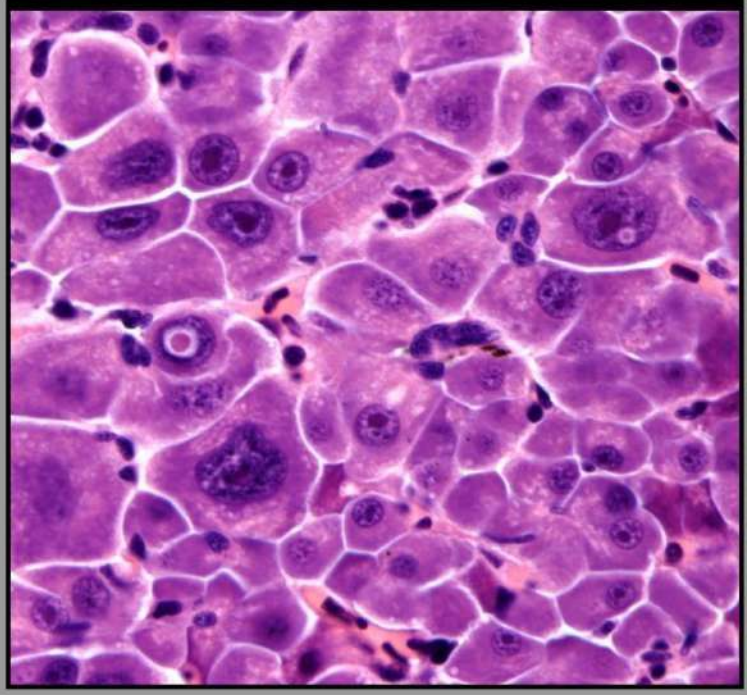
Pathology Study Guide
(3rd year) M.B.B.S

2023



STUDY GUIDE

PATHOLOGY

TABLE OF CONTENTS

Department in a glance

Pathology is the branch of medicine concerned with the study of the nature of diseases and its causes, processes, development and consequences. The medical specialty that provides microscopy and other laboratory services (e.g. cytology, histopathology) to Clinicians.

The pathologist is interested not only in the recognition of structural alterations, but also in their significance, i.e. the effects of these changes on cellular and tissue function and ultimately the effect of these changes on the patient. It is a basic approach to a better understanding of disease and therefore a foundation of sound clinical medicine.

The department of pathology is headed by Prof. Dr M Kashif Baig along with two Associate Professors one Assistant Professor and five Demonstrators, all of them are actively involved in teaching programs. The department comprise of general and special pathology including histopathology, hematology, microbiology and chemical pathology. Teaching of general pathology principal are supplemented by experimental work by which students are equipped with the skills required for the collection of different specimens for the pathological analysis and then are able to perform commonly used tests done in a side room laboratory. The aim is to produce clinicians with better understanding of the disease process so that they objectively use diagnostic tools designed to help them to reach a conclusive diagnosis in the shortest possible time.

The department has an adequate slide bank and gross specimen collection for the

Teaching purposes. This department is also equipped with a Penta Head microscope with LCD display screen for proper explanation of the microscopic slides. Binocular microscopes are also available for student's proper training. The department also has two labs along with experienced teachers and technical staff.

The academic session includes lectures, practical microbiology, histopathology slide discussions, museum classes, tutorials and small group discussions for MBBS students. Pathology is taught during the third and fourth years of the MBBS program. The students will be evaluated internally and externally. The department has a well – designed museum displaying neatly mounted specimens and several detailed and highly informative charts / graphs.

In January 2023, our department got approved for post-graduation by CPSP for Histopathology and Hematology. This future milestone could not have been achieved without the support of higher authorities specially Principal Dr. Muhammad Saeed. AFMDC is the only institute providing this facility in Faisalabad. This will enhance the career opportunities and skill development of the new graduates with promising and bright future ahead.

Department of Pathology

Designation	Name
HOD/Professor	Dr M Kashif Baig (Histopathologist)
Professor	Dr Khalid ur Rehman Hashmi (microbiology)
Associate Professor	Dr Usman Ansari (Hematologist)
Assistant Professor	Dr Javaid Iqbal (Hematologist) Dr Shireen Hamid (Histopathologist) Dr Asma Yaqoob (Microbiologist)
Demonstrators	Dr Madeeha Javwad Dr Amna Saleem Dr Ahmed Bilal Dr Hijab Fatima Dr Munaim Tahir
Postgraduate trainees	Dr Iqra Manzoor Dr Faiza Jabeen
Lab Assistant / Lab Tech	Rehman Dastgeer (Lab Tech), M. Waseem (Assistant Lab Tech) M. Asif and Azhar Hussain (lab Attendant) Zeeshan Ali (Lecture hall attendant)
Computer Operator	Zeeshan Ahmad

TIME LINE for SYLLABUS COMPLETION

GANTT CHART of 3rd YEAR LECTURES

Topic	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov
The Cell, Cellular Response + General Bacteriology										
Cellular Response +General bacteriology										
InflammationRepair + Special bacteriology										
Hemodynamics + Special bacteriology										
Hemodynamics + Special bacteriology										
Immune System + Virology										
Immune System +Virology										
Neoplasia + Parasitology + Mycology										
Revision Lectures + Send up										

Key:

Active Session

Sports Week

Summer Vacations + Eid ul Adha

Revision Lectures

Sendup Exam

TIME TABLE

Day	1	2	3	4	5	6	7	8
	08:00-08:45	08:45-09:30	09:30-11:00		11:00-11:45	11:45-12:00	12:00-13:00	13:00-14:00
Mon	Monthly Class Test		**Practical** **B**: Pharma **A**: Pathology **C**: F.Medicine		**Lecture** Pathology		**Lecture** Pharma	**Lecture** General Surgery
Tues	Behaviour Sciences	Behaviour Sciences	**Practical** **C**: Pharma **B**: Pathology **A**: F.Medicine		**Lecture** Pharma	**B** **R**	**Lecture** Pathology	**Lecture** F.Med.
Wed	**Lecture** Pharma	**Lecture** Pathology	**Practical** **A**: Pharma **C**: Pathology **B**: F.Medicine		**Lecture** Pathology	**E** **A**	Ward	
Thur	**Lecture** Forensic Medicine	**Lecture** Pharma	**Tutorial** **B**: Pharma **A**: Pathology **C**: F.Med.		**Lecture** Pathology	**k**	Ward	
Fri	**Lecture** Medicine	**Lecture** Pathology	**Tutorial** **C**: Pharma **B**: Pathology **A**: F.Med.		**SDL**		Case Base discussion Pharmacology	
Sat	Lecture Eye	**Lecture** Forensic Medicine	**Tutorial** **A**: Pharma **C**: Pathology **B**: F.Med.		**Lecture** Pharma		Skill Lab	

Monthly Class Test Schedule	**Subject**	**Ward Program: 8 Groups**	
		Group 1: Anesthesia	**Group 5:** Eye
1st Monday	Pathology	**Group 2:** Behavioral Science	**Group 6:** Medicine
2nd Monday	Forensic	**Group 3:** Em. Medicine	**Group 7:** Orthopedics
3rd Monday	Pharmacology	**Group 4:** ENT	**Group 8:** Surgery
4th Monday	B.S	**Ward Rotation for 4 weeks each/Ward test on last day of rotation.**	

Syllabus Outline

(A) GENERAL PATHOLOGY

CELL INJURY

1. Necrosis, Ischemia, Hypoxia, Infarction and GangreneOncosis and Autolysis.
2. Sequence of the ultrastructural and biochemical changeswhich occur in the cell in response to the following:
   - Ischemia
   - Immunological injury, e.g., Asthma / SLE / Anaphylacticreaction
   - Physical agents, e.g., Radiation
   - Genetic defects, e.g., Thalassemia / Hemophilia
   - Nutritional deficiency, e.g., Kwashiorkor
   - Infectious agents
   - Viruses, e.g., Hepatitis
   - Bacteria, e.g., Staphylococcus aureus
   - Fungi, e.g., Candida
   - Parasites, e.g., Malaria
   - Nutritional deficiency
3. Irreversible and reversible injury
4. Apoptosis and its significance.
5. Necrosis and its types
6. Exogenous and endogenous pigmentation.
7. Dystrophic and metastatic calcification along with clinicalsignificance.
8. Metabolic disorders
   - Lipid disorders, Steatosis of liver, Hyperlipidemia
   - Protein disorders
   - Carbohydrate disorders

INFLAMMATION, MEDIATORS OF INFLAMMATION

1. Role of inflammation in the defense mechanisms of the body.
2. Vascular changes of acute inflammation and their relation tomorphological and tissue effects.
3. Process of Chemotaxis, Opsonization and Phagocytosis.
4. Role of cellular components in inflammatory exudate.
5. Exudates and transudate.

6. Important chemical mediators of inflammation.
7. Pathway of Arachidonic Acid metabolism.
8. Role of products of Arachidonic acid metabolism in inflammation.
9. Mechanism for development of fever, with reference to exogenous andendogenous pyrogens.
10. Chronic inflammation including Granulomas.
11. Granuloma and its types along with causes.
12. Systemic effects of acute and chronic inflammation and their possibleoutcomes.
13. Significance of ESR.
14. Induced hypothermia in medicine.
15. Healing in specialized tissue.

WOUND HEALING

1. Repair and regeneration.
2. Wound healing by first and second intention.
3. Factors that influence the inflammatory reparative response.
4. Wound contraction and cicatrisation.
5. Formation of granulation tissue.
6. Complications of wound healing.

DISORDERS OF CIRCULATION

a. ***Thrombo-embolic disorders and their modalities***

1. Etiology and pathogenesis of thrombosis.
2. Possible consequences of thrombosis
3. Difference between thrombi and clots
4. Classification of emboli according to their composition.
5. Difference between arterial and venous emboli.

b. ***Hemorrhage, Hyperemia and Congestion***

1. Definitions of common types of Hemorrhage
2. Types of hyperemia
3. Difference between hyperemia and congestion

c. ***Infarction***

1. Types of infarction
2. Difference between anemic and hemorrhagic infarct
3. Morphological picture of infraction in different organ systems

d. ***Disorders of the circulation and shock***

1. Edema, ascites, hydrothorax and anasarca.
2. Pathophysiology of edema with special emphasis on CHF.
3. Pathogenesis of four major types of shock (Hypovolemic,cardiogenic, vasovagal & septic) and their causes.
4. Compensatory mechanisms involved in shock.

MICROBIOLOGY

1. Defence mechanisms of the body.
2. Microbial mechanisms of invasion and virulence.
3. Difference between sterilization and disinfection.
4. Methods of disinfection and sterilization of the following:
   a. Facility where the doctor practices,
   b. Examination table,
   c. Any spillage e.g. sputum, vomitus, stool, urine, blood,
   d. Examination tools, e.g., thermometer, nasal and ear specula andspatula,
5. Principles of aseptic techniques such as Venepuncture, urinarycatheterization, bandaging, suturing and lumber puncture.
6. Universal precautions for infection control.
7. General principles of the following serological tests:
   a. ELISA – Hepatitis (A,B,C,D,E,G) Rubella, CMV and HIV
   b. PCR
   c. Haemagglutination – TPHA
   d. Western Blot –HIVMalaria.
8. Interpretation of :
   a. Culture reports
   b. Serological reports and
   c. Microscopic reports of gram stain and ZN stain.
9. Principles of proper collection and submission of specimens forlaboratory investigations
9. General characteristics and taxonomy of Bacteria, Rickettsia, Chlamydia, Viruses and Fungi.
11. Communicable, Endemic, Epidemic, and Pandemic Diseases, CarriersPathogens,

Opportunists, Commensals and Colonizers.

12. Microorganisms responsible for infection of the following organsystems:

- Central Nervous System
- Respiratory System
- Gastrointestinal System
- Genital System
- Urinary System
- Infections of Bones and Joints
- Zoonosis
- Infection of the Skin
- Hepatic Infections

Pathogenesis, Treatment, Epidemiology, Prevention and Control of the following organisms:

(i) Bacteria

Staphylococcus aureus Streptococcus

pneumoniae

Beta hemolytic streptococcus group a & bDiphtheria sp.

Bordetella sp. Bacillus anthracis

Clostridium perfrignes

Clostridium botulinum, Clostridium difficile

Clostridium tetani Actinomycies israelli

Nocardia asteroides Neisseria meningitis

Neisseria gonorrhoeae Gardenella vaginalis

Haemophilus influenzae Mycobacterium

tuberculosisMycobacterium leprae E.coli

Klebsiella Proteus Salmonella

Shigella Yersinia pestis

PseudomonasVibrio cholera

Vibrio parahemolyticusCampylobacter

jejuni

Helicobacter pyloriLegionella

Mycoplasma pneumoniaeChlamydia

Treponema pallidiumLeptospira

Rickettsia sp.

(ii) **Viruses** Mumps Herpes
Measles Influenza, Para
influenzaRSV
Hepatitis A, B, C, D, ERota
CMVEBV
Rubella Chicken PoxHIV
Rabies

(iii) ***Fungus***
Cryptococcus neoformansCandida albicans
Tinea species

(iv) **Protozoa** Plasmodium species Giardia
lamblia Entamoeba histolytica
Cryptosporidium Leishmania species
Trichomonas vaginalisToxoplasma
gondii Pneumocyctis carinii

(v) ***Helminths***
Ascaris lumbricoides Ancylostoma
duodenaleTrichuris trichuria Enterobius
vermicularis Filaria species Strongyloides
stercoralisSchistosoma species
Echinococcus species Taenia solium
Taenia saginata Hymenolepis nana

Learning Objectives

Table of learning outcomes and teaching strategies in General Pathology and Microbiology

TOPIC	SUBTOPIC	LEARNING OBJECTIVES
The Cell as a Unit of Health and disease	Cellular Housekeeping	Describe the structure of Plasma Membrane
		Describe the components of Cytoskeleton along with Cell- Cell Interactions
		Describe the Biosynthetic Machinery of cell (Endoplasmic Reticulum and Golgi)
		Describe the structure and function of Lysosomes and Proteasomes
		Describe the Cellular Metabolism along with mitochondrial function
	Cellular Activation	Describe Cell Signaling and its mechanism
		Describe various types of Signal Transduction Pathways
		Enlist various types Growth Factors and Receptors with their function
		Describe the Interaction of intracellular and the Extracellular Matrix
	Maintaining Cell Populations	Explain the Proliferation and the Cell Cycle along with role of inhibitors and inducers
		Describe the role of Stem Cells in recent medicine
Cellular Responses to Stress and Toxic Insults: Adaptation, Injury, and Death	Introduction to Pathology	Define pathology
		Describe the four aspects of pathology
		1. Etiology
		2.Pathogenesis
		3.Morphology
		4. Clinical manifestations
	Overview: Cellular Responses to Stress and Noxious Stimuli	Enlist the Stages of the cellular response to stress and injurious stimuli.
		Describe the Stages of the cellular response to stress and injurious stimuli.
	Adaptations of Cellular Growth and differentiation	
		Enlist the types of cellular adaptations
		Describe the mechanism of hypertrophy with examples
		Describe the mechanism of hyperplasia with examples
		Describe the mechanism of atrophy with examples
		Describe the mechanism of metaplasia with examples
	Overview of Cell Injury and Cell	Enlist various Causes of Cell Injury
		Describe the mechanism of Reversible Injury

	death	Define Necrosis
		Describe various Patterns of Tissue Necrosis
	Mechanisms of Cell Injury	Describe Depletion of ATP with illustration
		Describe Mitochondrial Damage with illustration
		Describe Influx of Calcium and Loss of Calcium Homeostasis with illustration
		Describe the mechanism of Oxidative Stress in the cell and the injury caused by it
		Describe the defects in membrane permeability
		Describe the damage to DNA and proteins
	Clinicopathologic Correlations	Describe the mechanism of Ischemic and Hypoxic Injury
		Describe the mechanisms of ischemic cell injury
		Describe the Ischemia-Reperfusion Injury
		Describe the Chemical (Toxic) Injury to cell
	Apoptosis	Define Apoptosis
	Causes of Apoptosis	Describe the process of apoptosis in physiologic situations
		Describe the apoptosis in pathologic conditions
	Morphologic and Biochemical Changes in Apoptosis	Describe the following two Mechanisms of Apoptosis with illustrations
		1.The Intrinsic (Mitochondrial) Pathway of Apoptosis
		2. The Extrinsic (Death Receptor-Initiated) Pathway of Apoptosis
		Describe the execution phase of apoptosis
		Describe the process of removal of dead cells
	Clinicopathologic Correlations: Apoptosis in Health and Disease	Describe the examples of apoptosis
		Describe the disorders associated with dysregulated apoptosis
		Describe the process of heterophagy and autophagy
		Describe the process of Necroptosis with examples
	Intracellular Accumulations	Describe the pathogenesis and morphology of following intracecullar accumulations
		1. Lipids Steatosis (Fatty Change)
		2. Cholesterol and Cholesterol Esters
		3. Proteins
		4. Hyaline Change
		5. Glycogen
	Pigments	Enlist the types of exogenous pigments and endogenous pigments
		Describe the morphological features of various types of pigments
	Pathologic Calcification	Describe the pathogenesis , and morphology of Dystrophic Calcification
		Describe the pathogenesis , and morphology of Metastatic Calcification

		Describe the etiology of Cellular Aging and cellular senescence
		Demonstrate the working of microscope
Inflammation and Repair	Overview of Inflammation: Definitions	Enlist and briefly describe Causes of Inflammation
	and General Features	Explain and Illustrate the Recognition of Microbes and Damaged Cells
	Acute Inflammation	Describe the reactions of blood vessels in acute inflammation
		Describe the changes in vascular flow and caliber
		Explain mechanism of increased vascular permeability (Vascular Leakage)
		Describe the responses of lymphatic vessels and lymph nodes
	Leukocyte Recruitment to Sites of Inflammation	Describe the mechanism of leukocyte adhesion to endothelium
		Describe the mechanism of leukocyte migration through endothelium
		Describe the mechanism of chemotaxis of leukocytes
	Phagocytosis and Clearance of the Offending Agent	Describe the mechanism of Phagocytosis
		Describe the role of Intracellular destruction of microbes and debris
		Define Neutrophil Extracellular Traps
		Describe the Leukocyte-mediated tissue injury and associated defects
	Termination of the Acute Inflammatory Response	Describe the termination of the response
	Mediators of Inflammation	Describe the role and source of mediators;
		1. Vasoactive Amines: Histamine and Serotonin
		2. Arachidonic Acid Metabolites
		3. Cytokines and Chemokines
		4. Complement System
	Morphologic Patterns of Acute Inflammation	Explain the morphological pattern and example of Serous Inflammation
		Explain the morphological pattern and example of Fibrinous Inflammation
		Explain the morphological pattern and example of Purulent (Suppurative) Inflammation, Abscess
		Explain the morphological pattern and example of Abscess and ulcer
	Outcomes of Acute	Summarize the events of Acute Inflammation

	Inflammation	
	Chronic Inflammation	Enlist the Causes of Chronic Inflammation
		Describe the morphologic features of chronic inflammation
	Cells and Mediators of Chronic Inflammation	Explain the role of macrophages in chronic inflammation
		Explain the role of Role of Lymphocytes
		Enumerate the other cells in chronic inflammation
	Granulomatous Inflammation	Describe the etiology, pathogenesis and morphology of granuloma
	Systemic Effects of Inflammation	Enumerate the systemic effects of inflammation
	Tissue Repair	
	Overview of Tissue Repair	Describe the control mechanisms in cell proliferation
		Describe the Mechanisms of Tissue Regeneration
	Repair by Connective Tissue Deposition	Enumerate the Steps in Scar Formation
		Describe the process of angiogenesis
		Explain the Deposition of Connective Tissue in tissue remodeling
		Explain the mechanism of Remodeling of Connective Tissue
	Factors That Influence Tissue Repair	Enumerate all local and systemic factors for tissue repair
	Selected Clinical Examples of Tissue Repair	Describe Healing of Skin Wounds both primary and secondary
		Explain mechanism of Fibrosis in Parenchymal Organs
	Abnormalities in Tissue Repair	Describe the formation of keloid ad hypertrophic scar
		Describe the formation of exuberant formation and desmoids
Hemodynamic disorders,	Edema and Effusions	Discuss the causes of increased hydrostatic pressures
Thromboembolic Disease and		Discuss the causes of reduced plasma osmotic pressures
shock		Discuss the causes of sodium and water retention
		Discuss the causes of lymphatic obstruction
		Identify pathophysiological categories of Edema
		Explain the morphology and clinical features of Edema
	Hyperemia and Congestion	Explain the differences of the terms hyperemia and congestion morphologically
	Hemostasis, Hemorrhagic disorders and	Define the term Hemostasis and explain the sequence of events leading to hemostasis
		Relate the role of platelets in maintaining hemostasis

	thrombosis	Revise the coagulation cascade
		Discuss in detail the significance of Endothelium in maintaining Hemostasis
		Introduction to the term Hemorrhagic Disorders
		Explain the etiology, pathogenesis and morphology of thrombosis
		Discuss the effects of endothelial injury
		Describe in detail the effects of alternations in normal blood flow
		Associate hypercoagulability with thrombus formation
		Discuss in detail the fate of thrombus
		Explain the process of Disseminated intravascular coagulation
		Discuss the pathophysiology and morphology of DIC
	Embolism	Introduction to the term embolism
		Discuss the etiology, pathogenesis and morphology of pulmonary embolism
		Discuss the etiology, pathogenesis and morphology of systemic thromboembolism
		Discuss the etiology, pathogenesis and morphology of fat and marrow embolism
		Discuss the etiology, pathogenesis and morphology of air embolism
		Discuss the etiology, pathogenesis and morphology of amniotic fluid embolism
	Infarction	Explain the mechanism of infarction
		Discuss the factors that lead to development of infarct and its morphology
	Shock	Discuss the pathogenesis of septic shock
		Describe all stages of shock, morphology and clinical consequences
Genetics	Genes and human diseases	Discuss in detail mutations
		Define Mendelian disorders
	Single gene disorders	Discuss the transmission patterns of autosomal dominant disorders
		Discuss the transmission patterns of autosomal recessive disorders
		Discuss the transmission patterns of X-linked disorders
	Biochemical and molecular	Discuss the enzyme defects and their consequences with example (lysosomal and glycogen storage diseases)
		Discuss the disorders of structural proteins(Marfan Syndrome, EDS)
	basis of single gene disorders	Discuss the defects in receptors and transport system with example (familial hypercholesterolemia)
		Brief review of alteration in structure, function or quantity of nonenzyme proteins

		Brief review of genetically determined adverse reaction to drugs
	Chromosomal Disorders	Discuss cytogenetic disorders involving autosomes(Downs Syndrome, deletion syndrome)
		Discuss cytogenetic disorders involving sex chromosomes(Klinefelter Syndrome, Turner syndrome)
		Define the terms hermaphroditism and pseudo hermaphroditism
	Single gene disorders with noncalssical inheritance	Define the diseases associated with single gene mutations
	Molecular Genetics Diagnosis	Explain the diagnostic methods (PCR,FISH,MLPA)
		Discuss polymorphic markers and molecular diagnosis, RNA Analysis
Neoplasia	Nomenclature	Explain the terms differentiation and anaplasia
		Explain the terms local invasion and metastasis
		Briefly explain pathways of spread of tumors
		Discuss features of benign and malignant neoplasms
		Differences of benign and malignant neoplasms
	Epidemiology of cancer	Discuss the global impact of cancer
		Discuss the role of environmental factors in development of cancer
		Discuss in detail age, acquired predisposing conditions
		Explain the genetic predisposition and interaction between inherited and environmental factors
	Molecular basis of cancer	Discuss role of genetic and epigenetic alterations
		Describe cellular and molecular hallmarks of cancer
		Explain the self-sufficiency in growth signals
		Describe the terms, oncogenes, proto-oncogenes, oncoproteins
		Explain the insensitivity to growth inhibition
		Explain the growth promoting metabolic alterations
		Explain Warburg effect
		Discuss in detail the evasion of programmed cell death(APOPOTOSIS)
		Associate limitless replicative potential with tumor growth
		Explain the role of angiogenesis, invasion and metastasis in development of tumor
		Discuss the evasion of host defense, genomic instability
		Illustrate with examples cancer enabling inflammation
		Discuss dysregulation of cancer associated gene(chromosomal changes, epigenetic changes and non- coding RNA's)
	Carcinogenic	Role of chemical carcinogenesis and steps involved in

	Agents	development of cancer
		Describe direct acting carcinogens
		Describe indirect acting carcinogens
		Explain the role of radiation carcinogenesis(UV rays, ionizing
		Discuss the microbial carcinogenesis
	Clinical Aspects of Neoplasia	Explain the grading and staging of tumors
		Discuss laboratory diagnosis of cancer
		Explain the tumor markers in detail
General Bacteriology		Recall bacteria
		Discuss important features of microbes
	Introduction	Describe characteristics of prokaryotic and eukaryotic cells
		Discuss shape and size of bacteria
		Discuss cell wall and its components
		Compare cell wall of gram positive and gram negative
	Structure of bacteria	Describe bacterial spores and their importance
		Discuss cytoplasmic structure and its components
		Define Binary fission
		Discuss growth cycle and curve and its phases
		Discuss aerobic and anaerobic growth
	Growth	Discuss fermentation and iron metabolism
		Define genetics
		Discuss mutation and its types
		Discuss transfer of DNA within bacterial cell
		Discuss transfer of DNA between bacterial cell
	Genetics	Discuss recombination and its types
	Classification of important bacteria	Discuss principles of classification
		Classify bacteria on different basis
		Define normal flora
		Enlist normal flora with their anatomical sites
		Discuss medical importance of normal flora
	Normal flora	Define commensals, carrier state, colonization and resistance
		Define pathogen, virulence, infectious dose, parasite and types
		Describe types of bacterial infections
		Enlist stages of bacterial infection
		Discuss determinants of bacteria
	Pathogenesis	Enumerate different strains of bacteria causing disease
		Define innate and acquired immunity
		Describe host defenses against bacteria
	Host Defense	Describe components of acquired and innate immunity
	Laboratory diagnosis of	Discuss approach to laboratory work
		Discuss approach to serological testing

	bacteria	Describe specimen taking for different cultures
		Discuss commonly used bacterial agars
		Discuss different methods of diagnosis based on nucleic acid analysis
		Enlist general principles of bacterial vaccines
		Describe active and passive immunity
	Bacterial vaccine	Enlist common bacterial vaccine
	Sterilization and	Define sterilization and disinfection
	Disinfection	Discuss methods of sterilization and disinfection
		Identify instruments/agents/machine used in sterilization
General virology		Recall virus
		Discuss important properties
	Introduction	Enlist comparison of viruses and cell
		Discuss shape and size of virus
	Structure of virus	Discuss different component of virus
	Classification of	Discuss principle of classification
	virus	Enumerate classification of virus
Special virology		Define herpes virus
DNA enveloped virus	Herpesvirus	Demonstrate features, transmission, pathogenesis, diagnosis, prevention
	Herpes simplex virus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Varicella-Zoster virus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Cytomegalovirus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Epstein-barr virus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Human herpesvirus8	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Smallpox	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
DNA NON-enveloped virus	Adenovirus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Papillomavirus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Parvovirus	Recall orthomyxoviruses
RNA enveloped virus	Orthomyxoviruses	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Influenza virus	Define paramyxoviruses
	Paramyxoviruses	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Measles virus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Mumps virus	Demonstrate

		features,transmission,pathogenesis,diagnosis,prevention
	Respiratory syncytial virus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Parainfluenze virus	Define togavirus
	Togavirus	Discuss features,transmission,pathogenesis,diagnosis,prevention
	Rubella virus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Rhabdovirus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Rabies virus	Define retrovirus
	Retrovirus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Human T-cell lymphotrophic virus	Define filoviruses
	Filoviruses	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Ebola virus	Define enterovirus
RNA non-enveloped virus	Enteroviruses	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Poliovirus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Coxsackie viruses	Discuss reovirus
	Reovirus	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Rotavirus	recall hepatitis
Hepatitis virus	Introduction	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Hepatitis A	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Hepatitis B	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Hepatitis C	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Hepatitis C	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Hepatitis D	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Hepatitis E	Demonstrate features,transmission,pathogenesis,diagnosis,prevention
	Hepatitis G	Define abrovirus
Abrovirus	Introduction	Discuss features,transmission,pathogenesis,diagnosis,prevention

	Yellow fever	Discuss features,transmission,pathogenesis,diagnosis,prevention
	Dengue virus	Discuss features,transmission,pathogenesis,diagnosis,prevention
	Chikungunya virus	Discuss features,transmission,pathogenesis,diagnosis,prevention
HIV	Introduction of HIV	Discuss features,transmission,pathogenesis,diagnosis,prevention
Mycology		
Basic mycology	Introduction	Define mycology
		Discuss structure of fungi
		Compare of fungai and bacteria
		Discuss pathogenesis
Cutaneous and subcutaneous mycoses	Introduction	enlist cutaneous and subcutaneous mycoses
	Dermatophytoses ,tinea nigra	Discuss features,transmission,pathogenesis,diagnosis,prevention
	tinea versicolor	Discuss features,transmission,pathogenesis,diagnosis,prevention
	Sporotrichosis, chromomycosis	Discuss features,transmission,pathogenesis,diagnosis,prevention
	mycetoma	Discuss features,transmission,pathogenesis,diagnosis,prevention
Systemic mycoses	Introduction	Enlist systemic mycoses
	coccidioides,Histoplasma	Discuss features,transmission,pathogenesis,diagnosis,prevention
	Blastomyces,Paracoccidioides	Discuss features,transmission,pathogenesis,diagnosis,prevention
Opportunistic mycoses	Introduction	Enlist opportunistic mycoses
	Candida,Cryptococcus,Aspergillus,mucor&rhizopu s	Discuss features,transmission,pathogenesis,diagnosis,prevention
	Pnuemocystis, penicllium marneffei,	Discuss features,transmission,pathogenesis,diagnosis,prevention
	fusarium solani, pseudalles cheria boydii	Discuss features,transmission,pathogenesis,diagnosis,prevention
Parasitology		
Intestinal and urogenital parasite	Intestinal parasite	Enlist intestinal parasite
	Entamoeba, Giardia, cryptosporidiu	Discuss features,transmission,pathogenesis,diagnosis,prevention

	m	
	Urogenital parasite	Enlist urogenital parasite
	Trichomonas	Discuss features,transmission,pathogenesis,diagnosis,prevention
Blood and tissue parasite	Introduction	Enlist blood and tissue parasite
	Plasmodium,toxoplasm	Discuss features,transmission,pathogenesis,diagnosis,prevention
	leishmania	Discuss features,transmission,pathogenesis,diagnosis,prevention
Cestodes	Introduction	Define cestodes
	Taenia,Diphyllobathrium,Echinococcous	Discuss features,transmission,pathogenesis,diagnosis,prevention
trematodes	Introduction	Define trematodes
	Schistosoma,clon orchis,paragonim	Discuss features,transmission,pathogenesis,diagnosis,prevention
	fasciola,Fasciolopsis,Heterophyses	Discuss features,transmission,pathogenesis,diagnosis,prevention
Nematodes	Introduction	Define nematodes
	enterobius,trichuris,ascaris,ancylo stoma&nectar	Discuss features,transmission,pathogenesis,diagnosis,prevention
	strongyloides,trichinella	Discuss features,transmission,pathogenesis,diagnosis,prevention
	wucheria,onchoc erca,loa,dracunc	Discuss features,transmission,pathogenesis,diagnosis,prevention
	toxocara,ancylostoma,angiostrongylus,anisakia	Discuss features,transmission,pathogenesis,diagnosis,prevention
Special bacteriology		
Gram positive cocci	Introduction	Enlist types of gram positive cocci
	Staphylococcus	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Staphylococcus aureus,epidermidis,saprophyticus	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Streptococcus	Discuss streptococcus pathogenesis,diseases,laboratory diagnosis and prevention
	Streptococcus	Discuss pathogenesis,diseases,laboratory diagnosis and

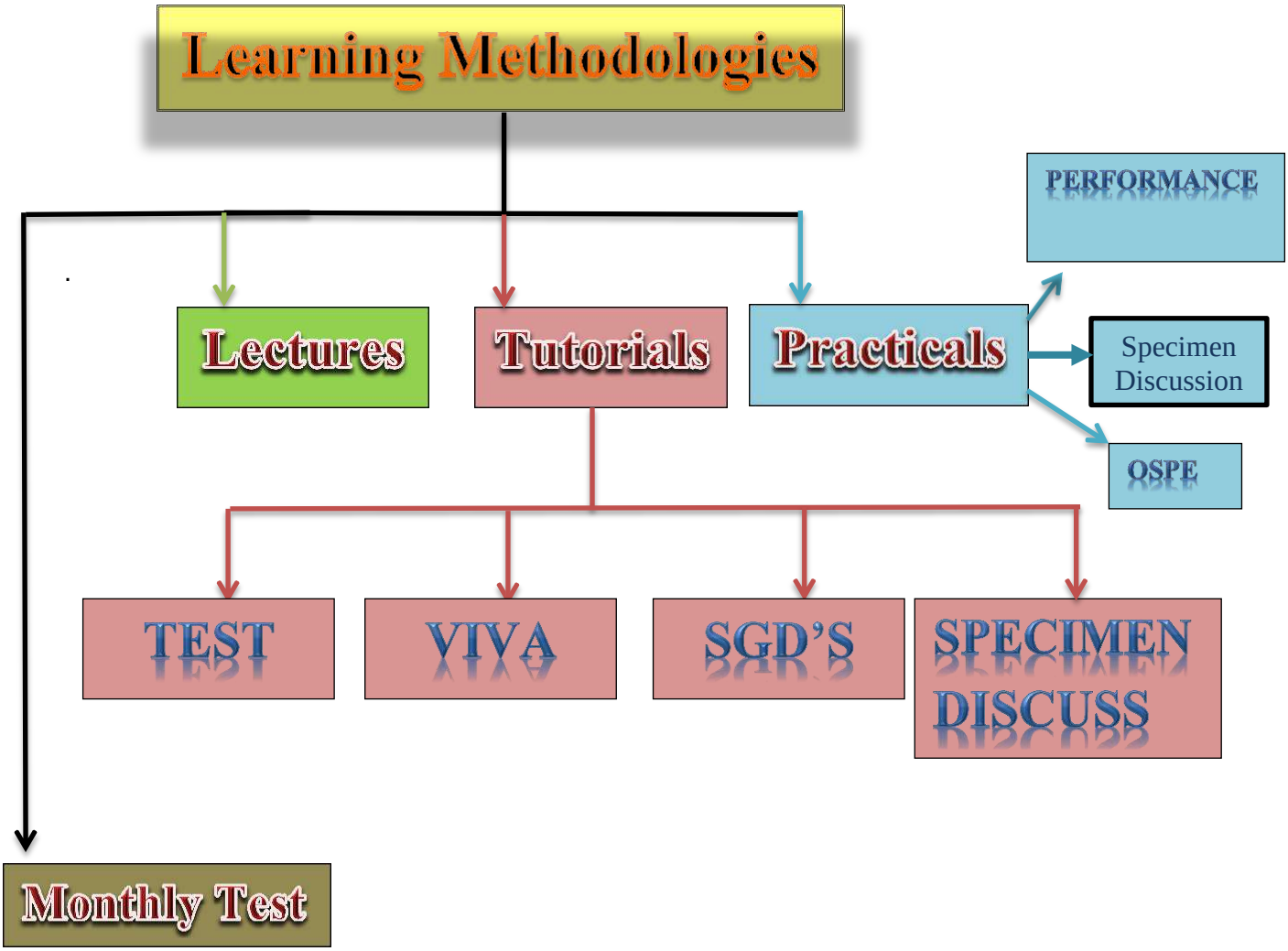
	Pneumoniae	prevention
Gram negative cocci	Introduction	Enlist types of gram negative cocci
	Nesseris Meningitidis,N. gonorrhea	Discuss properties,pathogenessis,transmission,diagnosis,treatment and prevention
Gram positive rods	Introduction	Define gram positive rods
		Classify gram positive rods
	Spore-forming gram positive rods	Discuss types of spore forming gram positive rods
	Bacillus anthracis,cereus	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Clostridium tetani,botulinum, perfringens,difficile	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Non-spore forming gram positive rods	Introduce and classify non-spore forming gram positive rods
	Cornybacterium diphtheriae	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Listeria monocytogenes	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Gardenerella vaginalis	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
Gram negative rods related to enteric tract	Introduction of enterobacteriace	Discuss enetrobacteriace and related organism
	Pathogen both inside and outside enteric tract	Enlist pathogens both inside and outside enteric tract
	E.coli,Salmonella,	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Pathogens within the enteric tract	enlist pathogens within enteric tract
	Shigella,compylo bacter,helicobact	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	vibrio cholera,parahaemolyticus,vulnificus	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Pathogens	Discuss pathogen outside the enteric tract

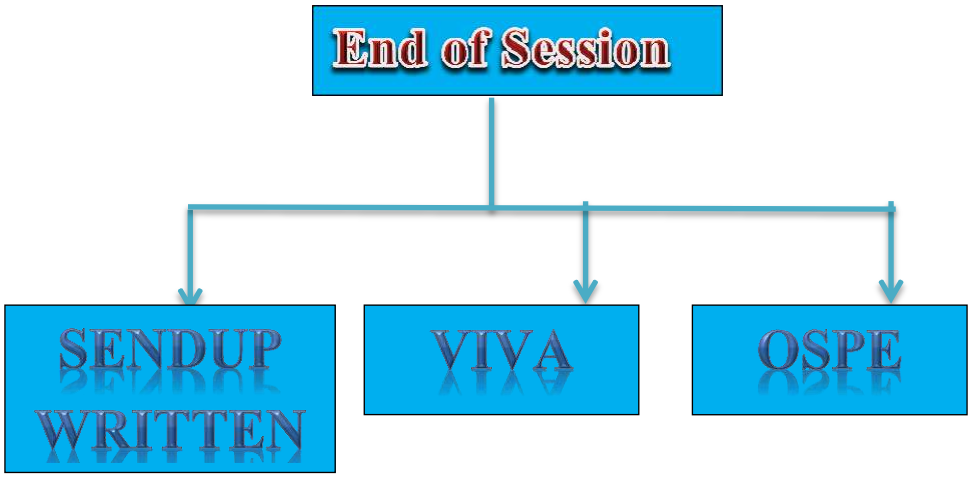
	outside the enteric tract	
	Klebsilla-enterobacter-serratia group	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	proteus-providencia-morganella group	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	pseudomonas,bacteroides&prevotella	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
Gram negative rods related to respiratoy tract	Introduction	Recall and classify gram negative rods related to respiratory tract
	Haemophilus,Boedetella,Legionella,Acinetobacter	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
Gram negative rods related to animal source	Introducion	Discuss gram negative rods related to animal source
	Brucella,Francisella,Pasteurella,Bartonella,	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
Mycobacterium	Introduction	Discuss types of mycobacterium
	Mycobacterium tuberculosis	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Atypical mycobacteria,Mycobacterium leprae	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
Actinomycetes	Introduction	Define actinomycetes
	Actinomyces israelii,Nocardia Asteroides,	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
Mycoplasma	Introduction	Recall Mycoplasma
	Mycoplasma Pneumonia	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
Spirochetes	Introduction	Recall spirochetes
	Treponema,Leptospira	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	Borrelia burgdorferi,recurrentis,hermsii,miyamotoi	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
Chlamydiae	Introduction	Recall chlamydia

	Chlaymydia trachnomatis,pneumoniae,psittaci	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
Rickettsiae	Introduction	Recall rickettsiae
	Rickettsia rickettsii,prowazekii	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention
	coxiella burnetii,anaplasma phagocytophilum	Discuss transmission,pathogenesis,diseases,laboratory diagnosis and prevention

Practical List

	Section-I Microbiology	
Practical #	**Practical Name**	**Dates**
1	Microscope + Introduction to Book	
2	*Inoculation + Smear Preparation*	
3	Gram Staining	
4	Zn Staining	
5	Stool Examination	
6	Urine Examination	
7	Sterilization+ Disinfection	
8	Culture Media	
9	Motility of Bacteria	
10	**Biochemical Test 01** Coagulase+ Citrate Test	
11	**Biochemical Test 02** Catalase+ Indole Test	
12	**Biochemical Test 03** Oxidase+ Urease +VP Test	
	Section-II General Pathology	
13	Acute Inflammation	
14	Chronic Inflammation	
15	Chronic granulomatous inflammation	
16	Necrosis	
17	Pathological calcification	
18	Pigmentation: Melanin pigment in Nevus	
19	Pigmentation: Anthracosis	
20	Fatty Change: Liver steatosis	
21	Hypertrophy and Hyperplasia	
22	Chronic Venous Congestion	
23	Infarctions	
24	Thrombosis	
25	Lipoma	
26	Leiomyoma Uterus (Fibroid)	
27	Hemangioma	
28	Malignant Tumors+ Squamous Cell Carcinoma	
29	Basal Cell Carcinoma	


Learning Methodologies
PERFORMANCE
Lectures
Tutorials
Practicals
Specimen Discussion
OSPE
TEST
VIVA
SGD'S
SPECIMEN DISCUSS
Monthly Test


End of Session
SENDUP WRITTEN
VIVA
OSPE

Assessment Methodologies as per UHS

Oral and practical examination carries 150 marks

EXAMINATION COMPONENT		MARKS
A	**Internal Assessment**	15
B	**Practical notebook manual (Internal Examiner)**	05
C	**Structured viva voce** **a)** External Examiner:30 Marks **b)** Internal Examiner:28 Marks	58
D	**Observed Practical**	6x4= 24
E	**OSPE (Unobserved)** 12 stations 04minute each station	12 x 4= 48 Grand total 48+24= 72

Written examination carries 150 marks

EXAMINATION COMPONENT		MARKS
A	**Internal Assessment**	15
B	**SEQs (14x5)**	70
C	**MCQs (65x1)**	65
	Total Marks (Written)	150

Total Marks= 300

Text Books and References

1. Pathological Basis of Disease by Kumar, Cortan and Robbins, 10th Ed., W.B. Saunders.

2. Medical Microbiology and Immunology by Levinson and Jawetz, 17th Ed., Mc Graw-Hill.

3. Medical Genetics by Jorde, 3rd Ed., Mosby.

4. Clinical Pathology Interpretations by A. H. Nagi

MBBS SECOND PROFESSIONAL EXAMINATION

GENERAL PATHOLOGY AND MICROBIOLOGY

Table of Specifications

(SEQs)

Sr. No.	Topic Specification	SEQ's
1.	Acute and Chronic Inflammation	01
2.	Cellular Adaptations, Cellular Injury and Cell Death	01
3.	Inflammation and Repair	01
4.	Disorders Of Circulation	01
5.	Genetic Disorders	01
6.	Neoplasia	01
7.	Immunology	01
8.	Bacteriology	03
9.	Bacteriology (Mycobacteria)	01
10.	Parasitology	01
11.	Mycology	01
12.	Virology	01
	Total	14

MBBS THIRD PROFESSIONAL EXAMINATION
GENERAL PATHOLOGY AND MICROBIOLOGY

Table of Specification
(MCQs)

Sr No	Topic Specification	MCQs
1	Cell Injury	04
2	Inflammation and Mediators of inflammation	06
3	Healing and Repair	02
4	Disorders of Circulation	04
5	Parasitology	05
6	Virology	06
7	General Bacteriology	04
8	Special Pathology	14
9	Mycology (Fungi)	04
10	Genetics	02
11	Disorders of Growth	09
12	Immunology	05
	TOTAL	65


Thank
You