal Transduction Pathways
vi. Growth Factors and Receptors
vii. Interaction with the Extracellular Matrix
viii. Maintaining Cell Populations - Proliferation and the Cell Cycle, Stem Cells

2. Cellular Responses to Stress and Toxic Insults: Adaptation, Injury, and Death:

i. Introduction to Pathology,
ii. Overview: Cellular Responses to Stress and Noxious Stimuli,
iii. Adaptations of Cellular Growth and Differentiation Hypertrophy- Mechanisms of Hypertrophy, Hyperplasia, Physiologic Hyperplasia, Pathologic Hyperplasia, Mechanisms of Hyperplasia, Atrophy- Mechanisms of Atrophy, Metaplasia- Mechanisms of Metaplasia.
iv. Overview of Cell Injury and Cell Death.
v. Causes of Cell Injury.
vi. Morphologic Alterations in Cell Injury- Reversible Injury, Necrosis, Patterns of Tissue Necrosis.
vii. Mechanisms of Cell Injury- Depletion of ATP, Mitochondrial Damage, Influx of Calcium and Loss of Calcium, Homeostasis, Accumulation of Oxygen-Derived Free Radicals, (Oxidative Stress), Defects in Membrane Permeability, Damage to DNA and Proteins. Clinicopathologic Correlations: Selected Examples of Cell Injury and Necrosis- Ischemic and Hypoxic Injury- Mechanisms of Ischemic Cell Injury, Ischemia-Reperfusion Injury, Chemical (Toxic) Injury.
viii. Apoptosis- Causes of Apoptosis, Apoptosis in Physiologic Situation, Apoptosis in Pathologic Conditions, Morphologic and Biochemical Changes in Apoptosis, Mechanisms of Apoptosis, The Intrinsic (Mitochondrial) Pathway of Apoptosis, The Extrinsic (Death Receptor-Initiated) Pathway of Apoptosis, The Execution Phase of Apoptosis, Removal of Dead Cells.
ix. Clinicopathologic Correlations.

x. Apoptosis in Health and Disease. Examples of Apoptosis, Disorders Associated with Dysregulated, Apoptosis, Necroptosis.
xi. Autophagy
xii. Intracellular Accumulations – Lipids -Steatosis (Fatty Change), Cholesterol and Cholesterol Esters, Proteins, Hyaline Change, Glycogen, Pigments, Exogenous Pigments, Endogenous Pigments.
xiii. Pathologic Calcification- Dystrophic Calcification, Metastatic Calcification.
xiv. Cellular Aging.

3. Inflammation and Repair:

i. Overview of Inflammation: Definitions and General Features
ii. Acute Inflammation- Reactions of Blood Vessels in Acute Inflammation, Leukocyte Recruitment to Sites of Inflammation, Phagocytosis and Clearance of the Offending Agent, Mediators of Inflammation, Morphologic Patterns of Acute Inflammation.
iii. Chronic Inflammation: Cells and Mediators of Chronic Inflammation, Granulomatous inflammation.
iv. Systemic Effects of Inflammation
v. Tissue Repair: Repair by Connective Tissue Deposition, Factors That Influence Tissue Repair

4. Hemodynamic Disorders, Thromboembolic Disease, and Shock:

i. Edema and Effusions: Increased Hydrostatic Pressure, Reduced Plasma Osmotic Pressure, Sodium and Water Retention, Lymphatic Obstruction.
ii. Hyperemia and Congestion
iii. Hemostasis, Hemorrhagic Disorders, and Thrombosis-Hemostasis, Coagulation Cascade, Endothelium Hemorrhagic Disorders, Thrombosis. Disseminated Intravascular Coagulation.
iv. Embolism- Pulmonary Embolism, Systemic Thromboembolism, Fat and Marrow Embolism, Air Embolism, Amniotic Fluid Embolism.
v. Infarction
vi. Shock- Pathogenesis of Septic Shock, Stages of Shock

5. Genetic Disorders:

i. Genes and Human Diseases- Mutations
ii. Mendelian Disorders- Transmission Patterns of Single-Gene Disorders, Biochemical and Molecular Basis of Single- Gene (Mendelian) Disorders, Disorders Associated with Defects in Structural Proteins, Disorders Associated with Defects in Receptor Proteins, Disorders Associated with Defects in Enzymes, Disorders Associated with Defects in Proteins That Regulate Cell Growth.
iii. Complex Multigenic Disorders

iv. hromosomal Disorders- Normal Karyotype, Structural Abnormalities of Chromosomes, Cytogenetic Disorders Involving Autosomes, Cytogenetic Disorders Involving Sex Chromosomes- Klinefelter Syndrome,Turner Syndrome, Hermaphroditism and Pseudohermaphroditism.

v. Single-Gene Disorders with Nonclassic Inheritance-Diseases Caused by Trinucleotide-Repeat Mutations, Fragile X Syndrome and Fragile X Tremor/ Ataxia. Mutations in Mitochondrial Genes - Leber Hereditary Optic Neuropathy, Genomic Imprinting, Gonadal Mosaicism.

vi. Molecular Genetic Diagnosis- Diagnostic Methods and Indications for Testing, Diagnostic Methods and Indications for Testing, Molecular Analysis of Genomic Alterations, Polymorphic Markers and Molecular

vii. Diagnosis, Epigenetic Alterations, RNA Analysis, Next-Generation Sequencing-Bioinformatic, Clinical Applications of NGS DNA, Sequencing, Future Applications.

6. Diseases of the Immune System:

i. The Normal Immune Response- Innate Immunity, Adaptive Immunity, Cells of the Immune System, Tissues of the Immune System, Major Histocompatibility Complex (MHC) Molecules: The Peptide Display System of Adaptive Immunity, Cytokines: Messenger Molecules of the Immune System, Overview of Lymphocyte Activation and Immune Responses.

ii. Hypersensitivity: Immunologically Mediated Tissue Injury-Classification of Hypersensitivity Reactions.

iii. Autoimmune Diseases- Immunologic Tolerance, Mechanisms of Autoimmunity: General Principles, General Features of Autoimmune Diseases, Rheumatoid Arthritis, Sjögren Syndrome, Systemic Sclerosis (Scleroderma), Inflammatory Myopathies, Mixed Connective Tissue Disease, Polyarteritis Nodosa and Other Vasculitides, IgG4-Related Disease.

iv. Rejection of Tissue Transplants- Mechanisms of Recognition and Rejection of Allografts, Rejection of Kidney Grafts, Transplantation of Other Solid Organs, Transplantation of Hematopoietic Cells.

v. Immunodeficiency Syndromes- Primary Immunodeficiencies, Defects in Innate Immunity, Defects in Adaptive Immunity, Defects in Lymphocyte Maturation, Defects in Lymphocyte Activation and Function, Immunodeficiencies Associated with Systemic Diseases, Secondary Immunodeficiencies, Acquired Immunodeficiency Syndrome (AIDS), Amyloidosis.

7. Neoplasia

i. Nomenclature

ii. Characteristics of Benign and Malignant Neoplasms- Differentiation and Anaplasia, Local Invasion, Metastasis.

iii. Epidemiology of Cancer- The Global Impact of Cancer, Environmental Factors, Age, Acquired Predisposing Conditions, Genetic Predisposition and Interactions Between Environmental and Inherited Factors,

iv. Molecular Basis of Cancer: Role of Genetic and Epigenetic Alterations- Cellular and Molecular Hallmarks of Cancer, Self-Sufficiency in Growth Signals: Oncogenes, Proto-oncogenes, Oncogenes, and Oncoproteins, Insensitivity to Growth Inhibition: Tumor Suppressor Genes, Growth-Promoting Metabolic Alterations: The Warburg Effect, Evasion of Programmed Cell Death (Apoptosis), Limitless Replicative Potential:The Stem Cell–Like Properties of Cancer Cells, Angiogenesis, Invasion and Metastasis, Evasion of Host Defense, Genomic Instability, Cancer-Enabling Inflammation, Dysregulation of Cancer-Associated Genes, Molecular Basis of Multistep Carcinogenesis.

v. Carcinogenic Agents and Their Cellular Interactions-Steps Involved in Chemical Carcinogenesis, Direct-Acting Carcinogens, Indirect-Acting Carcinogens, Promotion of Chemical Carcinogenesis, Radiation Carcinogenesis, Microbial Carcinogenesis.

vi. Clinical Aspects of Neoplasia- Grading and Staging of Tumors, Laboratory Diagnosis of Cancer- Molecular Profiles of Tumors: The Future of Cancer Diagnostics, Tumor Markers.

8. Infectious Diseases:

i. General Principles of Microbial Pathogenesis- How Microorganisms Cause Disease, Host-Pathogen Interactions, Host Damage, Sexually Transmitted Infections, Spectrum of Inflammatory Responses to Infection.

ii. Special Techniques for Diagnosing Infectious Agents.

iii. Viral Infections- Acute (Transient) Infections, Latent Infections (Herpesvirus Infections), Chronic Productive Infections, Transforming Viral Infections

iv. Bacterial Infections- Gram-Positive Bacterial Infections, Gram-Negative Bacterial Infections, Mycobacteria, Spirochetes, Anaerobic Bacteria, Obligate Intracellular Bacteria.

v. Fungal Infections- Yeast, Molds, Dimorphic Fungi.

vi. Parasitic Infections- Protozoa, Metazoa.

vii. Emerging Infectious Diseases.

9. Environmental and Nutritional Diseases:

i. Environmental Effects on Global Disease Burden.

ii. Health Effects of Climate Change.

iii. Toxicity of Chemical and Physical Agents.

iv. Environmental Pollution.

v. Occupational Health Risks: Industrial and Agricultural Exposures.

vi. Effects of Alcohol

vii. Injury by Therapeutic Drugs and Drugs of Abuse- Injury by Therapeutic Drugs (Adverse Drug Reactions), Injury by Nontherapeutic Agents (Drug Abuse)

viii. Injury by Physical Agents- Mechanical Trauma, Thermal Injury, Electrical Injury, Injury Produced by Ionizing Radiation.
ix. Nutritional Diseases- Dietary Insufficiency, Protein-Energy Malnutrition, Anorexia Nervosa and Bulimia, Vitamin Deficiencies. Obesity, Diets, Cancer, and Atherosclerosis.

10. Diseases of Infancy and Childhood:

i. Congenital Anomalies-Causes of Anomalies.
ii. Prematurity and Fetal Growth Restriction- Neonatal Respiratory Distress Syndrome, Necrotizing Enterocolitis.
iii. Perinatal Infections
iv. Fetal Hydrops - Immune Hydrops, Nonimmune Hydrops.
v. Inborn Errors of Metabolism and Other Genetic Disorders- Phenylketonuria, Galactosemia, Cystic Fibrosis (Mucoviscidosis)
vi. Sudden Infant Death Syndrome (SIDS)
vii. Tumors and Tumor-like Lesions of Infancy and Childhood- Benign Tumors and Tumor-like Lesions, Malignant Tumors- Benign Tumors and Tumor-like Lesions, Malignant Tumors.

B. HEMATOLOGY

1. Diseases of white blood cells, lymph nodes, spleen, and thymus

DEVELOPMENT AND MAINTENANCE OF HEMATOPOIETIC TISSUES-

a. DISORDERS OF WHITE CELLS:

Leukopenia-0 Neutropenia, Agranulocytosis.
Reactive Proliferations of White Cells and Lymph Nodes- Leukocytosis. Lymphadenitis.
Neoplastic Proliferations of White Cells- Etiologic and Pathogenetic Factors in White Cell Neoplasia: Overview, Lymphoid Neoplasms, Myeloid Neoplasms, Langerhans Cell Histiocytosis.

b. SPLEEN:

Splenomegaly- Nonspecific Acute Splenitis, Congestive Splenomegaly, Splenic Infarcts.
Neoplasms
Congenital Anomalies
Rupture

c. THYMUS:

Developmental Disorders
Thymic Hyperplasia
Thymomas.

2. Red Blood Cell and Bleeding Disorders:

i. Anemias- Anemias of Blood Loss, Hemolytic Anemias, Anemias of Diminished Erythropoiesis.

ii. Polycythemia

iii. Bleeding Disorders: Hemorrhagic Diatheses- Bleeding Disorders Caused by Vessel Wall Abnormalities, Bleeding Related to Reduced Platelet Number: Thrombocytopenia, Bleeding Disorders Related to Defective Platelet Functions, Hemorrhagic Diatheses Related to Abnormalities in Clotting Factors- The Factor VIII-vWF Complex, Von Willebrand Disease, Hemophilia A (Factor VIII Deficiency), Hemophilia B (Christmas Disease, Factor IX Deficiency) Disseminated Intravascular Coagulation, Disseminated Intravascular Coagulation, Complications of Transfusion- Allergic Reactions, Hemolytic Reactions, Transfusion-Related Acute Lung Injury, Infectious Complications.

MICROBIOLOGY

General Microbiology

1. History and Pioneers in Microbiology.
2. Microscopy.
3. Morphology of bacteria and other microorganisms.
4. Nomenclature and classification of microbes.
5. Growth and nutrition of bacteria.
6. Bacterial metabolism.
7. Sterilisation and disinfection.
8. Bacterial toxins.
9. Bacterial antagonism: Bacteriocine.
10. Bacterial genetics.
11. Gene cloning
12. Antibacterial substances used in the treatment of infections and drug resistance in bacteria.
13. Bacterial ecology-Normal flora of human body, Hospital environment, Air, Water and Milk.
14. Host parasite relationship.
15. Diagnostic tests based on molecular biology
16. Organization of clinical Microbiology laboratory and quality control / quality assurance.
17. Hospital Waste Management: Organization for Health care waste management (biomedical waste), techniques for treatment and disposal of biomedical waste regulation on biomedical waste management, 2015.

Immunology

1. Normal immune system
2. Innate immunity
3. Antigens
4. Immunoglobulins
5. Complement
6. Antigen-Antibody reactions
7. Cell mediated immunity
8. Hypersensitivity
9. Immunodeficiency
10. Auto-immunity
11. Immuno tolerance
12. Immunology of transplantation
13. Tumour immunology
14. Prophylaxis and immunotherapy
15. Measurement of immunity.

16. Immunogenetics.
17. Cells of the Immune System
18. Immune response
19. Design and development of vaccines.
20. Immunoprotentiation and Immunomodulation

Systematic Bacteriology

1. Isolation, description and identification of bacteria.
2. Staphylococcus and Micrococcus: The anaerobic gram positive cocci
3. Streptococcus and Lactobacillus
4. Neisseria, Branhamella & Moraxella
5. Corynebacterium and other coryniform organism
6. Bacillus: the anaerobic spore bearing bacilli
7. Clostridium: The spore bearing anaerobic bacilli
8. Enterobacteriaceae
9. Vibrios, Aeromonas, Plesiomonas, Campylobacter and Spirillum
10. Haemophilus and Bordetella
11. Pasteurella and Francisella
12. Brucella
13. Mycobacteria
14. Actinomyces, Nocardia, and Actinobacillus
15. Pseudomonas
16. Spirochaetes
17. Chlamydiae
18. Rickettsiae
19. The bacteriodaceae: Bacteriodes, Busobacterium and leptotricha
20. Mycoplasmatales: Mycoplsama, Ureaplasma, Acholeplasma
21. Erysipelothrix and listeria
22. Chromobacteruium, Flavobacterium, Acinetobacter and Alkaligens
23. Miscellaneous bacteria

Virology

1. The nature of viruses
2. Classification of viruses
3. Morphology, virus structure
4. Viral replication
5. The genetics of viruses
6. Pathogenicity of viruses
7. Epidemiology of viral infections
8. Vaccines
9. Anti viral drugs
10. Bacteriophages
11. Pox viruses

12. Herpes viruses
13. Vesicular viruses
14. Toga viridae
15. Flavi viridae
16. Arena viridae
17. Marburg and Ebola viruses
18. Rubella
19. Orbi viruses
20. Influenzae viruses
21. Respiratory diseases: Rhinoviruses, Adenoviruses and Corona viruses
22. Paramyxoviridae
23. Enteroviruses
24. Hepatitis viruses
25. Rabies viruses
26. Slow Viruses
27. Human immunodeficiency viruses
28. Oncogenic viruses
29. Teratogenic viruses
30. Other Enteric Viruses
31. Bunyaviridae
32. Emerging & re-emerging viral infection. Zika, Nipah virus

Parasitology

1. Protozoan parasites of medical importance:
    - Entamoeba,
    - Giardia,
    - Trichomonas,
    - Leishmania,
    - Trypanosoma,
    - Plasmodium,
    - Toxoplasma,
    - Sarcocystis,
    - Cryptosporidium,
    - Isospora
    - Microsporidium
    - Babesia,
    - Balantidium etc.

1. Helminthology: All those medically important helminthes belonging to Cestode s, Trematode and Nematode.

Cestode:

- Diphyllobothrium,
- Taenia,
- Echinococus,
- Hymeonolepis,
- Dipylidium,
- Multiceps etc.
- Termatode:
- Schistosomea,
- Fasciola,
- Gastrodiscoides,
- Paragonimus,
- Clonarchis,
- Opisthorchis, etc.,

Namatodes:

- Trichuria,
- Trichinella,
- Strongyloides,
- Ancylostoma,
- Ascaris.
- Enterobius,
- Filarial worms,
- Dracunculus, etc.,
- Antiparasitic agent.
- Entamology

Mycology

1. The morphology and reproduction in fungi and antimycotic agents,
2. Classification of fungi,
3. Contaminant and opportunistic fungi
4. Superficial mycotic infections.
5. Fungi causing subcutaneous mycoses
6. Fungi causing systemic infections.
7. Opportunistic fungal infections
8. Antifungal drugs and susceptibility testing.

Applied Microbiology

1. Epidemiology of infections diseases
2. Hospital acquired infections
3. Hospital Antibiotic Policy
4. Infections of various organs and systems of human body
5. Immunization schedules
6. Molecular genetics as applicable to microbiology.

7. Sexually transmitted diseases
8. Vaccinology: Principle, methods of preparation, administration of vaccines.
9. Bioterrorism
10. Emerging and Remerging microbial infections
11. Biosafety in Microbiology
12. Epidemiology of Infectious diseases
13. Investigation of an Infectious outbreak in hospital and community
14. Statistical Analysis of Microbiological data & Research methodology
15. Animal and Human ethics involved in Microbiological work

SKILLS

Bacteriology

1. Preparation and pouring of media –
   Nutrient agar, Blood agar, Mac Conkey agar, Sugars,
   Triple sugar iron Agar (TSI) etc.
2. Operation and maintenance of autoclave, hot air oven, distillation plant, filters like Sei tz and Membrane and sterility tests.
3. Washing and sterilization of glassware.
4. Preparation of reagents – oxidase, kovacs reagent etc.,
5. Disposal of contaminated materials.
6. Testing of disinfectants – Phenol co-efficient and In use test.
7. Quality control of media, reagents etc.,
8. Aseptic practice in Lab and safety precautions.
9. Care and maintenance of common laboratory equipments.
10. Preparation of antibiotic discs; performance of Kirby Bauer, Stokes etc.,
11. Estimation of Minimum inhibitory/ Bactericidal concentrations by tube / plate dilution
12. methods. IQC antibiotic disc potency
13. Tests for Beta lactamases.
14. Collection of clinical specimens for Microbiological investigations.
15. Enverormental sampling
16. Techniques of anaerobiosis.
17. Identification of Bacteria of Medical Importance upto species level (except Anaerobes
18. which could be upto generic level)
19. Preparation of stains viz, Grams, Alberts, Capsules, spores, Ziehl Neelsen etc,
20. and performing staining procedure, identification and interpretation. IQC of staining
21. Care and operation of microscopes viz., light Dark ground, Phase Contrast and
22. Fluorescent microscopes, Electron microscopy.
23. Skin tests Mantoux, Lepromin, Casoni‟s etc.
24. Serum antibiotic assay
25. Sero grouping of streptococci
26. Antibiotic susceptibility test for Mycobacteria.
27. Sputum concentration techniques.

28. Identifcation of HAI, Calculation of HAI quality indicators
29. Methods of preseration of bacteria
30. Mainainance of stock culture
31. Operation of Bact /T Alert, VITEK II- compact

Immunology

1. Collection and preservation of serum
2. Preparation of antigens
3. Preparation of adjuvants and rising of antisera in animals
4. Performance of common serological tests
5. ANA by IF and Immunoblot
6. IQC Serology
7. Immunodiffusion and CIEP
8. Opresation and maintances of ELISA reader and washer
9. Radial immuno diffusion
10. Immuno electrophoresis
11. CD4, CD8 counts
12. Operation & maintenance of Mini VIDAS

Mycology

1. Collection and processing of clinical specimen for fungi,
2. Special techniques like Woods lamp examination, hair baiting techniques, slide cultur es.
3. Stock culture maintenance
4. Animal pathogenicity test for Cryptococcus and Candida
5. Basic tahniqu-KOH prepation, Germ tube, Slide culture, Negative staining LPBC mount

Parasitology

1. Examination of faeces for ova, cysts and larvae and trophozoites.
2. Stool Concentration methods.
3. Egg counting techniques
4. Examination of peripheral blood, urine, CSF, and other fluids for parasites.
5. Examination and identification of histopathology slides for parasitic infection,
6. Serological tests for parasitic diseases
7. Preservation of parasites.
8. Permanent staining techniques for parasites – Giemsa stain, modified ZN for C parvum
9. Entomolgy slides.
10. Laboratory diagnosis of toxoplasma.
11. Laboratory diagnosis of Malaria.
12. Laboratory diagnosis of Coccidian parasites.

Virology

1. Preparation and identification of CPE in various tissue cultures.
2. Serological tests for viral infections
3. ELISA technique for viral diagnosis.
4. Handling of experimental animals and collection of various samples for evidence of viralinfection in animals.
5. Laboratory diagnosis of HIV infection and AIDS
6. Laboratory diagnosis of Hepatitis
7. Prevention and laboratory safety measures
8. Prepation of Tissue Culute
9. Virus Titration

H. LIST OF BOOKS RECOMMENDED:

[Recent editions of following books]

1. Samuel Baron, **Medical Microbiology**, 4th Edn, 1996, Churchill Livingstone Inc.
2. Edmin H Lennette, **Laboratory Diagnosis of Viral Infections,** 4th Edn, 2010, Newyork Marcel Dekker, Inc.
3. Gordon Cook, **Manson's Tropical Diseases,** 22th Edn, 2008, London, ELBS.
4. John G Holt et al, **Bergey's Manual of Determinative Bacteriology,** 9th Edn, 1994, Maryland, Williams & Wilkins.
5. Albert Balows, **Manual of Clinical Microbiology,** 5th Edn, 1991, Washington D.C, American Society for Microbiology
6. Ellen Jo Baron et al; **Bailey & Scott's Diagnostic Microbiology**, 13th Edn, 2013,Mi ssouri, Mosby
7. Douglas D Richman, **Clinical Virology,** 3rd 2009, Newyork, Churchill Livingstone.
8. Bob A Freeman, **Burrows Textbook of Microbiology,** 22st Edn, 1985, W.B. Saunders.
9. Brian I Duerden & B S Drasar, **Anaerobes in Human Disease,** 1991, Great Britain, Edward Arnold.
10. Elmer W Koneman et al, **Introduction to Diagnostic Microbiology,** 2005, Philadelphia, J B Lippincott Company.
11. Bernard N Fields et al, **Field Virology**, Vol. 1, 6th Edn, 2013, Philiadelphia, Lippincott-Ramen.
12. Bernard Fields et al, **Field's Virology,** Volume 2, 6th Edn, 2013, Philadelphia, Lippincott-Raven.
13. Danial Greenwood et al, **Medical Microbiology,** A guide to microbial Infections, Pathogenesis, Immunity, Laboratory Diagnosis and Control, 18th Edn, 2012, London, Churchill Livingstone.
14. J G College et al, Mackie & McCartney, **Practical Medical Microbiology,** 14th Edn, 1996, London, Churchill Livingstone.
15. John V Bennett & Philip S Brachman, **Hospital Infections,** 4th Edn, 1997, Little

Brown.

16. Noel R Rose et al, **Manual of Clinical Laboratory Immunology,** 6th Edn, 2002, Washington D.C, American Society for Microbiology.
17. William E Paul; **Fundamental Immunology,** 7th Edn, 2012, Newyork, Raven Press.
18. Ivan Roitt, **Essential Immunology,**12th ed, 2011
19. Stites, **Clinical Basic Immunology,** 8th ed, 1994
20. Parasitology: Paul Chester Beaver, Rodney Clifton Jung, Eddie Wayne cipp. **Clinical parasitology**: 9 th edition, Philadelphia Lea and Febiger.
21. Topley & Wilsons Microbiology and Microbial infections. Bacteriology VOL 1 &2 (10th edition)
22. Topley & Wilsons Microbiology, Virology Volume 1& 2(10th edition)
23. Topley & Wilsons Microbiology, Medical Mycology (10th edition)
24. Topley & Wilsons Microbiology, Parasitology (10th edition)

COMMUNITY MEDICINE

1) MEDICAL SOCIOLOGY & BEHAVIOURAL SCIENCES

1. Principles of Sociology and the Behavioral Sciences

- Concepts of Sociology and Behavioral Sciences
- Influence of Social and Cultural Factors on Health and Disease
- Social Structures and Social Organization
- Accelerated changes in life style.

2. Principles of Social Psychology

- Principles of psychology , Principles of behavioral sciences , Principles of social anthropology

3. Application of Sociology in Health and Development

- Social Problems in Health and Disease
- Use of Sociology in addressing problems in Health and Disease
- Hospital Sociology

2) CONCEPT OF HEALTH & DISEASE

- Concept of Health & Public Health. Public health in developed and developing countries. Determinants, dimensions, spectrum of health
- Concept of diseases, natural history of diseases, Iceberg phenomena
- Health promotion, protection, prevention and control of diseases
- Measuring Health & disease – Measuring tools, Health indicators
- Contemporary issues in public health

3) HEALTH INFORMATICS & BIOSTATISTICS

HEALTH INFORMATICS

HEALTH INFORMATICS

- Information systems in health care,
- Sources and types of information systems
- System design of health information systems and health care records; language and coding;
- compatibility and security issues
- Tools to improve management & use of information
- Integration of different information systems

BIOSTATISTICS

- Introduction
- Collection/ Organization of data / Measurement scales
- Presentation of data

- Measures of Central Tendency
- Measures of variability
- Sampling and planning of health survey
- Sampling methods, sampling errors and sample size calculations
- Probability, Normal distribution and inductive statistics
- Estimating population values
- Tests of significance (Parametric/Non-parametric including qualitative methods)
- Introduction to multivariate analysis , Analysis of variance
- Association, correlation and Regression , interaction
- Vital statistics
- Evaluation of health and measurement of morbidity / mortality
- Life table and its us

4) EPIDEMIOLOGY

- Introduction to epidemiology including clinical epidemiology
- Basic principles of epidemiology
- Measurement of morbidity and mortality: Incidence, Prevalence, Age-adjustment and survival analysis
- Epidemiological studies and trials
- Epidemic investigations
- Association & Causation
- Risk assessment in epidemiology – relative risk, odds ratio, attributable risk, population attributable risk, hazards ratio
- Systematic review and meta analysis
- Screening of the diseases
- Surveillance of the diseases
- Integrated Disease Surveillance Programme
- International rules & regulation for travelers

5) OCCUPATIONAL HEALTH AND SAFETY

- Occupational Epidemiology
- Screening for occupational diseases
- Industrial toxicology & Hygiene
- Occupational ergonomics
- Occupational safety
- Workers Compensation
- Agencies & Organizations
- Occupational health and safety programs
- Occupational Health Services with special reference to agricultural & unorganized workers (medical & biological monitoring including first-aid)
- Labour union and occupational health

- Protective Technical Approaches to Occupational Injury Prevention
- Occupational Violence & Prevention Strategies
- Treatment and rehabilitation
- Factories Act., Employees State Insurance Act, Workmen's Compensation Act, Mines Act, Plantation Labour Act.

6) COMMUNICABLE DISEASES

- Introduction and epidemiology of communicable diseases
- Epidemiological transition of communicable diseases
- Emerging & re-emerging diseases
- Principles of prevention & control of communicable diseases
- Respiratory Diseases such as Chicken Pox, Measles, Mumps,
- Rubella, Diphtheria, Pertussis, Influenza, Tuberculosis, ARI etc.
- Intestinal Infections such as Poliomyelitis, Hepatitis, Food Poisoning, gastro-enteritis, cholera, Enteric Fevers, Amoebiasis, Worm Infestations etc.
- Arthropod Borne Infections such as Malaria, Filaria, Dengue, chikenguinea, JE etc.
- Zoonotic Diseases such as Rabies, Leptospirosis, Brucellosis, Rickettsial Diseases, hydatid diseases etc.
- Surface Infectious Diseases of Public Health Importance e.g. Leprosy, STI, HIV/AIDS

7) NON COMMUNICABLE DISEASES

- Non-Infectious Diseases of Public Health Importance
- Emerging non communicable diseases due to changing lifestyles
- Cardiovascular diseases, diabetes, blindness, accidents, cancers

8) HEALTH SYSTEMS DEVELOPMENT

- Introduction to various Health System Models
- Stakeholders in health care delivery
- Concept & Delivery of Primary Health Care
- Development of decentralized health care delivery system
- Sustainable Grassroots Comprehensive Health Models
- Health Systems research - 10/90 Gap in medical research

9) PRINCIPLES AND PRACTICE OF INFORMATION, EDUCATION & COMMUNICATION.

1. Principles of IEC Health Education
   - Objectives of Health Education , Content of Health Education
2. Communication Skills
   - Principles of Communication, Communication blocks, Body Language
   - The use of Media for IEC

- Practice (Methods) of IEC and its application in Community Health
- Evaluation of impact

10) PUBLIC HEALTH MANAGEMENT

- Concept & theories of management
- Qualitative skills of management
- SWOT analysis
- PLA techniques
- Programme planning, implementation, monitoring and evaluation
- Human resource management
- Organizational behaviour and development
- Material management / logistic and supply management
- Communication in organizations, networking and advocacy
- Strategic project management and Logical Framework Analysis
- Quality management and continuous quality improvement in health sector
- Social marketing

11) REPRODUCTIVE & CHILD HEALTH INCLUDING FAMILY WELFARE (RCH)

1. **Structure of RCH and Family Welfare services in India**
   - History and evolution of RCH
   - Problems of Maternal Health in India
   - Problems of Child health in India
   - Trends in the RCH services delivery, including Private Public Partnership
   - RCH related programmes in India eg. MCH, RCH, CSSM, ICDS, IMNCI.

2. **Components and services of Reproductive and Child Health**

   A. Essential Obstetrical Care.
   - Risk Approach, Antenatal Care, Antenatal visits, Preventive services, Intranasal Care, Postnatal Care, Care of the mother

   B. Emergency Obstetrical Care
   - Toxemia of pregnancy / Hypertensive disorders of pregnancy, Antepartam hemorrhage, Sever Anemia

   C. Care of children
   - Care of the neonate & an infant
   - Low Birth Weight, Preterm babies, small for date babies
   - Growth and Development
   - Childhood Infections
   - Preventive services

3. **Family Welfare**
    - Concept of Family Planning & Family welfare, Methods of family planning, Small family norm
    - Unmet Need

4. **Evaluation of M C H & Family Planning Services**
    - Evaluation of MCH care services, Evaluation of Family Planning Services

5. **Social Pediatrics**
    - Juvenile Delinquency, Child Abuse, Child Labour, Street Children, Child Guidance Clinic
    - Child Marriage, Child Placement

6. **Social issues related to women**

School Health services

- Concept & Objectives
- Components of school health services
- Planning for school health services
- Behavioral and Learning Problems in Children
- Evaluation School Health Services

Adolescent Health

- Concept
- Common Adolescent Problems including Psychosocial problems
- Changes during Adolescent
- Teenage Pregnancy
- Safe Abortion
- Adolescent Health Services in India

Health care of the aged and the challenged

a **Community Geriatrics**
- Implications of demographic charges in Indian Population
- Health Problems of the aged
- Preventive Health Services for the aged

b **The Challenged and Rehabilitation**
- Problem of disabled in the country
- Types of disabilities and their management
- Rehabilitation of the disabled

- Community Based Rehabilitation
- Agencies for rehabilitation – National & International

12) NATIONAL HEALTH PROGRAMMES

The origin, historical development, interventions, current state and critique of the different National Health Programmes:

- National Family Welfare Programme (NFWP)
- National Tuberculosis Control Programme
- National Leprosy Eradication Programme
- National Diarrhoeal Diseases Control Programme
- National Malaria Eradiation Programme
- National Filariasis Control Programme
- National Acute Respiratory Infections (ARI) Control Programme
- National AIDS Control Programme
- National Guinea Worm Eradication Programme
- National Kala Azar Control Programme
- National Japanese Encephalitis (JE) Control Programme
- National Nutritional Programmes
- National Iodine Deficiency Disorders (IDD) Programme
- National Programme for the Control of Blindness
- National Cancer Control Programme
- National Mental Health Programme
- National Diabetes Control Programme
- Reproductive Child Health (RCH) including Child Survival and Safe Motherhood (CSSM) and Universal Immunization Programme (UIP)
- National Water Supply and Sanitation Programme
- Minimum Needs Programme
- National Rural Health Mission
- The implementation of NHPS at a programme level and in the community

13) VOLUNTARY SECTOR IN HEALTH / PUBLIC PRIVATE PARTNERSHIP

VOLUNTARY SECTOR IN HEALTH

- Role of the Voluntary Sector in Health
- Activities undertaken by Voluntary Sector in the Health Sector
- Activities of specific Voluntary Sector in Health
- Innovative Approaches in the Voluntary Effort in Health

PUBLIC PRIVATE PARTNERSHIP (PPP)

- Concept & Definition
- Need for PPP
- Models of PPP
- Potential areas of collaboration
- Public (Govt.) initiatives
- An articulated framework on PPP

14) PUBLIC HEALTH EMERGENCIES (PHE)

- Concept, definition and scope
- Types of public health emergencies
- Impact of PHE
- Preparedness for PHE
- National and district level Programmes to deal with PHE

15) HEALTH TECHNOLOGY

- Computer application in Health
- Software for research and statistical analysis e.g. Epi-info, SPSS etc.
- Remote sensing
- GIS & other newer technology
- Tele-medicine / health

16) RECENT ADVANCES AND TOPICS OF CURRENT INTEREST

- Recent advances in all the topics mentioned above
- Agricultural Medicine and Plantation Health
- Community Ophthalmology
- Community Dentistry
- Community Health Nursing
- Other Free Topic

Recommended Books & Journals as References:

1. Maxy Roseman John M. Last, Maxcy-Roseman **Public Helath and Preventive Medicine**, Appleton-Centrury-Crofts, Newyouk
2. Hobson W, **The Theory and Practice of Public Health**, Oxford Med. Publication
3. Barker D J P, **Practical Epidemiology**, Churchill Livingstone
4. Park J E & K Park, **Text Book of P & S.M.**, M/s Banarsidasm Bhanot, Jabalpur
5. Mahajan B K and M/C.Gupta, **Text Book of P & S.M.**, Jaypee Publications
6. Bradford Hill, **Principles of Medial Statistics**, The Lancet Ltd. No.7 Adam Street, Adelphine, London, 1967
7. Mac, Mahon & Pugh, **Epidemiology-Principles and Methods**, Little Brown and Co. Boston, U.S.A.

8. **Hunter's Diseases of Occupations**, Edited by P.A.B. Raffle, P.H. Adams, P.J. Baxter and W. R. Lee Edward Arnold Publishers (1994), Great Britain.
9. Text book of PSM: A P Kulkarni and Dr. Baride
10. Committee Reports And Policy Documents – Medical Education And Health Policy
11. Epidemiology and Health Management: By Dr. P. V. Sathe
12. National Health Programmes of India: J. Kishore
13. Text Book of Infection Diseases: Christae
14. Statistics: K. Vishvesh Rao
15. Oxford Text Book of by Public Health: Holland & Detel

OTORHINOLARYNGOLOGY, HEAD & NECK SURGERY

Course Contents:

- Biostatistics Research methodology research in the current ENT challenges.
- Conditions of external nose
- Abnormalities of smell
- Allergic rhinitis
- Intrinsic rhinitis and nasal polypi
- Infective rhinosinusitis , Complication *Basic sciences*

1. Evolution of Otorhinolaryngology, Documentation of Patient information, Statistical Analysis, Publication Methodology, Research avenues in Otorhinolaryngology.

- Anatomy of the ear
- Physiology of hearing & equilibrium
- Anatomy of nose and paranasal sinuses
- Anatomy of pharynx , oesophagus , deglutition
- Anatomy of larynx and tracheobronchial tree
- Physiology of respiration
- Physiology of generation of speech.
- Through knowledge of anatomy of head and neck region including thyroid, neck spaces and salivary glands
- Physiology of smell
- HIV in ENT

2. Audiology:

Brief Knowledge of Acoustics, Diagnostic Audiometry, Diagnostic Testing of Vestibular System, Epidemiology, Prevention, Rehabilitation of Balance and Hearing Disorders, Hearing Aids, Cochlear Implants.

3. Otology:

- Diseases of External Auditory Canal
- Diseases of Middle Ear – Acute Suppurative Otitis Media, CSOM.
- Otosclerosis
- SN Loss In Adults And Children
- Vertigo, Meniere's Disease
- Ototoxicity
- Tumours: Vestibular Schwannoma, Tumours Middle Ear Cleft, Glomus Jugulare
- Disorders of Facial Nerve
- Cochlear Implants.

4. Laryngology

- Acute and Chronic Infections of Oral Cavity, Pharynx, Tonsils and Larynx
- Trauma And Stenosis of Larynx
- Management of Obstructed Airway and Tracheotomy
- Disorders of Voice
- Neurological Affections of Pharynx and Larynx
- Pharyngeal Pouch
- Tumours of Larynx
- Angiofibroma and Nasopharyngeal Lesions
- Tumours of Oropharynx and Lymphoma Head and Neck
- Tumours of Hypopharynx
- Benign Diseases of The Neck

5. Rhinology

- Congenital anomalies of the nose and surgical management
- Disorders and trauma of facial skeleton
- Disorders and nasal septum
- CSF rhinorrhoea
- Epistaxis
- Snoring and sleep apnea
- Chronic granulomas of nose and PNS
- The orbit in relation to ENT
- Transphenoidal hypophysectomy

Books: (Latest Editions of the following)

1. Scott Brown's Text book of Otolaryngology. Publishers: Butterworth & Co Ltd
2. Cummings otolaryngology, Head & Neck Surgery. Publishers: Mosby
3. Rob & Smith; Operative Surgery. Publishers: Butterworth - Heinemann
4. Paparella, Otolaryngology. Publishers: W B Saunders Co.
5. Logan & Turner-Diseases of ENT. Publishers: Wright/Verghese & co
6. Shambaugh- Surgery of the Ear. Publishers: W B Saunders Co.
7. Ballenger- Laryngology. Publishers: Williams & Wilkins
8. GeraldEnglish-Otolaryngology. Publishers: Lippencott-Roven, Philadelphia/New york
9. Stammberger- Endoscopic Sinus Surgery. Publishers: W.B.Saunders Co.
10. Stell & Maran- Head & Neck Surgery. Publishers: Oxford University Press
11. Eugene Meyers-Head & Neck Surgery. Publishers: W.B.Saunders Co

MEDICINE

Sl. No.	Topic
1	Immunological factors in disease
2	Environmental and nutritional factors in disease
3	Principles of infectious disease
4	Critical illness
5	Poisoning
6	Oncology
7	Infectious disease
8	HIV infection and AIDS
9	Sexually transmitted infections
10	Kidney and urinary tract disease
11	Cardiovascular disease
12	Respiratory disease
13	Endocrine disease
14	Diabetes mellitus
15	Alimentary tract and pancreatic disease
16	Liver and biliary tract disease
17	Blood disease
18	Musculoskeletal disease
19	Neurological disease
20	Skin disease

SURGERY

The topics are considered under:

- Basic sciences,
- General Surgery topics
- Specialty topics

- **The Metabolic Response to Injury**
- **Fluid and electrolyte balance / Acid - Base balance**. The body fluid compartments; metabolism of water and electrolytes; factors maintaining homeostasis; causes for and treatment of acidosis and alkalosis.
- **Shock and Blood transfusion**: Blood grouping & cross matching, blood component therapy Indications and complications of blood transfusion, blood substitutes; auto transfusions.
- **Wounds, Tissue Repair and Scar:** Wound management, Tissue repair & Scars: Types and pathogenesis of wounds, types of healing, factors influencing healing management of wounds and management of scars. Basic surgical techniques; properties of suture materials; appropriate use of sutures and other materials used for management of wound.
- **Surgical infections**: asepsis and antisepsis, microbiological principles, rational use of antibiotics. Special infections like synergistic gangrene, and other uncommon infections. Understanding and following universal precautions.
- **HIV:** Pathogenesis, Prevalence, Surgical diseases & management with special reference to universal precautions, post exposure prophylaxis and chemotherapy. Awareness and management of ART related complications and various surgical diseases in HIV/AIDS.
- **Diabetes and Surgeon**: Diabetes related surgical problems and their management, Diabetic foot, pathogenesis, grades, and management.
- **Surgical nutrition**: nutritional assessment; metabolic response to stress; need for nutritional support; enteral nutrition; routes of access to GI tract; parenteral nutrition; access to central veins for nutritional support.
- **Skin and Soft Tissue:** ulcer, sinus, fistula, cysts and tumours (benign & malignant)
- **Soft tissue sarcomas**: Classification and types of soft tissue sarcomas. Principles of management of soft tissue sarcomas.

Imaging modalities in surgery

- Conventional X-rays and contrast radiography.
- CT, MRI, MRCP& other relevant procedures.
- Ultrasound and Doppler FAST
- Image guided interventional procedures.

GI endoscopy:

- Principles of GI endoscopy
- Complications including infective considerations
- Diagnostic and therapeutic GI endoscopy including upper GI, lower GI and pancreato biliary systems.

Tissue Diagnosis: methodologies of taking biopsies, preservation and transport.

Surgical Audit and Biostatistics

- Principles of surgical audit
- Understanding the audit of process and outcome
- Methods adopted for the same.
- Bio statistics

Preoperative Preparation/workup: concept of fitness for surgery; basic medical workup; Workup in special situations like, diabetes, renal failure, cardiac and respiratory illness; risk stratification;

Basic Surgical Skills and Anastomosis: scrubbing gowning, gloving Instruments, trolley layout Sutures, Drains, their maintenance & sterilization.etc
Principles of operative surgery like asepsis, antisepsis, sterilization and OT setup. Concepts of safe surgery practices
Postoperative care: concept of recovery room care; airway management, assessment of wakefulness; management of cardiovascular instability in this period; criteria for shifting to a ward; pain management.

Biomedical waste management with special references to waste generated in O.T and wards.

Trauma surgery:

- Introduction to trauma
- Early assessment and management of polytrauma
- Trauma scores
- TRIAGE/ Management of mass casualty
- Pre hospital care

- Trauma to the face and mouth
- Chest and abdomen
- Closed abdominal trauma and flail chest
- Penetrating injuries
- Genitourinary injuries
- Fracture pelvis
- Extremity trauma
- Vascular injuries
- Role of surgeon in natural disaster

Laparoscopic &robotic surgery

- Laparoscopic anatomy of the abdomen
- Physiology of pneumo peritoneum, complications of pneumoperitoneum
- Informed consent for Laparoscopic procedures
- Anaesthetic considerations in Laparoscopic surgery
- Diagnostic laparoscopy
- Pre and post operative management in laparoscopic surgeries
- Recognition and management of Laparoscopic complications
- Principles of diathermy, uses and dangers
- Technology of video imaging, cameras, insufflate or etc.
- Laparoscopic instruments, clips, staplers and port types
- Endoscopic suturing devices
- Medico-legal implications of video-endoscopic surgery
- Principles of uses and dangers of lasers and other energy sources e.g harmonic scalpel

Burns, plastic surgery and reconstructive surgeries

- Burns management
- Facial injuries
- Principles of tissue transfer & skin flaps
- Cleft lip and palate
- Congenital defects of hand
- Pressure sores
- Principles of microsurgery
- Hypospadias

Hand & Foot Surgery

- Applied anatomy of hand and foot
- Common hand infections

- Foot infections with special reference to diabetic foot ,its pathogenesis, management and preventive care

Head & Neck:

- Craniocerebral injuries
- Spinal Injuries
- Peripheral nerve injuries
- Hydrocephalus
- Space occupying intracranial & spinal lesions
- Epilepsy Secondary to surgical causes
- Eye, orbit
- Nose and sinus
- Ear
- Pharynx, larynx and neck
- Oral cavity: non malignant disease of oral cavity, pre malignant lesions
- Malignant tumors of oral cavity, tongue, gum, palate
- Salivary glands
- Lymphnodes of neck and drainage area
- Metastatic cervical nodes and occult primary
- Jaw swellings
- Differential diagnosis of neck swelling or fistula.

ENDOCRINE

Thyroid

- Anatomy, physiology of thyroid &Thyroid function tests
- Hyper and hypothyroidism
- Goitres, autoimmune diseases
- Solitary thyroid nodule-evaluation and management,
- Thyroid cancer
- Thyroid Surgery, techniques and complications

Parathyroid

- Localisation techniques
- Hyperparathyroidism & Hypoparathyroidism
- Surgery-indications, techniques and complications

Adrenal

- Adrenal imaging
- Hyperaldosteronism & Cushing's disease

- Pheochromocytoma and other tumors.

Neuroendocrine tumours of GI tract

- Islet cell tumours
- Gastrinoma
- Carcinoid tumour
- Multiple endocrine neoplasia (Type 1 & 2)
- Gastro intestinal stromal tumors

Breast

- Acute breast infections-abscess
- Nipple discharge
- ANDI
- Benign breast diseases
- Management of non-palpable breast lesion
- Breast cancer- detection, diagnosis and its management,
- Neo adjuvant therapy and follow up.
- Principles of breast conservation and reconstruction
- Screening procedures

Cardiovascular system & heart

- Physiology and pharmacological control of cardiac output, blood flow, blood pressure and coronary circulation
- Cardiac arrest, resuscitation
- Monitoring of cardiac function in the critically ill patient, central venous pressure, pulmonary wedge pressure, tamponade, cardiac output measurement
- The management of haemorrhage and shock
- Pulmonary oedema
- Cardiopulmonary bypass-general principles, cardiac support
- Basic principles of Coronary vessel disease & management. Coronary bypass, its indications and management
- Basic principles and management of valvular and pericardial diseases

Respiratory system and surgery of thorax

- The surgical anatomy of the airways, chest wall, diaphragm and thoracic viscera
- The mechanics and control of respiration
- The interpretation of special investigations; lung function tests, arterial blood gases, radiology
- The understanding of disorders of respiratory function caused by trauma, acute surgical illness and surgical intervention

- Respiratory failure & artificial ventilation
- Adult respiratory distress syndrome
- Principles of Bronchoscopy, Thoracoscopy, Mediastinoscopy
- Pulmonary Tuberculosis& surgical management
- Empyema thoracis
- Pulmonary neoplasms
- Complications of thoracic operations

Multisystem Failure

Multisystem failure, its pathogenesis and management of multi organ failure

Vascular Surgery

- Investigation of Vascular disease
- Arterial occlusive disease.& Limb ischemia
- Atherosclerosis, Thrombo angitis obliterans
- Venous disorders of Lower limb
- Varicose veins and management
- Deep vein thrombosis and thromboembolism
- Vascular reconstruction
- Chronic leg ulceration

Diseases of Lymphnodes and lymphatics & spleen

- Congenital abnormalities
- Lymphedema
- Lymphadenopathy
- Malignancies of lymphatic system
- Common pathologies of spleen
- Principles of splenectomy and potential complications
- Prophylaxis after splenectomy

Acute abdomen:

- Pathophysiology, differential diagnosis investigations, operative and non operative management of abdominal emergencies complications & management of various nontraumatic abdominal emergencies

Hernias, Umbilicus and Abdominal Wall:

- Simple and complicated hernias
- Various types of hernias, hernia repairs, complications and recent concepts
- Prosthetic materials

The Peritoneum, Omentum, mesentery and retro peritoneum.

- Inflammatory, Benign and malignant disorders
- Abdominal tuberculosis and its management.

Oesophagus:

- Dysphagia,
- GERD,
- Achalasia cardia
- Ca esophagus

Stomach and duodenum

- Peptic ulcer
- Gastric outlet obstruction
- Stress ulcers
- Upper GI tract hemorrhage including obscure GI hemorrhage
- Gastric tumors
- Gastric surgery for obesity
- Bariatric and metabolic surgery

Liver

- Segmental anatomy and principles of segmental resection
- Liver abscess
- Portal hypertension & its management
- Benign cysts 7non-cystic liver lesions
- Hepato cellular carcinoma
- Liver metastasis
- Hepatic failure & Principles of liver transplantation

Biliary system

- Calculous disease and cholecystitis
- Choledochal cysts and Caroli's disease
- Bile duct anomalies & strictures
- Neoplasms of Gall Bladder and Bile duct
- Obstructive Jaundice

Pancreas

- Acute and chronic pancreatitis
- Benign tumours and cysts of the pancreas
- Cancer

Small Intestine and Appendix

- Intestinal obstruction& paralytic ileus
- Meckel's diverticulum
- Intestinal fistulae
- Short bowel syndrome
- Neoplasms and carcinoid syndrome
- Small bowel and mesenteric ischemia
- Appendicitis & other diseases of appendix

Colon, rectum and anus

- Colitis, types, causes and management
- Inflammatory bowel disease: Crohn's disease& Ulcerative colitis
- Irritable bowel syndrome (I.B.S.)
- Colonic ischemia
- Obstruction: Volvulus,Intussusception, malignant obstruction& obstruction due to inflammatory conditions
- Pseudo obstruction
- Rectal prolapse
- Colorectal Cancer, premalignant lesions, polyposis coli and other syndromes etc.
- Colonic cancer screening
- Lower Gastrointestinal hemorrhage
- Anal and perianal disorders:
- Anal and perianal sepsis
- Fissure in ano
- Fistula in ano
- Hemorrhoids
- Anorectal malignancies
- Pilonidal sinus

Urology

- Anatomy of Kidney Ureter bladder, Prostate, Penis
- Genitourinary congenital anomalies polycystic kidney diseases
- Urinary stone disease and principles of management including recent methods
- Urinary Tract Infections, pyonephrosis and perinephric abscess
- Genitourinary injuries
- Hydronephrosis, hydro ureter and other obstructive conditions
- GU Tuberculosis
- Genito urinary malignancies and their management
- Urinary fistula
- Prostate-Benign enlargement of prostate

- Ca prostate
- Urethral strictures
- Scrotal diseases
- Diseases of penis
- Vasectomy

Transplantation

Principles of organ transplantation, renal transplantation and other organ transplants**.** Cadever donation,organ harvesting and transport

Principles of Oncology

- Epidemiology of common neoplasms & tumour-like conditions; role of cancer registries.
- Principles of molecular biology of cancer, cell kinetics, carcinogenesis; genetic factors; mechanisms of metastasis.
- Clinico-pathological staging of cancer.
- Pathology, clinical features, diagnosis and principles of management of common cancers in each of the surgical specialties.
- Principles of cancer treatment by surgery, radiotherapy, chemotherapy, immunotherapy and hormone therapy.
- Screening.

Paediatric Surgery

- Fluid and electrolyte management
- Preparation for surgery/post operative care
- Spinal fusion defects
- Ventral defects
- Undescended testes, torsion testes, Hernia, Hydrocoele
- Hypertrophic pyloric stenosis, duodenal atresia
- Hirschprung's disease
- Diaphragmatic hernia
- Tracheo esophageal fistula
- Anorectal anomalies, Neo natal intestinal obstruction
- Necrotising enterocolitis, Intussusception and meconium ileus
- Pediatric Burns

Surgery in the tropics

- Filariasis
- Hydatid disease, brucellosis, amoebiasis, Hansens disease
- Other parasitic infections

Surgical Ethics

- Definition of medical Ethics
- Difference between medical ethics and bio-ethics
- Major principles of medical Ethics, Beneficence, Justice & Autonomy
- Historical Perspective of medical Ethics
- The Hippocratic oath
- The Declaration of Helsinki
- The WHO Declaration of Geneva
- International code of medical Ethics (1993)
- Medical Council of India Code of Ethics
- The patient as a person
- The Right to be respected
- Truth and confidentiality
- The autonomy of decision
- Informed consent
- Ethical issues regarding surgical procedures, choices and information
- The physician patient relationship
- Prolongation of life
- Advanced life directives; the living will
- Euthanasia
- Cancer and terminal Care.

Professional ethics

- Code of conduct
- Contract and confidentiality
- Charging of fees, Fee-splitting
- Prescription of drugs
- Over-investigating the patient low-cost drugs, vitamins and tonics
- Allocation of resources in health cares
- Malpractice and Negligence
- Research Ethics
- Animal and experimental research
- Human experimentation
- Human volunteer research-Informed Consent
- Drug trials
- ICMR guidelines for Ethical Conduct of Research on humans and animals
- ICH / GCP Guidelines, Schedule Y of the Drugs and Cosmetics Act
- Ethical workup of cases

OBSTETRICS AND GYENECOLOGY

I. Basic Sciences

- Normal and abnormal development, structure and function of urogenital system
- Applied Anatomy of genito-urinary system, abdomen, pelvis, pelvic floor, anterior abdominal wall, upper thigh (inguinal ligament, inguinal canal, vulva, rectum and anal canal).
- Physiology of spermatogenesis.
- Endocrinology related to male and female reproduction (Neurotransmitters).
- Anatomy and physiology of urinary and lower GI (Rectum / anal canal) tract.
- Development, structure and function of placenta, umbilical cord and amniotic fluid.
- Anatomical and physiological changes in female genital tract during pregnancy.
- Anatomy of fetus, fetal growth and development, fetal physiology and fetal
- circulation.
- Physiological and neuro-endocrinal changes during puberty, adolescence,
- menstruation, ovulation, fertilization, climacteric and menopause.
- Biochemical and endocrine changes during pregnancy, including systemic
- changes in cardiovascular, hematological, renal hepatic, renal, hepatic and other
- systems.
- Biophysical and biochemical changes in uterus and cervix during pregnancy and
- labor.
- Pharmacology of identified drugs used during pregnancy, labour, post-partum
- period in reference to their absorption, distribution, excretion, (hepatic)
- metabolism, transfer of the drugs across the placenta, effect of the drugs (used) on
- labor, on fetus, their excretion through breast milk.
- Mechanism of action, excretion, metabolism of identified drugs used in the
- management of Gynaecological disorder.
- Role of hormones in Obstetrics and Gynaecology.
- ***Markers in Obstetrics & Gynaecology*** - Non-neoplastic and neoplastic diseases
- Pathophysiology of ovaries, fallopian tubes, uterus, cervix, vagina and external genitalia in healthy and diseased conditions.
- Normal and abnormal pathology of placenta, umbilical cord, amniotic fluid and fetus.
- Normal and abnormal microbiology of genital tract. Bacterial, viral and parasitical infections responsible for maternal, fetal and gynaecological disorders.
- Humoral and cellular immunology in Obstetrics & Gynaecology.
- Gametogenesis, fertilization, implantation and early development of embryo.
- Normal Pregnancy, physiological changes during pregnancy, labor and pauperism.
- Immunology of pregnancy

- **Pathology**
  Pathology of inflammatory, degenerative and neoplastic diseases of the vulva, vagina, cervix, uterus, fallopian tubes, ovaries and the broad ligament.

- **Haematology**
  Blood groups, Rh factor, incompatibility, Blood transfusion, coagulation system and coagulation disorders diagnosis
- Lactation.
- Genetics
  Basic medical genetics including cytogenetics.
  - Pattern of inheritance
  - Chromosomal abnormalities - types, incidence, diagnosis, management and recurrence risk.
  - General principles of Teratology.
  - Screening, counseling and prevention of developmental abnormalities.
  - Birth defects - genetics, teratology and counseling.

II. Obstetrics

1. Antenatal Care:

- Prenatal care of normal pregnancy including examination, nutrition, immunization and follow up.
- Identification and management of complications and complicated of pregnancy- abortion, ectopic pregnancy, vesicular mole, Gestational trophoblastic Diseases, hyperemesis gravidarum, multiple pregnancy, antipartum hemorrhage, pregnancy induced hypertension, preeclampsia, eclampsia, Other associated hypertensive disorders, Anemia, Rh incompatibility, diabetes, heart disease, renal and hepatic diseases, preterm - post term pregnancies, intrauterine fetal growth retardation,
- Neurological, hematological, dermatological diseases, immunological disorders and other medical and surgical disorders/problems associated with pregnancy, Multiple pregnancies, Hydramnios, Oligoamnios.
- Diagnosis of contracted pelvis (CPD) and its management.
- High-risk pregnancy
- Pregnancy associated with complications, medical and surgical problems.
- Prolonged gestation.
- Preterm labor, premature rupture of membranes.
- Blood group incompatibilities.
- Recurrent pregnancy wastage.
- Evaluation of fetal and maternal health in complicated pregnancy by making use of diagnostic modalities including modern once (USG, Doppler, Electronic monitors)

and plan for safe delivery for mother and fetus. Identifying fetus at risk and its management. Prenatal diagnostic modalities including modern ones.

- Infections in pregnancy (bacterial, viral, fungal, protozoan)
- Malaria, Toxoplasmosis.
- Viral-Rubella, CMV, Herpes, HIV, Hepatic viral infections (B, C etc)
- Sexually Transmitted Infections (STDs).
- Mother to fetal transmission of infections.
- Identification and management of fetal malpositions and malpresentations.
- Management of pregnancies complicated by medical, surgical (with other specialties as required) and gynecological diseases.
- Anemia, hematological disorders.
- Respiratory, Heart, Renal, Liver, skin diseases.
- Gastrointestinal, Hypertensive, Autoimmune, Endocrine disorders.
- Associated Surgical Problems.
- Acute Abdomen (surgical emergencies - appendicitis and GI emergencies). Other associated surgical problems.
- Gynaecological disorders associate with pregnancy - congenital genital tract developmental anomalies, Gynaec pathologies - fibroid uterus, Ca Cx, genital prolapse etc.
- Prenatal diagnosis (of fetal problems and abnormalities), treatment – Fetal therapy
- M.T.P, PC & P.N.D.T Act etc
- National health MCH programs, social obstetrics and vital statistics
- Recent advances in Obstetrics.

2. Intra-partum care:

- Normal labor - mechanism and management.
- Partographic monitoring of labor progress, recognition of abnormal labor and its appropriate management.
- Identification and conduct of abnormal labor and complicated delivery - breech, forceps delivery, caesarian section, destructive operations.
- Induction and augmentation of labor.
- Management of abnormal labor - Abnormal pelvis, soft tissue abnormalities of birth canal, mal-presentation, mal-positions of fetus, abnormal uterine action, obstructed labor and other distocias.
- Analgesia and anaesthesia in labor.
- Maternal and fetal monitoring in normal and abnormal labor (including electronic fetal monitoring).
- Identification and management of intrapartum complications, Cord presentation, complication of 3rd stage of labor - retained placenta, inversion of uterus, rupture of uterus, post partum hemorrhage.

3. Post Partum Care:

- Complication of 3rd stage of labor retained placenta, inversion of uterus, post partum hemorrhage, rupture of uterus, Management of primary and secondary post-partum hemorrhage, retained placenta, uterine inversion. Post-partum collapse, amniotic fluid embolism
- Identification and management of genital tract trauma - perineal tear, cervical/vaginal tear, episiotomy complications, rupture uterus.
- Management of critically ill woman.
- Post partum shock, sepsis and psychosis.
- Postpartum contraception.
- Breast feeding practice; counseling and importance of breast-feeding. Problems in breast-feeding and their management, Baby friendly practices.
- Problems of newborn - at birth (resuscitation), management of early neonatal problems.
- Normal and abnormal purpureum - sepsis, thrombophlebitis, mastitis, psychosis. Hematological problems in Obstetrics including coagulation disorders. Use of blood and blood components/products.

4. Operative Obstetrics:

- Decision-making, technique and management of complications.
- Vaginal instrumental delivery, Caesarian section, Obst. Hysterectomy, destructive operations, manipulations (External/internal podalic version, manual removal of placenta etc).
- Medical Termination of Pregnancy - safe abortion - selection of cases, technique and management of complication. MTP law.

5. New Born

1. Care of new born: Normal and high risk new born (including NICU care).
2. Asphyxia and neonatal resuscitation.
3. Neonatal sepsis - prevention, detection and management.
4. Neonatal hyper - bilirubinemia - investigation and management.
5. Birth trauma - Detection and management.
6. Detection and management of fetal/neonatal malformation.
7. Management of common neonatal problems.

III. Gynaecology:

1. GYNAEC DISORDERS

- Epidemiology and etiopathogenesis of gynaecological disorders.
- Diagnostic modalities and management of common benign and malignant gynaecological diseases (diseases of genital tract):
  Fibroid uterus

Endometriosis and adenomyosis
Endometrial hyperplasia
Genital prolapse (uterine and vaginal)
Cervical erosion, cervicitis, cervical polyps, cervical neoplasia.
Vaginal cysts, vaginal infections, vaginal neoplasia (VIN)
Benign Ovarian pathologies
Malignant genital neoplasia - of ovary, Fallopian tubes, uterus, cervix, vagina, vulva and Gestational Trophoblastic diseases, Cancer Breast.

- Diagnosis and surgical management of clinical conditions related to congenital malformations of genital tract. Reconstructive surgery in gynaecology.
- Intersex, ambiguous sex and chromosomal abnormalities.
- Reproductive endocrinology: Evaluation of Primary/secondary Amenorrhea, management of Hyperprolactinemia, Hirsutism, Chronic an-ovulation, PCOD, thyroid and other endocrine dysfunctions.
- Infertility - Evaluation and management
  - Methods of Ovulation Induction
  - Tubal (Micro) surgery
  - Management of immunological factors of Infertility
  - Male infertility
  - Obesity and other Infertility problems.
  - **(Introductory knowledge of)** Advanced Assisted Reproductive Techniques (ART)
- Reproductive tract Infections: prevention, diagnosis and treatment.
  - STD
  - HIV
  - Other Infections
  - Genital Tuberculosis.
- Principles of radiotherapy and chemotherapy in gynaecological malignancies. Choice, schedule of administration and complications of such therapies.
- Rational approach in diagnosis and management of endocrinal abnormalities such as: menstrual abnormalities, amenorrhea (primary/secondary), dysfunctional uterine bleeding, polycystic ovarian disease, hyperprolactinemia (galoctorrhea), hyperandrogenism, thyroid-pituitary-adrenal disorders, menopause and its treatment (HRT).
- Urological problems in Gynaecology - Diagnosis and management.
  - Urinary tract infection
  - Urogenital Fistulae
  - Incontinence
  - Other urological problems
- Orthopedic problems in Gynaecology.
- Menopause: management (HRT) and prevention of its complications.
- Endoscopy (Laparoscopy - Hysteroscopy)

- Diagnostic and simple therapeutic procedures (PG students must be trained to do these procedures)
- Recent advances in gynaecology - Diagnostic and therapeutic
- Pediatric, Adolescent and Geriatric Gyanecology
- **Introduction to Advance Operative procedures.**

2. Operative Gynaecology

- Abdominal and Vaginal Hysterectomy
- Surgical Procedures for genital prolapse, fibromyoma, endometriosis, ovarian, adenexal, uterine, cervical, vaginal and vulval pathologies.
- Surgical treatment for urinary and other fistulae, Urinary incontinence
- Operative Endoscopy

3. Family Welfare and Demography

- Definition of demography and its importance in Obstetrics and Gynaecology.
- Statistics regarding maternal mortality, perinatal mortality/morbidity, birth rate, fertility rate.
- Organizational and operational aspects of National health policies and programs, in relation to population and family welfare including RCH.
- Various temporary and permanent methods of male and female contraceptive methods.
- Knowledge of in contraceptive techniques (including recent developments).
    1. Temporary methods
    2. Permanent Methods.
    3. Recent advances in contraceptive technology
- Provide adequate services to service seekers of contraception including follow up.
- Medical Termination of Pregnancy: Act, its implementation, providing safe and adequate services.
- Demography and population dynamics.
- Contraception (fertility control)

ORTHOPEDICS

COURSE CONTENTS:

1. **Basic Sciences**
   - Anatomy and function of joints
   - Bone structure and function
   - Growth factors and facture healing
   - Cartilage structure and function
   - Structure and function of muscles and tendons
   - Tendon structure and function
   - Metallurgy in Orthopaedics
   - Stem Cells in Orthopaedic Surgery
   - Gene Therapy in Orthopaedics

2. **Diagnostic Imaging in Orthopaedics**
   (Should know the interpretation and Clinical Correlation of the following)

   - Digital Subtraction Angiography (DSA)
   - MRI and CT in Orthopaedics
   - Musculoskeletal USG
   - PET Scan
   - Radio-isotope bone scan

3. **Metabolic Bone Diseases**
   - Rickets and Osteomalacia
   - Osteoporosis
   - Scurvy
   - Mucopolysaccharoidoses
   - Fluorosis
   - Osteopetrosis

4. **Endocrine Disorders**
   - Hyperparathyroidism
   - Gigantism, Acromegaly

5. **Bone and Joint Infections**
   - Pyogenic Haematogenous Osteomyelitis - Acute and Chronic
   - Septic arthritis
   - Fungal infections
   - Gonococcal arthritis,syphilitic arthritis 7
   - Bone and joint brucellosis
   - AIDS and the Orthopaedic Surgeon (universal precautions)
   - Musculoskeletal Manifestations of AIDS

- Pott's spine
- Tubercular synovitis and arthritis of all major joints

6. Poliomyelitis

- General considerations
- Polio Lower limb and spine
- Management of Post Polio Residual Palsy (PPRP)

7. Orthopaedic Neurology

- Cerebral Palsy
- Myopathies

8. Peripheral Nerve Injuries

- Traumatic
- Entrapment Neuropathies

9. Diseases of Joints

- Osteoarthrosis
- Gout, Pseudo-gout, Crystal arthropathies
- Collagen diseases

10. Systemic Complications in Orthopaedics

- Shock
- Crush syndrome
- Disseminated Intravascular Coagulation **(**DIC)
- Acute Respiratory Distress Syndrome (ARDS)

11. Bone Tumors

- Benign bone tumors
- Malignant bone tumors
- Tumor like conditions
- Secondaries in bone

12. Miscellaneous Diseases

- Diseases of muscles
- Fibrous Dysplasia
- Unclassified diseases of bone
- Paget's disease
- Peripheral vascular disease
- Orthopaedic manifestations of bleeding disorders

13. Regional Orthopaedic Conditions of Adults and Children

- The spine
- The shoulder
- The elbow
- The hand

- The wrist
- The hip
- The knee
- The foot and ankle
- The pelvis

14. Biomaterials

- Orthopaedic metallurgy
- Bio-degradable implants in Orthopaedics
- Bone substitutes
- Bone Banking

15. Fracture and Fracture-Dislocations

- General considerations
- Definitions, types, grades, patterns and complications
- Pathology of fractures and fracture healing
- Clinical and Radiological features of fractures and dislocations
- General principles of fracture treatment
- Recent advances in internal fixation of fractures
- Locking plate osteosynthesis
- Less Invasive Stabilisation System (LISS)
- Ilizarov technique
- Bone grafting and bone graft substitutes
- Open fractures and soft tissue coverage in the lower extremity
- Compartment syndrome
- Fractures of the upper extremity and shoulder girdle
- Fractures of the lower extremity
- Fractures of the hip and pelvis
- Malunited fractures
- Delayed union and non union of fractures
- Fractures/dislocations and fracture/fracture-dislocations of spine

16. Dislocations and Subluxations

- Acute dislocations
- Old unreduced dislocations
- Recurrent dislocations

17. Traumatic Disorders of Joints (Sports Injuries)

- Ankle injuries
- Knee injuries
- Shoulder and elbow injuries
- Wrist and hand injuries

18. Arthrodesis

- Arthrodesis of various joints in lower extremity
- Arthrodesis of various joints in upper extremity
- Arthrodesis of spine

19. Arthroplasty

- Biomechanics of joints and replacement of the following joints.
- Knee
- Ankle
- Shoulder
- Elbow

20. Minimally Invasive Surgery (MIS)

Arthroscopy

- General principles of Arthroscopy
- Arthroscopy of knee and ankle
- Arthroscopy of shoulder and elbow

21. Amputations and Disarticulations

- Amputations and disarticulations in the lower limb
- Amputations and disarticulations in the upper limb

22. Rehabilitation - Prosthetics and Orthotics

23. Pediatric orthopaedics:

- Fractures and dislocations in children
- Perthes' disease
- Slipped capital femoral epiphysis
- Congenital Dislocation of Hip (CDH)
- Neuromuscular disorders

24. Spine

a) Spinal trauma: diagnosis and management including various types of fixations

- Rehabilitation of paraplegics/quadriplegics
- Management of bladder control
- Prevention of bed sores and management of established bed sores 10
- Exercise programme and Activities of Daily Living (ADL)
- Psychosexual counseling

b) Degenerative disorders of the spine

- Prolapsed Inter Vertebral Disc (PIVD)
- Lumbar Canal Stenosis (LCS)
- Spondylolysis/Spondylolisthesis
- Lumbar Spondylosis
- Ankylosing Spondylitis

- Spinal fusion: various types and their indications

25. Triage, Disaster Management, BTLS and ATLS

26. Recent advances in orthopaedics

- Autologous chondrocyte implantation
- Mosaicplasty
- Unicondylar Knee Replacement
- Computer assisted surgery
- Knowledge of Robotic Surgery in Orthopaedics
- Endoscopic spine surgery
- Metal on metal arthroplasty of hip
- Surface replacements of joints
- Microsurgical techniques in Orthopaedics
- Designing a modern orthopaedic operation theatre
- Sterilization
- Theatre Discipline
- Laminar air flow
- Modular OTs

27. Biomedical Waste Management

28. Medico-legal aspects of orthopaedic practice

29. Patients rights in Medical Practice

30. Emerging Demographic Changes in Orthopaedics

PAEDIATRICS

1. Growth and development
   - Developmental Mile stones
   - Growth Charts
   - Development assessment
   - Anthropometry assessment

2. Infectious diseases
   - Vaccine preventable diseases
   - Tuberculosis in children
   - Vector Borne diseases
   - Bacterial infection
   - Rheumatic fever

3. Neonatology
   - Essential New Born Care
   - Perinatal care
   - Birth Asphyxia
   - Neonatal sepsis

4. General Pediatrics
   - Gastrointestinal system
   - Adolescent nutrition
   - Cardiovascular system
   - Respiratory system
   - Central nervous system
   - Endocrine disorders
   - Musculoskeletal disorders

5. Vaccines and Immunology.

   Suggested Readings
   - Nelson Text Book of Pediatrics
   - Suraj Gupta Text Book of Pediatrics
   - O P Ghai Essential Pediatrics.

DERMATOLOGY, VENEREOLOGY & LEPROSY

General Dermatology

1. Anatomy and Physiology of skin and its appendages
2. Basic skin lesions and general principles of diagnosis of skin diseases
3. Basic dermatopathology including special stains and immunohistochemistry
4. Pathophysiology and management of pruritus
5. Infections, Infestations, bites and stings
6. Eczemas, papulosquamous disorders and other disorders of keratinization
7. Vesiculobullous disorders
8. Pigmentary disorders
9. Photodermatoses
10. Genodermatoses
11. Nevi and other developmental defects
12. Disorders of skin appendages (hair, nail, sebaceous, eccrine and apocrine glands)
13. Disorders of connective tissue
14. Inflammatory and neoplastic disorders of dermis
15. Disorders of subcutaneous tissue
16. Disorders of oral and anogenital mucosa
17. Vascular anomalies and tumors of skin and subcutaneous tissues
18. Benign and malignant tumors of epidermis and appendages
19. Occupational and environmental dermatoses
20. Skin changes due to chemical agents, drugs and transplantation
21. Skin changes due to mechanical and physical factors
22. Urticaria and angioedema

Dermatology related to internal systemic disorders

1. Cutaneous manifestations of nutritional and metabolic disorders
2. Cutaneous manifestations of internal malignancies
3. Cutaneous manifestations of endocrine disorders
4. Cutaneous manifestations of disorders of organ systems: CVS, RS, GIT, Renal, Nervous system, Musculoskeletal and Ocular
5. Cutaneous manifestations of multisystem diseases/syndromes

Dermatotherapeutics

1. Common topical agents
2. Common systemic drugs
3. Adverse cutaneous drug reactions

PULMONARY MEDICINE

1. Anatomy : Thorax, lungs, diaphragm, heart.
2. Physiology : Functions of lungs, Regulation of respiration, pressure & volume changes, surfactant, mechanics of breathing, high altitude physiology, sleep related disorders.
3. Immunology : Defence mechanisms
   Immunological aspects of lungs
4. Clinical Examination: Symptoms & signs in Resp. System.
5. Investigations:
   a) Spirometry
   b) X-ray chest
   c) Pulmonary cytopathology
   d) Sputum examination, culture sensitivity, newer techniques.
   e) Bronchoscoopy
   f) Lung biopsy, pleural biopsy, Inter costal drainage
   g) Blood gas analsis.
6. Tuberculosis;
   Symptoms, signs, diagnostic methods & management, recent advances, MDR TB, X-DR TB, DOTS, Therapy.

7. Environmental disorders:
   Air pollution, smoking etc. Focus on prevention of pollution, Tree plantation to maintain atmosphere, avoidance of plastic bag use, protection of Forests and wild vife and diff. Species for Ecological balance.
8. Occupational hazards esp. silicosis.
9. Chest diseases:
   a) Bronchial asthma
   b) COPD
   c) Diffuse interstitial lung diseases
   d) Disorders of diaphragm
10. Disorders of pulmonary. Circulation.
11. Diseases of pleura
    a) Pneumothorax-closed, open, tension aetiopathogenesis, clinical features, x-rays, management medical, surgical.
    b) Pleural effusion
    c) Hydropnemothorax
    d) Emphysema
12. Neoplasia of lung.

RADIO-DIAGNOSIS

Course Content:

A. RADIOLOGICAL PHYSICS & X-RAY TECHNOLOGY:

1. Radiation
2. Production of X –Rays
3. X- Ray Generators
4. Basic Interaction between X- Rays and Matter
5. Attenuation
6. Filters
7. X- Ray beam restrictors
8. Fluoroscopic imaging and image intensifier
9. Viewing & recording of the Fluoroscopic Image
10. Radiographic Image
11. Geometry of the Radiographic Image
12. Computed Tomography
13. Ultrasound
14. Digital Radiography
15. Magnetic Resonance Imaging
16. Radiation hazards & Protection
17. Atomic structure, Radioactive Isotopes
18. Positron Emission Tomography
19. Digital Subtraction Angiography
20. Pictorial Achieving & Communicating System (PACS)
21. DICOM

B. DARK ROOM TECHNIQUES:

1. CR Cassette: .construction & care
2. Factors affecting image details
3. Factors affecting image contrast & density
4. Grids : construction & types
5. Cones & collimator
6. Computers in radio-diagnosis

C. BASIC RADIOLOGY:

I. IMAGING TECHNIQUIES AND MODALITIES

a) Department Organization:

1. Digital Imaging and PACS
2. Processing in Computed Radiography
3. Intravascular Contrast Media

4. Radionuclide imaging General Principles
5. Mammography – conventional, Sonomammography, MR mammography, digital mammography, Ductography
6. Dual Energy X-ray Absorptiometry
7. Medicolegal issues in Diagnostic Radiology
8. Radiation Protection and patient doses in diagnostic radiology

II. RESPIRATORY SYSTEM:

1.1 Techniques of Investigations

1. Standard Techniques;
2. Digital Radiography
3. Magnetic Resonance Imaging
4. Ultrasound
5. Angiography
6. Lung Biopsy & Other Interventional Techniques.

1.2 Normal Chest:

1. The Lungs (Radiological Anatomy)
2. The Central Airways
3. The Lungs beyond Hila
4. The Hila
5. The Mediastinum:

    1. CT & MRI
    2. Plain film appearances of Mediastinal Masses:
    3. Thyroid/ Para Thyroid Masses/ Thymic tumors/Thymic hyperplasia/Teratoma/ Germ Cell Tumor.
    4. Mediastinal lymphadenopthy
    5. Neurogenic Tumors
    6. Extra medullar heamatopoiesis/Mesenchymal tumors/ herniations of / Mediastinal lipomatosis/ Aneurysm.
    7. Differential diagnosis.

1.3 The Chest Wall, Pleura & Diaphragm

a. Chest Wall: i) Soft tissue /Breasts, ii) Ribs /Sternum/Clavicle, Spine 2
b. The Pleura: i) Normal Pleura, ii) Pleural Pathologies
c. The Diaphragm:
    i) Height/ Eventration/Movements/Paralysis
    ii) Hernias/Trauma/Neoplasm

1.4 Pulmonary Infections in Adults.

1. Pneumonia
2. Associated features and complications of pneumonia
3. Pulmonary tuberculosis
4. HIV & AIDS

1.5 Large Airway Obstruction

Collapse: General features /Collapse of individual lobes / entire lung/ segmental collapse/ Rounded /obstructive collapse Obstructive Pneumonitis/ Bronchoscope/Bronchiectasis .

1.6 Pulmonary lobar Collapse essential considerations

1.7 Chronic airway obstruction

1. Asthma:
2. Chronic Bronchitis and Emphysema
3. Bronchiolitis

1.8 Pulmonary Neoplasm:

1. Bronchial Carcinomas
2. Benign Pulmonary Tumors
3. Malignant Lymphoma
4. Metastases
5. The solitary Pulmonary Nodule

1.9 Diffuse Pulmonary. Disease / Industrial Lung Disease / HRCT:

1. Pulmonary Edema,
2. Diffuse pulmonary Hemorrhage,
3. Inhalation of particulate matter,
4. Diffuse pulmonary Fibrosis,
5. Sarcoidosis / Collagen Vascular Disease / Systemic Vasculitidis / Lymphoid Disorders of Lungs / Pulmonary Eosinophilia / Drug induced Lung Disease.

2.0 Chest Trauma

2.1 Pulmonary thrombo-embolism: chest radiograph / radionuclide study / pulmonary arteriography CT / MRI.

2.2 Post operative and critically ill patients

2.3 Congenital Pulmonary Anomalies:

1. Abnormal development of lung bud
2. Abnormalities of separation of lung bud from foregut
3. Abnormalities of pulmonary vasculature
4. Ectopic hemartomatous developments.

2.4 The infant and young child:

1. Pathologies of diaphragm
2. Pleural abnormalities
3. Inflammation
4. Airway obstruction

5. Diffuse lung disease
6. Respiratory distress in newborn

2.5 Interventional techniques in thorax

1. Biopsy procedures
2. Thoracic drainage procedures
3. Therapeutic embolization
4. Dilatation and stenting techniques
5. Extraction techniques.

III. THE HEART AND GREAT VESSELS

3.1 Cardiac Anatomy and Enlargement

1. Plain radiography
2. Enlargement of various chambers on plain radiography.

3.2 Magnetic Resonance Imaging of heart and blood vessels

3.3 Congenital Heart Disease:

1. General Principles
2. Left to right shunts
3. Other Congenital Heart Disease
4. Diagnostic signs to diagnose them

3.4 Acquired Heart Disease

1. Non Rheumatic/ Rheumatic Mitral VD
2. Tricuspid VD
3. Aortic VD
4. Diagnostic signs to diagnose them

3.5 Ischemic Heart Disease

1. Myocardial Infarction
2. Mechanical complications of MI
3. Diagnostic signs to diagnose them

3.6 Pulmonary Circulation:

1. Anatomy and Physiology
2. Pulmonary Vascularity in Heart Disease
3. Pulmonary Arterial hypertension/ Its Imaging
4. MR in Pulmonary Vascular Abnormalities.

3.7 Imaging in Cadiomyopathy, Cardio Tumors, Trauma

3.8 The pericardium

3.9 Thoracic Aorta

IV. THE GASTROINTESTINAL TRACT

4.1 The Esophagus

1. Anatomy .and Functions
2. Methods of Examination
3. Pathologies of Esophagus
4. Motility Disorders
5. Extrinsic lesions/ miscellaneous conditions

4.2 The Stomach

1. Radiological anatomy and methods of examination
2. Inflammatory Diseases
3. Neoplastic Conditions
4. Peptic ulcers
5. Volvulus

4.3 The Duodenum

1. Anatomy and Normal Appearances
2. Methods of Radiological Examination
3. Peptic ulceration
4. Diverticula
5. Neoplasms benign and malignant

4.4 The Small Intestine

1. Anatomy and normal appearances
2. Methods of radiological examination
3. Crohn's disease/Coeliac Disease/Neoplasms/various conditions.

4.5 The Large Bowel

1. Anatomy and Normal Appearances
2. Methods of Radiological Examination
3. Tumors
4. Diverticular Disease
5. Colitis
6. AIDS
7. Miscellaneous Conditions

4.6 Peritoneum, Mesentery and Omentum

1. Peritoneal spaces and reflections
2. Abnormalities of Peritoneum
3. Abnormalities of Mesentery
4. Abnormalities of Omentum

4.7 Gastrointestinal Angiography.

1. General Consideration
2. Gastro intestinal bleeding

4.8 Pediatric Gastrointestinal Radiology

1. The Neonate
2. The Infant and Older Child

4.9 Interventional Radiology in Gastrointestinal tract

1. Introduction
2. Esophagus.
3. Stomach and Duodenum
4. Small Intestines
5. Colon and Rectum

V. LIVER, BILIARY TRACT, PANCREAS, ENDOCRINE SYSTEM AND LYMPHOMA LIVER

5.1 Liver

1. Normal and variant Anatomy
2. Liver Imaging Techniques
3. Diffuse Disease
4. Focal Disease
5. Intervention

5.2 The Biliary Tract

1. Anatomic Consideration
2. Methods of investigation
3. Biliary Disorders

5.3 Interventional Techniques Hepatobiliary System

1. Liver Biopsy
2. Biliary Obstruction
3. Malignant Biliary Obstruction
4. Percutaneous Cholangiography and Biliary Drainage Procedures
5. Vascular Interventional Techniques in Hepatobiliry System

5.4 The Pancreas

1. Embryology and Anatomy
2. Congenital Anomalies
3. Multisystem Diseases with Pancreatic involvement
4. Pancreatitis

5. Pancreatic Neoplasms
6. Trauma
7. Interventional Radiology in Pancreas

5.5 Imaging of the Endocrine System:

1. Hypothalamic-Pituitary Axis
2. Pineal Gland
3. Thyroid Gland
4. Parathyroid Gland
5. Pancreatic & Gastrointestinal Endocrine Disorders
6. Carcinoid Tumors
7. Adrenal Glands

5.6 Reticuloendothelial Disorders: Lymphoma

1. Histopathological Classification
2. Staging Investigation and Management
3. Extranodal Manifestation of Lymphoma
4. Monitoring response to therapy Reticuloendothenial Disorders:

5.7 The Spleen

1. Imaging Techniques
2. Normal Anatomy
3. Splenomegaly
4. Benign Mass Lesions
5. Malignant Mass Lesions
6. Splenic Trauma

VI. GENITO URINARY TRACT

6.1 Methods of Investigation:

6.2 Reno Vascular Disease:

1. Renal Arteriography
2. Vascular Abnormalities
3. Radiological Management of Reno Vascular Disease

6.3 Renal Parenchymal Disease

1. Normal Appearance of Kidney
2. Renal Parenchymal Disease
3. Parasitic Infections

6.4 Renal Masses

1. Methods of Analysis
2. Pathological Renal Masses

3. Neoplastic Renal Masses

6.5 Calculus Disease & Urothelial Lesions

1. Calculus Disease
2. Nephrocalcinosis
3. Urothelial Tumors

6.6 Urinary Obstruction:

1. Pathophysiology
2. Causes of Obstruction

6.7 Radiological Evaluation of Urinary Bladder, Prostrate & Urethra

6.8 Injuries to the Genito Urinary Tract

6.9 Renal Failure and Transplantation

6.10 Interventional Uroradiology

6.11 Imaging of the Kidneys & Urinary Tract in Children

1. Embryology
2. Techniques
3. Interventional Procedure

6.12 Imaging of Pediatric Pelvis

1. Imaging Techniques
2. Normal Anatomy
3. Congenital Anomalies
4. Pelvis Masses
5. Scrotal Disease

VII. SKELETAL SYSTEM

7.1 Skeletal Trauma

7.2 Bone Tumors: Generals Characteristic & Benign Lesions

7.3 Bone Tumors: Malignant Lesions

7.4 Myelproliferative and Similar Disorders

1. Generalized/Localized Decreased in Bone Density
2. Generalized/Localized Increased in Bone Density
3. Delayed Skeletal Maturity

7.5 Metabolic and Endocrine Disease of the Skeletal

7.6 Skeletal Dysplasias and Malformation Syndrome

7.7 Joints Diseases

1. Rhumatiod Arthritis
2. Other Connective Tissue Disease
3. Crystal Deposition Arthropathy
4. Degenerative Joint Disorders/Degenerative spine
5. Arthrography/ HPOA/ Pachy Dermoperiostritis

7.8 Bone and Soft tissue Infection

7.9 Imaging of Soft tissue

7.10 The Radiology of Non Accidental Injury in Children

7.11 Paediatric Musculo -Skeletal Trauma

VIII. THE REPRODUCTIVE SYSTEM

8.1 imaging in infertility

8.2 Imaging in Gynaecology

8.3 Hysterosalpingography

8.4 Male Reproductive System

IX. CENTRAL NERVE SYSTEM

9.1 Methods of Examination and Anatomy

9.2 Cranial and Intracranial Pathology:

1. Tumors in Adults
2. Cerebro Vascular Disease and Non Traumatic Intracranial Hemorrhage
3. Infections, AIDS
4. Demyelinating and Metabolic Disease

9.3 Spine: Method of Investigation

9.4 Imaging of Spinal Pathology

9.5 Neonatal Head and Spine Sonography

9.7 Neurology in Children – normal development & developmental disorders

X. THE ORBIT; ENT; FACE; TEETH:

10.1. The Orbit

1. Anatomy
2. Intraoccular Abnormalities
3. Lacrimal Gland Tumors
4. Muscular Tumors

5. Intra/Extra Conal Tumors
6. Proptosis
7. Infection
8. Developmental abnormalities.

10.2 Ear, Nose and Throat Radiology (anatomy, congenital disorders, infection & neoplasms)

1. The Ear
2. Nose and Paranasal Sinuses
3. Pharynx

10.3. Maxillofacial Radiology

1. Fractures of Maxilla
2. TM Joint
3. Salivary Glands
4. Dental Radiology

XI. INTERVENTIONAL RADIOLOGY

1. HSG & FTR
2. 4 vessel angiography
3. Biliary intervention(PTBD,PTC)
4. PCN
5. Laser ablation of varicose veins
6. RFA/ chemoembolisation of hepatic tumors and malformations.
7. Vertebroplasty.
8. Hemangioma and AVM management.
9. Tumor ablation

HUMAN GENETICS

Unit 1: Meaning and scope of Human Genetics:

Pedigree construction. Autosomal inheritance, sex linked inheritance.

Unit 2: Human Cytogenetics:

Normal Human Karyotype, autosomes and sex chromosomes, chromosome preparation methods – Leucocyte culture. Chromosome banding methods and nomenclature of chromosome bands. Fluorescent InSitu Hybridization.

Unit 3: Human Molecular Genetics:

Genes, DNA, Polymerase chain reaction (PCR), Real time PCR, DNA- Microarray, Direct DNA Sequencing, Conformation Sensitive gel electrophoresis (CSGE), Molecular diagnosis of single gene disorder- Hemophilia, Thalassemia.

Unit 4: Applied Human Genetics:

Prevention and cure of hereditary diseases, prenatal diagnosis, amniocentesis, chorion villi sampling, cytogenetic and DNA based diagnosis of hereditary diseases. Gene therapy. Genetic counseling. DNA profiling (finger printing) and paternity testing.

Unit 5: Cancer Genetics:

Forms of cancer. Genetic basis of cancer, Properties of cancer cells. Oncogenes. Tumor Suppressor genes. Familial hereditary cancer.

RESEARCH METHODOLOGY

Research overview:
Definition, meaning, scope, significance of ethical conduct in research, Classification of Research (Basic, Applied, Descriptive and Interventional Research), need of research and policy interventions

Research components:
Concepts, Constructs, Theory, Literature Review (Primary and Secondary Sources, Web sources) and its importance, assumptions, Models, Identification of the problem, assessing the status of the problem, formulating the objectives and research questions, research design and methodology.

Research Methods:
Deductive/ Inductive; Variables, Measurement- Types of Data - Categorical, nominal & Ordinal, Sources of Data – Primary, Secondary and Teritary –. Methods of Collecting Data : Observation, field investigations, Direct studies. Sample, Sampling techniques, Probability Distributions, Hypothesis Testing, types of errors (Type-I & Type-II) Level of Significance and Confidence Interval, t-test, ANOVA, Correlation, Regression Analysis, Non-parametric tests, coding, qualitative content analysis, thematic analysis, interviewing, focus groups discussion

Documentation and scientific writing:
Results and Conclusions, Preparation of manuscript for Publication of Research paper. Presenting a paper in scientific seminar. Types of Report: research papers, thesis, Research Project Reports, Pictures and Graphs, citation styles, writing a review of paper, Bibliography

References:

1. Garg.B.L., Karadia, R., Agarwal,F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
3. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.
4. Gupta S.P. (2008). Statistical Methods. 37th ed. (Rev)Sultan Chand and Sons. New Delhi. 1470 p.
5. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
6. Research Methodology Dr P M Bulakh,Dr P. S. Patki and Dr A S Chodhary 2010 Published by Expert Trading Corporation Dahisar West, Mumbai 400068