Theory

General Pathology
Cellular adaptation cell injury and cell death
Mechanism, morphology and examples of cell injury, necrosis and apoptosis.
Subcellular and cellular responses and adaptation to injury
Intracellular accumulations, pathological calcification and cell aging.

Acute and chronic inflammation
Vascular and cellular events in acute inflammation, chemical mediators, outcome and morphological patterns of acute inflammation.
Chronic inflammation with special reference to granulomatous inflammation.
Systemic effects and effects of deranged inflammation.

Tissue renewal and repair: Regeneration healing and fibrosis.
Control of normal cell proliferation and tissue growth, mechanism of tissue regeneration, repair by healing and fibrosis.
Extracellular matrix and cell matrix interactions.

Hemodynamic disorders, thrombo embolic disease and shock.
Edema, hyperemia, congestion and haemorrhage.
Normal Hemostasis, thrombosis, DIC, embolism, infarction and shock.

Genetic Disorders
Principles of genetics, normal karyotyping.
Mutations, Mendelian disorders, disorders with multifactorial inheritance cytogenetic disorders involving autosomes and sex chromosomes.
Single gene disorders with nonclassic inheritance.
Diagnosis of genetic disorders involving molecular and genetic techniques.
Neoplasia
Definition, nomenclature and biology of tumor growth
Molecular basis of cancer with special reference to carcinogenic agents and
molecular basis of multistep carcinogenesis
Epidemiology and clinical features of tumors.
Grading, staging and laboratory diagnosis of cancer.

Infectious Diseases
General principles of microbial pathogenesis, bacterial, fungal, parasitic and
viral infections

Environmental and nutritional pathology
Common environmental and occupational exposures leading on to
diseases.
Nutritional deficiencies and obesity related disorders.

Disease of Infancy and Childhood
Congenital anomalies, birth injuries, diseases of neonates, inborn errors of
metabolism, tumor and tumor like lesions of infancy and childhood

Systemic Pathology
Blood vessels, lymphatic and veins
Normal morphology, congenital anomalies, atherosclerosis, hypertensive
vascular disease
Inflammatory and neoplastic diseases of all the vessels.

Heart
Normal morphology, its blood supply and effect of aging on heart.
Ischemic, hypertensive, valvular, congenital heart diseases and
cardiomegaly
Pericardial diseases
Tumors of the heart.

Lungs
Congenital anomalies
Obstructive and restrictive pulmonary diseases.
Diseases of vascular origin.
Infections and tumors of lung
Lung transplantation
Diseases of pleura

Head and Neck
Oral cavity: - inflammatory disease and tumors
Diseases of teeth and supporting structures
Upper airways and ear – congenital anomalies, infections and tumors
Salivary glands – Infections autoimmune disorders and tumors.
Thymus – Developmental autoimmune and inflammatory disorder and tumors.

Gastro Intestinal Tract
Congenital anomalies, infections inflammatory and vascular disorders and
Tumors of esophagus, stomach, small and large intestines, appendix and
Anal canal.
Diseases of the peritoneum

Liver
Normal morphology with general features of hepatic disease including LFTs
Infectious, autoimmune drug induced, metabolic and circulatory disorders of
Liver.
Hepatic diseases associated with pregnancy, neonates organ and bone
Marrow transplantation
Liver transplantation
Nodules and tumors of liver

Biliary tract
Congenital anomalies, injuries, Gallstones, cholecystitis and tumors of gall
Bladder and extra hepatic bile ducts

Pancreas
Congenital anomalies, pancreatitis and neoplasms of pancreas.

Kidney
Clinical manifestations of renal diseases
Congenital anomalies
Diseases affecting glomeruli, tubules, interstitium and blood vessels
Cystic diseases of kidney.
Tumors of kidney

**Lower urinary tract and male genital system**
Congenital anomalies, inflammation and tumors of ureter, urethra, penis
testis and epididymis
Inflammation, enlargement and tumors of prostate.

**Female genital tract**
Embryology, Anatomy, Physiology and histology of female genital tract.
Congenital anomalies, inflammation and tumors of vulva, vagina, cervix, uterus, fallopian tubes and ovaries
Gestational and placental disorders

**Breast**
Inflammations, benign epithelial lesions and tumors of the breast.
Diseases of male breast

**The Endocrine System**
Normal hormonal levels and functions of all the endocrine glands
Hypo and hyperactivity of glands of endocrine system i.e. pituitary, thyroid parathyroid, pancreas, adrenals and pineal gland
Autoimmune diseases, inflammations and tumors affecting these glands.

**Skin**
Disorders of pigmentation and melanocytes
Inflammatory, vesiculobullous and infectious disease
Tumors of the epidermis, dermis and skin appendage.

**Musculoskeletal system**
Bones
Modelling, growth and development, genetic and acquired abnormalities in bone cells, matrix and structure, features necrosis and infections of bones
tumors and tumor like lesions
Joints
Arthritis, tumor and tumor like lesions
Soft tissue
Tumors and tumor like lesions

Peripheral nerves and skeletal muscles
General reactions of motor units
Inflammatory, infectious, hereditary, metabolic and traumatic neuropathies
Atrophy, dystrophy, myopathies of the skeletal muscles
Diseases of neuromuscular junction
Tumors of peripheral nerves and skeletal muscle bundles

Central Nervous System
Degenerative, metabolic, toxic, demyelinating, infectious, cerebrovascular
malformations and traumatic injuries of skeletal muscle bundles
Tumors

Eye
Infections, inflammatory, congenital diseases and neoplasms of orbit, eyelid
conjunctiva sclera, uvea, cornea, retina and optic nerves

Cytopathology
General Cytology
Origin & principles with stress on basic structure of a mammalian cell.
Recognition and classification of different cell types
Fundamental concepts of neoplasia – Benign & malignant

Cytology of Female Genital Tract
Normal FGT
Cytologic evaluation of menstrual disorders and hormonal abnormalities
Benign disorders of uterus, cervix and vagina.
Intraepithelial lesions and squamous carcinoma of the uterine cervix
Adenocarcinoma and related lesions of the uterine cervix
Proliferative disease and carcinoma of the endometrium
Diseases of vagina and vulva
Tumorous and non-tumorous conditions of ovary and fallopian tubes

Cytology of Respiratory tract
Non-cancerous and cancerous lesions including conventional and aspiration
cytology.

**Cytology of GIT**
Lesions of oral cavity, salivary glands, oesophagus, stomach, small intestine colon and rectum.

**Cytology of kidney & lower urinary tract**
Cancerous & non-cancerous lesions, conventional cytology, aspiration cytology, urine & brushings.

**Breast cytology**
Cytological diagnosis of all breast lesions on FNA.

**Cytology of thyroid, lymph nodes, neck masses**
Aspiration cytology of all common lesions.

**Cytology of Skin, Bone & Soft tissue**
Cytology of common lesions

**Cytology of Liver, Spleen, Pancreas, Retroperitoneum, Abdominal lumps**
Cytology of neoplastic and non-neoplastic lesions

**Cytology of Testis & Prostate**

**Miscellaneous**
Lesions of eye, orbit
Mediastinum
CNS – Touch smears

**Cytology of all effusions & fluids in the absence as well as presence of cancer.**

**Haematology**
**Clinical Correlation**
Signs & Symptoms, General & Systemic examination) with various haematological disorders.

**Biology of stem cell & disorder of Haematopoiesis.**
Interaction between haematopoietic stem cells, progenitor cell and stromal compartment of bone marrow.
Stem cell homing & mobilization.

**Erythroid maturation, differentiation and abnormality.**
Pathobiology of human erythrocyte & Haemoglobin.
Anaemias
Approach to anaemia in adults and children in: Clinical correlation & diagnostic modalities.
Classification of anaemias (Morphological, pathophysiological and based on erythropoiesis ie Proliferative vs non-proliferative)

Iron deficiency anaemia including iron metabolism and differential diagnosis from other microcytic hypochromic anaemias
Disorder of iron metabolism including iron overload
Anaemia of chronic disorders with special reference to infections collagen vascular disorders, inflammation etc.
Megaloblastic anaemia and other causes of megaloblastosis
Definition, lab diagnosis of Haemoglobin disorders like Thalassemia, sickle cell anaemia, Haemoglobin associated with altered Oxygen affinity.
Red blood cell enzymopathy, membrane disorder, autoimmune hemolytic anaemia, non immune hemolytic anaemia, paroxysmal nocturnal haemoglobinuria
Approach to Pancytopenia

**WBC disorders, complement and immunoglobulin biology**
Normal granulopoiesis
Acquired and congenital disorders of phagocytosis (neutrophil, monocyte, eosinophil and macrophages)
Disorder of lymphocyte function
Storage disorder
Lymphocyte response to the various viral disorders like infectious Mononucleosis, Hepatitis & Dengue
Hematological responses to Viraemia and parasitic infections

**Haematological malignancies**
Conventional & molecular cytogenetic and immunohistochemical basis of
haematological malignancies
Classification (FAB, WHO). Their basis and diagnostic approach to various haematological malignancies
Pathophysiology, prognostic factors, cytochemistry, cytogenetics of various acute myeloid and lymphoblastic leukaemias
Pathophysiology and classification of MDS, MPD/MDS, myeloproliferative Disorders
Plasma cell dyscrasias & Mastocytosis, especially with reference to practical aspects of the clinical approach to patient
Role of chemotherapy and antineoplastic agents based on molecular mechanism of haematological malignancies, clinical use of haematopoietic growth factors
Late complications of Haematological disorders

Haematopoietic stem cell transfusion

Haemostasis & Thrombosis.
Megakaryocyte and platelet structure. Molecular basis of platelet function activation. Role of blood vessel, coagulation system and fibrinolytic system in haemostasis.
Clinical evaluation of bleeding disorder
Clinical & diagnostic aspects of:
Haemophilia,
Coagulation factor deficiency,
Von Willebrand disease
Thrombotic and non thrombotic purpura
Hereditary and acquired platelet disorders
Factors effecting coagulation, Venous T hromboembolism and role of lupus anticoagulant.

Human blood group antigen and antibody
Principle, indication and storage of red blood cell, WBC. & platelet and
plasma transfusion. Various methods of component separation and plasma derivatives with special reference to fresh frozen plasma, cryoprecipitates albumin and Immunoglobulin. Graft Rejection, GVH diseases, Transfusion Reactions, Blood grouping & cross matching

Haematological manifestations of various diseases like liver disorders, renal disorders, infections, cancers, AIDS and Parasitic diseases. Haematological problem in surgical patients

Spleen and its disorders.

Current topics and recent advances.

Immunopathology
Innate immunity
Role of phagocytic cells, complement, mast cells & humoral mechanisms

Specific Acquired Immunity
Details about antibody production & action, Brief principles about memory, Ag specificity & vaccination

Cell involved in Immune response-
T- lymphocytes, B-lymphocytes, macrophages, dendritic cells and natural-killer cells, dendritic cells, Natural killer Cells

Cytokines with details about their properties and functions

Structure and function of histocompatibility molecules and disease Association

Disorders of the immune system
All hypersensitivity reactions
Autoimmune disorders with special reference to SLE, Rheumatoid arthritis, Sjogren’s syndrome, systemic sclerosis, polyarteritis nodosa and other vasculitides, Mixed connective tissue disorders and inflammatory disorders
Immune deficiency syndrome – Acquired with emphasis on AIDS

Amyloidosis including pathogenesis, special stains & clinical correlation.
Transplant rejection in detail
Graft vs Host Disease

Practical
Histopathology
Histological techniques
Principles of grossing
Fixation and fixatives.
Tissue processing and microtomy
Theory of staining and its implications
Details of haematoxylin and eosin stain
Principles of special stains used in histopathology with their practical applications.
Processing of bones
Immunocytochemical, enzyme, histochemistry, immunofluorescence techniques
Details, techniques and uses of immunohistochemistry.
Internal and external quality control and management of laboratory.
Principles & application of all types of microscopes e.g. light, electron, fluorescence etc.
Block cutting,
Staining - routine (H & E),
Mounting and labelling of slides
Special stains
PAS stain
ZN stain
Reticulin stain

Cytopathology
Fixation & staining of smears
Processing of fluid specimens
Cyto centrifugation
Filtration procedures
Liquid based cytology
Preparation of cell blocks
Stains
Pap stain
Ziehl Neelsen stain
Giemsa stain
H & E stain
Haematology
Interpretation of a Hemogram
Preparation & examination of blood & Bone marrow with relevant special stains
Bone marrow aspiration & biopsy procedure
ESR
Reticulocyte count preparation & interpretation of smear for Reticulocyte count
Hemoglobin electrophoresis
Osmotic fragility,
BT, CT, PTI, PTTK, FDP, Fibrinogen
G6PD
Plasma Hb
Fetal Hb
Coomb's test
Sickling test
LE cell phenomenon

Clinical Pathology
Complete urine examination with reference to its physical, chemical and special tests.
Semen examination – Physical, chemical (pH, Liquefaction time) and microscopic examination.
Stool examination – Physical and microscopic examination

Immunopathology
Agglutination Reactions
ELISA
Protein Electrophoresis
Immunoelectrophoresis
ANA & ANCA profile
Immunohistochemistry
Immunofluorescence
RIA
PCR
FISH, CISH
Flow cytometry
Blot techniques