

PATHOLOGY
GUIDE BOOK

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VISION

To set local and global standards for quality patient outcomes- creating a culture of excellence to promote a transformative experience for the 21st century clinicians, educators and researchers to benefit all humanity.

MISSION

We are committed to develop well rounded academics, thinkers, clinicians and researchers by strengthening a global view, broadening intellectual foundation and teaching effective communication. It is our aspiration to cultivate creative and critical thinking skills for problem solving, sensitive to cultural and ethical values and responsibilities. Our graduates will be role models and leaders for society.

VALUES

- Equity
- Quality
- Compassionate behaviour
- Social accountability
- Social justice
- Humanistic approach
- Leadership
- Innovation
- Integrity
- Collaboration

PROGRAM LEARNING OUTCOMES – 7 STAR DOCTOR - (PMDC)

Our dental graduate shall be able to:

- Develop insight, imagination and curiosity, define one's unique self, one's values and one's place in the world, while incorporating the qualities of a good physician.
- Answer complex questions facing physicians, including the role they should play in society, politics, and promotion of social justice.
- Display enlightenment and moral values to prepare themselves for life and work in a problematic, changing and diverse world.
- Be responsible leaders for their own good of their family, community and country.
- Be humane and socially equipped individuals, in tune with rights of patients and vulnerable groups
- Develop moral reasoning for ethical dilemmas
- Be experts of critical situational analysis
- Believe in diversity in practice
- Display effective communication
- Be able to address population health system issues on the basis of demography, by statistics, epidemiology and cultural nuances.

PATHOLOGY - COURSE CODE - 2.1

INTRODUCTION

The word *pathology* is the study of disease. It is a broad and complex scientific field which seeks to understand the mechanisms of injury to cells and tissues, and diagnose diseases through examination of organs, tissues, body fluids and whole bodies.

Pathology describes the steps in the development of disease and how the different etiological factors trigger cellular and molecular changes giving rise to specific functional and structural abnormalities that characterize the disease. It impacts nearly all aspects of patient care, from diagnosing cancer to managing chronic diseases through accurate laboratory testing. Pathology is actually the basis of all the clinical subjects like medicine, surgery, gynaecology etc.

Pathology is taught under two broad sections, Pathology and Medical Microbiology and these comprise of two components - general or basic which includes general basis of all diseases and systemic or special includes specific diseases of various organs and tissues. General pathology is about the general disease processes occurring in the body during various disorders. It is taught under the following headings: Cellular adaptation & injury, Inflammation & tissue repair, Fluid & hemodynamics, Neoplasia, Genetic disorders, Environmental & Nutritional disorders and Immunology.

Cellular adaptation includes study of cellular adaptation to injury which is a form of reversible change in number, size, shape, & metabolic activity in cells to fit a changed environment. e.g.: Atrophy, Hypertrophy, Hyperplasia. Cell injury describes reversible & irreversible injury, the patterns of cell death, the mechanism underlying them and intracellular accumulations.

Inflammation & tissue repair describes the protective response of the body to cell injury and the process of wound healing and repair.

Fluid & hemodynamic disorders includes conditions in which changes occur in the circulation of blood like thrombosis which means clot formation inside the blood vessels, hemorrhage which means rupture of a blood vessel, embolism, infarction & shock.

Neoplasia which means new growth deals with tumors. Tumors can be simple or benign which if removed do not recur or they can be malignant which if removed can recur and also can cause tumors at far off places (metastasis). These are also called cancers.

General Pathology also includes the various genetic, environmental and nutritional disorders. It also includes immunology which is the study of all aspects of the immune system, including its structure and function, disorders of the immune system, , immunization, & immunological techniques.

Systemic or special pathology includes the important disorders of various systems- cardiovascular, hematopoietic, respiratory, endocrine and gastrointestinal.

Medical Microbiology is the study of various human infectious agents and the disease they cause. It is taught under the sections of Basic & Clinical Bacteriology, Virology, Parasitology, Mycology & Immunology. The Basic part deals with the basic structure, classification, physiology, pathogenesis, antibacterial drugs, drug resistance, sterilization & disinfection and vaccines against these microorganisms. Clinical side deals with important properties, epidemiology, diseases caused, clinical features, lab diagnosis, treatment and prevention of diseases caused by these medically important microorganisms.

Section on immunology describes various components of our immune system- innate immunity, acquired immunity both humoral and cell-mediated and their role in host defense. It also includes immune-pathology which encompasses hypersensitivity reactions, autoimmune & immunodeficiency diseases and various serological techniques for the diagnosis of these disorders.

LEARNING OUTCOMES FOR BDS PATHOLOGY SECOND YEAR

By the end of teaching of Pathology (Second year BDS program), the student should be able to:

1. Describe the basic mechanism and general features of various types of cell injury, acute & chronic inflammation, hemodynamic disorders e.g. thrombosis, embolism & shock.
2. Describe the nomenclature of neoplasia, the characteristics of benign and malignant tumours, molecular basis of cancer, carcinogenic agents and methods of diagnosis.
3. Describe the important specific diseases of various systems in regards to their pathogenesis, epidemiology, risk factors, morphology (both gross and microscopic), clinical features, complications, diagnosis and management.
4. Identify the gross and microscopic changes in different adaptive, inflammatory, preneoplastic and neoplastic lesions.
5. Describe the basic structure, classification, physiology and pathogenesis of various infectious agents.
6. Describe the important properties of various microorganisms, their specific diseases in relation to pathogenesis, epidemiology, clinical features, complications, lab diagnosis and prevention.
7. Describe various steps in lab diagnosis of an infectious disease: Collection of proper specimens, microscopy, culture, biochemical reactions, serological and molecular techniques.
8. Perform various staining techniques to identify the microorganisms on the basis of their morphological features by observing under the microscope.
9. Identify various biochemical tests, culture medias and cultural techniques for specific identification of microorganisms.
10. Describe the various methods, techniques and chemicals used for sterilization and disinfection of various instruments, surfaces & areas, glassware, culture media and vaccines.
11. Interpret lab reports of Complete blood picture (CBC) for various types of anemias, infections and other hematological disorders.
12. Maintain Histopathology and Microbiology practical journals.

TEACHING AND LEARNING STRATEGIES

LECTURES

(large group teaching) Second year BDS students are taught General & Systemic Pathology and Microbiology & Immunology in the lectures and they are complemented with tutorials (small group teaching) and practical in the microbiology & histopathology labs for a better understanding of the theory taught.

It is thrice-a-week lecture of 50 minutes duration, and once a week tutorial and practical both of 1 ½ hours duration.

For student engagement and active participation to its fullest, following are employed:

- a. Quizzes
- b. Active learning strategies.
- c. Mini-student presentations

LEARNING GUIDANCE

To complement the lectures, students are provided with videos, relevant book chapters and materials for better understanding.

Along with these individual and group tasks are assigned.

E-LEARNING

In the challenging times of pandemic COVID-19, distance learning has been incorporated in the strategies of learning and teaching.

An easy access has been provided to the students through the institution's E-portal. Each student has access to the portal through their individual IDs, on which they can go through the recorded lectures and material, whenever they want.

During the pandemic, and now as a routine, students can access their recorded lectures of Pathology on Google classroom as well. The same is used to share videos of practical; and share and receive assignments with students.

Zoom is also utilized to deliver the lectures and conduct tutorials in real time during the lockdown.

ASSESSMENT TOOLS AND STRATEGIES:

In-Class Assessment:

- a. Participation/ interaction
- b. Quizzes.
- c. Presentations.
- d. Assignments

Class tests:

A test is conducted at the end of teaching of each section. This is to ensure that the students have understood the taught material before proceeding to the next topic.

Midterm examinations:

These are conducted in the mid of the academic year. It has the following components:

Component	Marks
BCQs	100
OBSERVED OSCE	50
NON-OBSERVED OSCE	40
INTERNAL EVALUATION/JOURNAL	10
TOTAL	200

Pre-Professional examinations:

These are conducted at the end of the academic year before the final professional examination so that students have a chance to practice for the final exam. The break-up is as follows:

Component	Marks
BCQs	100
OBSERVED OSCE	50
NON-OBSERVED OSCE	40
INTERNAL EVALUATION/JOURNAL	10
TOTAL	200

INTERNAL EVALUATION/CONTINUOUS ASSESSMENT POLICY:

Continuous Assessment

Internal Evaluation Breakup		
1	Assignment/ class test/ ward test etc.	25%
2	Mid-term exam	35%
3	Pre-prof. exam	35%
4	Extra effort	5%

Details of assignments/ Test/Mid-term/ Pre-prof.		
1.	Present and fail	25%
2.	Pass	Actual percentage
3.	ABSENT	ZERO

Professional Annual Examination

Professional annual examinations are conducted by the University (JSMU) and comprise theory examinations and OSPE/OSCE.

Eligibility criteria for sitting in the Professional Annual Examinations is as follows:

1. inimum of **40% aggregate** marks in all internal examinations (Mid-Term, Pre-Prof. , Assignments and Tests)
2. Students less than **75% overall attendance** will not be allowed to sit in the Annual Professional Examinations.
3. Clinical attendance will be maintained separately. Attendance in any clinical rotation which falls below **75%** must be made up by students.
4. Students must obtain **passing marks in the clinical ward tests**. Failing to do so, students will have to sit for re-take ward test (Only one re-take is allowed).

To be considered successful in annual professional examination the students must pass individual components of the professional examination.

This is to say, that the students must pass theory and OSPE/ OSCE examinations independent of each other.

CONTENT OF PATHOLOGY

GENERAL PATHOLOGY & SYSTEMIC/SPECIAL PATHOLOGY

S. No.	Topic
01	Cellular Responses to Stress & Noxious Stimuli: Adaptations of Cellular Growth and Differentiation
02	Sequence and events of cell injury
03	Mechanisms of Cell Injury
04	Overview of cell death: Necrosis
05	Apoptosis
06	Abnormal Intracellular Depositions and Calcifications
07	General Features and Causes of Inflammation
08	Acute inflammation
09	Principal Mediators of acute Inflammation
10	Morphologic Patterns of Acute Inflammation
11	Chronic inflammation
12	Repair by Regeneration-1&2
13	Edema and effusion
14	Hemorrhage, Hyperemia and Congestion
15	Hemostasis, Hemorrhagic Disorders, and Thrombosis
16	Embolism
17	Infarcts
18	Shock
19	Introduction to neoplasia: Nomenclature & Classification
20	Characteristics of Benign and Malignant Neoplasms
21	Molecular Basis of Cancer I & II
22	Carcinogenic Agents and Their Cellular Interactions
23	Clinical aspect of neoplasia
24	Tumor diagnosis
25	Environmental diseases
26	Nutritional Diseases
27	Mutation
28	Mendelian disorders: Enlist and classify inherited and cytogenic disorders
29	Blood disorders
30	Blood vessels disorders
31	CVS disorders
32	Respiratory system disorders

33	GIT disorders
34	Endocrine disorders

MICROBIOLOGY & IMMUNOLOGY

S. No.	Introduction to Microbiology: Eukaryotes & Prokaryotes
01	Morphology of bacteria
02	Anatomy of bacterial cell
03	Physiology of bacteria
04	Genetics of bacteria
05	Classification of medically important bacteria
06	Normal human microbiome
07	Pathogenesis of bacterial infections
08	Lab diagnosis of bacterial infections
09	Sterilization & Disinfection
10	Overview of major pathogens & Anaerobic bacteria
11	Gram positive cocci: Staphylococci
12	Gram positive cocci: Streptococci
13	Gram negative cocci: Neisseria
14	Gram positive rods: Bacillus sp., Anaerobes: Clostridium tetani & C. difficile
15	Gram positive rods: Aerobes: C. diphtheriae
16	Gram negative rods: Enterobacteriaceae: E. coli
17	Gram negative rods: Salmonella
18	Gram negative rods: Pseudomonas, Klebsiella, Vibrio cholerae, Campylobacter Helicobacter
19	Gram negative respiratory rods: H.influenzae & Bordetella, Zoonotic organisms
20	Mycobacteria
21	Introduction to Virology: Basic virology
22	Clinical virology: Herpes viruses
23	Hepatitis viruses
24	HIV
25	Dengue virus, Measles virus, Polio virus
26	Influenza virus, Corona virus & Covid-19, Mumps virus
27	Introduction to Parasitology, Protozoa: <i>Entameba histolytica</i> & <i>Giardia</i>
28	Protozoa: Malaria & <i>Leishmania</i>
29	Nematodes
30	Introduction to Basic mycology, Dermatophytes (Taenias)

31	Opportunistic mycosis: <i>Candida, Aspergillus & Cryptococcus</i>
32	Introduction of immune system & Innate immunity
33	Adaptive immunity: Cell mediated
34	Adaptive immunity: Humoral immunity
35	Complement
36	MHC
37	Immune pathology: Hypersensitivity
38	Autoimmunity
39	Immunodeficiency diseases
40	Immunization
41	Serological techniques

CURRICULUM OF PATHOLOGY

SECOND YEAR BDS

GENERAL PATHOLOGY AND SPECIAL PATHOLOGY**2.1.1 CELLULAR RESPONSES TO STRESS AND NOXIOUS STIMULI**

S. No.	TOPIC	LEARNING OBJECTIVES By the end of lectures, the second year BDS student should be able to:	MODE OF TEACHING	ASSESSMENT TOOLS The students will be assessed during class tests, mid-rotation and end-of rotation tests; mid-term and final examination through:
1	Introduction to Pathology	1. Define Pathology 2. Classify its various types with regards to its application	1. Lectures 2. SGD	1. BCQS 2. OSPE
2	Cellular Responses to Stress and Noxious Stimuli: Adaptations of Cellular Growth and Differentiation	1. List nature of various injurious Stimulus 2. Describe cellular adaptations 1. Define Hyperplasia, Metaplasia, Atrophy and Hypertrophy. 2. Explain with example: Hyperplasia, Metaplasia, Atrophy and Hypertrophy.	1. Lectures 2. SGD 3. Practicals	1. BCQS 2. OSPE
3	Sequence and events of cell injury	1. Describe morphologic alterations and biochemical changes in response to reversible and irreversible cell injury.	1. Lectures 2. SGD	1. BCQS 2. OSPE
4	Mechanisms of Cell Injury	1. Explain mechanism of cell injury in context with effect on various cell organelles Mitochondria, Cell membrane & DNA 2. Discuss role of Ischemia, Free radical and calcium accumulation.	1. Lectures 2. SGD	1. BCQS OSPE
5	Overview of cell death Necrosis	1. Define two principal types of cell death, Necrosis and Apoptosis.	1. Lectures 2. SGD Practicals	1. BCQS 2. OSPE

		<ol style="list-style-type: none"> 2. Classify the various types of necrosis 3. Discuss briefly: <ul style="list-style-type: none"> • Coagulative necrosis • Liquifactive necrosis • Fat necrosis • Caseous necrosis • Fibrinoid necrosis 		
6	Apoptosis	<ol style="list-style-type: none"> 1. Discuss the pathogenesis and its significance in physiology and disease 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
7	Abnormal Intracellular Depositions and Calcifications	<ol style="list-style-type: none"> 1. Enlist the various abnormal intracellular deposit associated with cell damage. 2. Discuss and differentiate b/w dystrophic and metastatic calcification along with clinical significance. 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE

2.1.2 INFLAMMATION AND WOUND HEALING

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	General Features and Causes of Inflammation	<ol style="list-style-type: none"> 1. Define inflammation 2. Discuss causes and features of acute and chronic inflammation 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
2	Acute inflammation	<ol style="list-style-type: none"> 1. Discuss the steps of acute inflammation in response to: <ul style="list-style-type: none"> • Recognition of the injurious agent. • Recruitment of leukocytes. • Removal of the agent. • Regulation (control) of the response • Resolution (Repair) 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practicals 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE

3	Principal Mediators of acute Inflammation	<ol style="list-style-type: none"> List the cell derived and plasma derived chemical mediators of acute inflammation. Discuss the pathway and principal Actions of Arachidonic acid metabolites, complement and coagulation pathways. 	<ol style="list-style-type: none"> Lecture SGD 	<ol style="list-style-type: none"> BCQs OSPE
4	Morphologic Patterns of Acute Inflammation	<ol style="list-style-type: none"> Describe the various morphological features of acute inflammation. Discuss systemic effects and outcome of inflammation. 	<ol style="list-style-type: none"> Lecture SGD Practicals 	<ol style="list-style-type: none"> BCQs OSPE
5	Chronic inflammation	<ol style="list-style-type: none"> Define chronic inflammation. List the causes of nonspecific and specific (granulomatous) inflammation. Define granuloma, its pathogenesis, types and morphology. 	<ol style="list-style-type: none"> Lecture SGD Practicals 	<ol style="list-style-type: none"> BCQs OSPE
6	Repair by Regeneration-1&2	<ol style="list-style-type: none"> Define regeneration and repair Discuss healing by 1st and 2nd intention. List the factors that delay wound healing. Discuss briefly complications of wound healing. 	<ol style="list-style-type: none"> Lecture SGD Practicals 	<ol style="list-style-type: none"> BCQS OSPE

2.1.3. FLUID & HEMODYNAMIC DISORDERS

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Edema and effusion	<ol style="list-style-type: none"> Define edema List the causes of edema. Define various Categories of Edema, ascites, hydrothorax and anasarca. 	<ol style="list-style-type: none"> Lecture Tutorial/ Small Group Discussion 	<ol style="list-style-type: none"> BCQS OSCE

2	Hemorrhage, Hyperemia and Congestion	<ol style="list-style-type: none"> 1. Define various term of hemorrhagic manifestation 2. Differentiate between Hyperemia and Congestion 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSCE
3	Hemostasis, Hemorrhagic Disorders, and Thrombosis	<ol style="list-style-type: none"> 1. Explain primary abnormalities <ul style="list-style-type: none"> • Endothelial injury • Stasis or turbulent blood flow • Hypercoagulability of the blood (the so-called Virchow triad) which lead to thrombosis 2. Describe: Thrombus, its types with examples & DIC 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. Case presentation 2. BCQS
4	Embolism	<ol style="list-style-type: none"> 1. Define embolism formation. 2. Discuss the mechanism of various embolism formation. 3. Discuss: <ul style="list-style-type: none"> • Pulmonary Embolism, e.g. Fat • Marrow Embolism • Air Embolism 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practical s 	<ol style="list-style-type: none"> 1. BCQS 2. OSCE
5	Infarcts	<ol style="list-style-type: none"> 1. Define infarcts 2. Differentiate between red and white infarct. 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practical 	<ol style="list-style-type: none"> 1. BCQS 2. OSCE
6	Shock	<ol style="list-style-type: none"> 1. Define and classify various type of shock 2. Discuss pathogenesis of various type of shock 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSCE

2.1.4 NEOPLASIA

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Introduction to neoplasia	<ol style="list-style-type: none"> 1. Define neoplasia 2. List the Nomenclature of various Tumors with regard to their cell and tissue of origin. 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE

2	Characteristics of Benign and Malignant Neoplasms	<ol style="list-style-type: none"> 1. Discuss Characteristics of Benign and Malignant Neoplasms 2. Discuss differentiation and features of anaplastic changes. 3. Describe route of spread of tumors. 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 3. Practical 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
3	Molecular Basis of Cancer I & II	<ol style="list-style-type: none"> 1. Discuss epidemiology and molecular basis with role of genetics, Oncogenes, Oncoproteins. 2. Discuss role of tumor suppressor gene (p53 & Rb gene) and Unregulated Cell Proliferation 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
4	Carcinogenic Agents and Their Cellular Interactions	<ol style="list-style-type: none"> 1. Classify the carcinogenic agents. 2. Discuss chemical, radiation and microbial carcinogenic agents associated with various tumors. 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
5	Clinical aspect of neoplasia	<ol style="list-style-type: none"> 1. Explain the clinical manifestation Cachexia etc. and paraneoplastic syndrome 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
6	Tumor diagnosis	<ol style="list-style-type: none"> 1. Explain: <ul style="list-style-type: none"> • Staging, • Grading, • Tumor markers • Specific lab tests 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE

2.1.5 ENVIRONMENTAL AND NUTRITIONAL DISEASES

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Environmental diseases	<ol style="list-style-type: none"> 1. Describe: <ul style="list-style-type: none"> • Effects of Tobacco • Burns and Radiation 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	1. BCQS
2	Nutritional Diseases	<ol style="list-style-type: none"> 1. Describe: <ul style="list-style-type: none"> • Nutritional deficiencies • Effects of Alcohol 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	1. BCQS

2.1.6 GENETIC DISORDERS

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Mutation	<ol style="list-style-type: none"> 1. Define mutation. 2. List various types of mutation. 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
2	Enumerate and Discuss the various common genetic disorders	<ol style="list-style-type: none"> 1. Describe: <ul style="list-style-type: none"> • Mendelian Disorders. • Autosomal Dominant Disorders • Autosomal Recessive Disorders • X-Linked Disorders 2. Describe cytogenetic disorders: <ul style="list-style-type: none"> • Down Syndrome • Klinefelter Syndrome • Turner Syndrome 		

2.1.7 SYSTEMIC / SPECIAL PATHOLOGY

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Blood disorders	<ol style="list-style-type: none"> 1. Define anemia. 2. Classify anemia. 3. Describe various types of anaemias: Iron deficiency & sickle cell anemia 4. Interpret lab results of various type of anemia 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 3. Practical interpretation of *CBC* 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
		Disorders of WBCs: Neoplastic and Proliferative Disorders	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	
		Discuss bleeding and clotting disorders <ul style="list-style-type: none"> • Hemophilia • Von Willebrand disease • Thrombocytopenia • Discuss briefly Blood Transfusions 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	

2	Blood vessels disorders	<ol style="list-style-type: none"> 1. Define atherosclerosis 2. Discuss atherosclerosis's: <ul style="list-style-type: none"> • Risk factors • Pathogenesis • Characteristic microscopic features • Complications 3. List the common causes of hypertension. 4. Describe the effects of hypertension on blood vessels and heart. 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
3	CVS disorders	<ol style="list-style-type: none"> 1. Discuss types and features of Ischemic heart disease. 2. Define myocardial infarction 3. Discuss: <ul style="list-style-type: none"> • Clinical feature of MI. • Morphological feature of MI. • Lab diagnosis of MI. 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
		<ol style="list-style-type: none"> 1. Discuss pathogenesis, complication and diagnostic criteria of rheumatic heart disease. 2. Define Endocarditis. 3. Explain causes of acute and Sub-acute infective endocarditis. 4. Discuss differentiating feature of acute and Sub-acute infective endocarditis. 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	
4	Respiratory system disorders	<ol style="list-style-type: none"> 1. Discuss pathogenesis, clinical features of asthma 2. Discuss briefly chronic bronchitis, emphysema & bronchiectasis. 	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
5	GIT disorders	Discuss briefly Peptic ulcer disease and gastritis GERD.	<ol style="list-style-type: none"> 1. Lecture 2. SGD 	<ol style="list-style-type: none"> 1. BCQs 2. OSPE
		IBD (Crohn's disease & Ulcerative colitis)		

6	Endocrine disorders	1. Thyroid disorders (briefly discuss Grave disease its pathogenesis and diagnosis)	1. Lecture 2. SGD 3. Practical *Diabetes screening tests	1. BCQs 2. OSPE
		1. Diabetes mellitus (discuss briefly its types pathogenesis, complications and diagnosis)		

MICROBIOLOGY

2.1.8 GENERAL BACTERIOLOGY

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Introduction to Microbiology: Eukaryotes & Prokaryotes	1. Define microbiology 2. Classify the different groups of microorganisms with examples 3. Differentiate Eukaryotes from prokaryotes and give examples	1. Lectures 2. SGD	1. BCQS 2. OSPE
2	Morphology of bacteria	1. Describe staining procedures for bacteria 2. Identify various shapes of bacteria 3. Report presence or absence of motility & accessory structures	1. Lectures 2. SGD 3. Practicals	1. BCQS 2. OSPE
3	Anatomy of bacterial cell	1. Describe essential & non-essential structures of bacteria with regards to their properties and functions 2. Differentiate between gram positive & negative bacterial cell walls.	1. Lectures 2. SGD 3. Practicals	1. BCQS 2. OSPE
4	Physiology of bacteria	1. Categorize bacteria according to their oxygen requirements 2. List different examples of aerobes, anaerobes, microaerophilic, carboxyphilic organism. 3. Discuss their nutritional requirements 4. Describe their growth curve.	1. Lectures 2. SGD	1. BCQS 2. OSPE

5	Genetics of bacteria	1. Describe different methods of transfer of genetic material between bacterial cells	1. Lecture 2. SGD	1. BCQS 2. OSPE
6	Classification of medically important bacteria	1. Classify medically important bacteria based on their various characteristics	1. Lecture 2. SGD	1. BCQS
7	Normal human microbiome	1. List the microorganisms present as normal flora at various body sites 2. Discuss the significance of normal flora 3. Describe briefly normal flora of oral cavity	1. Lecture 2. SGD	1. BCQS 2. OSPE
8	Pathogenesis of bacterial infections 1&2	1. Define communicable endemic, epidemic and pandemic infections, carriers, pathogens, opportunists, commensals and colonizers 2. Identify the stages of pathogenesis 3. Explain determinants of bacterial pathogenesis in regards to methods of transmission of infections, adherence to cell surface and invasion and intracellular survival	1. Lecture 2. SGD	1. BCQS 2. OSPE
		1. Discuss bacterial virulence factors: <ul style="list-style-type: none"> • Structural • Enzymes • Toxins 2. Differentiate between exotoxins and endotoxins 3. Describe the typical stages of an infectious disease		
9	Lab diagnosis of bacterial infections 1&2	1. Discuss the principles of proper collection, submission and transport of specimens	1. Lectures 2. SGD 3. Practicals	1. BCQS 2. OSPE

		<p>(throat swabs, blood culture etc.) for laboratory investigations with due precautions.</p> <p>2. Describe the principles and steps of the following lab procedures:</p> <ul style="list-style-type: none"> • Preparation of smears of specimens • Use of relevant staining methods • Observation by direct microscopy • Use of unstained preparation in wet mount <p>3. Describe the general principles of Mountox test</p> <hr/> <p>4. Demonstrate and inoculate different culture media and discuss their use:</p> <ul style="list-style-type: none"> • Enriched & selective media • SDA <p>5. Describe different types of hemolysis</p> <p>6. Demonstrate different methods of anaerobic culture:</p> <ul style="list-style-type: none"> • Cooked meat media • Thioglycolate broth • Gas pack jar <p>7. Describe the principles and steps of Culture & Sensitivity testing and media used for it</p> <p>8. Demonstrate sensitivity plates</p> <p>9. Perform biochemical testing:</p> <ul style="list-style-type: none"> • Coagulase • Catalase • Oxidase • TSI & Urease <p>10. Discuss serological tests of bacterial diseases:</p> <ul style="list-style-type: none"> • Widal test demonstration • Typhidot 		
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10	Sterilization & Disinfection	<ol style="list-style-type: none"> 1. Differentiate between sterilization and disinfection. 2. Describe the principles of aseptic techniques. 3. Describe universal precautions for infection control. 4. Describe various physical & chemical methods of sterilization with examples 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practicals 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
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2.1.9 SPECIAL BACTERIOLOGY

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Overview of major pathogens & anaerobic bacteria	<ol style="list-style-type: none"> 1. Summarize major bacterial pathogens 2. Classify medically important anaerobic bacteria 3. Describe briefly important properties, pathogenesis, clinical infections & lab diagnosis of Bacteroides 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practicals 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
2	Gram positive cocci: Staphylococci	<ol style="list-style-type: none"> 1. Classify Staphylococci 2. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of Staphylococci 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practicals 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
3	Gram positive cocci: Streptococci	<ol style="list-style-type: none"> 1. Classify Streptococci 2. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of Streptococcus pyogenes and S. pneumoniae 3. Discuss briefly other Streptococci 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practical 	<ol style="list-style-type: none"> 1. BCQS OSPE
4	Gram negative cocci: Neisseria	<ol style="list-style-type: none"> 1. Describe important properties, diseases, pathogenesis, clinical features & lab diagnosis, of N. meningitis and N.gonorrhoeae 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practical 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE

5	Gram positive rods: Aerobes: <i>C. diphtheriae</i>	<ol style="list-style-type: none"> 1. Classify gram positive rods 2. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of <i>C. diphtheriae</i> 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
6	Gram positive rods: <i>Bacillus</i> sp., Anaerobes: <i>Clostridium tetani</i> & <i>C. difficile</i>	<ol style="list-style-type: none"> 1. Classify <i>Clostridia</i> 2. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of <i>Clostridium tetani</i> & <i>C. difficile</i> 3. Discuss briefly <i>Bacillus</i> species 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
7	Gram negative rods: Enterobacteriaceae : <i>E. coli</i>	<ol style="list-style-type: none"> 1. Classify gram negative rods 2. List organisms in each group 3. Describe the properties of family Enterobacteraceae 4. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of <i>E. coli</i> 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practicals 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
8	Gram negative rods: <i>Salmonella</i>	<ol style="list-style-type: none"> 1. Classify <i>Salmonella</i> 2. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of <i>Salmonella typhi</i> 3. Discuss other groups of <i>Salmonella</i> 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practical 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
9	Gram negative rods: <i>Pseudomonas</i> , <i>Klebsiella</i> , <i>Vibrio cholerae</i> , <i>Campylobacter</i> <i>Helicobacter</i>	<ol style="list-style-type: none"> 1. Discuss briefly important properties, diseases, clinical features & lab diagnosis of the following enteric rods: <ul style="list-style-type: none"> • <i>Pseudomonas aeruginosa</i> • <i>Klebsiella</i> • <i>Vibrio cholerae</i> • <i>Campylobacter enterocolitis</i> • <i>Helicobacter gastritis</i>, peptic ulcer 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practical 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE

10	Gram negative respiratory rods: H.influenzae & Bordetella, Zoonotic organisms	<ol style="list-style-type: none"> 1. Classify respiratory pathogens 2. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of H.influenzae & Bordetella pertussis. 3. List zoonotic organisms and their diseases 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
11	Mycobacteria	<ol style="list-style-type: none"> 1. Classify Mycobacteria 2. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of Mycobacterium tuberculosis 3. Discuss Mycobacterium leprae 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practical 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE

2.1.10 VIROLOGY

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Introduction to Virology: Basic virology1&2	<ol style="list-style-type: none"> 1. Discuss basic concept of viral structure, growth curve, replicative cycle and atypical virus like agents 2. List the major group of DNA and RNA viruses 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
		<ol style="list-style-type: none"> 1. Discuss viral pathogenesis 2. Demonstrate specific lab diagnosis of viral infection. 		
2	Clinical virology	<ol style="list-style-type: none"> 1. Classify Herpes viruses. 2. Discuss important properties, clinical feature and complication of herpes simplex & herpes zoster viruses. 3. Discuss briefly VZV, EBV & CMV 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE

		<ol style="list-style-type: none"> 1. Classify Hepatitis viruses, explain their mode of transmission. 2. Discuss structure, clinical manifestation, complication and serological markers of HBV & HCV 		
		<ol style="list-style-type: none"> 1. Discuss structure function, clinical features, opportunistic infection and lab diagnosis of HIV. 		
		<ol style="list-style-type: none"> 1. Describe important properties, clinical manifestation, lab diagnosis and preventive measure for following viruses: <ul style="list-style-type: none"> • Dengue, • Measles • Polio virus 		
		<ol style="list-style-type: none"> 1. Describe important properties, clinical manifestation, lab diagnosis and preventive measure for following viruses: <ul style="list-style-type: none"> • Influenza virus • Corona virus & Covid-19 • Mumps virus 		

2.1.11 PARASITOLOGY

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Introduction to Parasitology, Protozoa: <i>Entameba histolytica</i> & <i>Giardia</i>	<ol style="list-style-type: none"> 1. Classify parasites 2. Define different types of parasites, hosts, vectors 3. Classify protozoa 4. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practical 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE

		treatment and prevention of <i>E. histolytica</i> & Giardia		
2	Protozoa: Malaria & <i>Leishmania</i>	1. Classify malarial parasites (plasmodia) 2. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of <i>Plasmodium falciparum</i> and <i>P. vivax</i> . 3. Discuss briefly <i>Leishmania</i>	1. Lectures 2. SGD 3. Practical	1. BCQS 2. OSPE
3	Nematodes	1. Classify Helminthes 2. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of <i>Hookworms</i> , <i>Ascaris lumbricoides</i> & <i>Entrobilus vermicularis</i>	1. Lectures 2. SGD 3. Practical	1. BCQS 2. OSPE

2.1.12 MYCOLOGY

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
1	Introduction to Basic mycology, Dermatophytes (Taenias)	1. Classify Fungi 2. Discuss the structure, growth and general features of fungi 3. Describe important properties, diseases, pathogenesis, clinical features, lab diagnosis, treatment and prevention of Dermatophytes (Taenias)	1. Lectures 2. SGD	1. BCQS OSPE
2	Opportunistic mycosis: <i>Candida</i> , <i>Aspergillus</i> & <i>Cryptococcus</i>	1. Define opportunistic mycosis 2. Describe important properties, diseases, clinical features & lab diagnosis of opportunistic mycoses: <i>Candida albicans</i> , <i>Aspergillus</i> & <i>Cryptococcus</i>	1. Lectures 2. SGD 3. Practical	1. BCQS 2. OSPE

2.1.13 IMMUNOLOGY

S. No.	LECTURE TOPIC	LEARNING OBJECTIVES	MODE OF TEACHING	ASSESSMENT TOOLS
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1	Introduction of immune system & Innate immunity	<ol style="list-style-type: none"> 1. Define immunity. 2. Classify immunity 3. Define antigen & antibodies 4. Explain main components of innate immunity and their mode of action. 5. Compare the feature of specific and non-specific immunity. 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
2	Cell mediated immunity	<ol style="list-style-type: none"> 1. Discuss the role and function of cell mediated immunity 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
3	Humoral immunity	<ol style="list-style-type: none"> 1. Classify antibodies 2. Discuss their structure and function. 		
4	Complement	<ol style="list-style-type: none"> 1. Define and discuss pathway, function and clinical aspect of complement system. 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
5	MHC	<ol style="list-style-type: none"> 1. Discuss MHC and its significance in immune regulation and autoimmune diseases. 		
6	Immune pathology: Hypersensitivity	<ol style="list-style-type: none"> 1. Define hypersensitivity 2. Discuss mechanism of action of type I, 2, 3 and 4 hypersensitivity with examples. 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 	<ol style="list-style-type: none"> 1. BCQS 2. OSPE
7	Autoimmunity	<ol style="list-style-type: none"> 1. Discuss tolerance induction of tolerance list various single organ and multi organ autoimmune disorder. 		
8	•Immuno deficiency diseases	<ol style="list-style-type: none"> 1. List various B cell, T cell, complement and phagocyte cell deficiency diseases. 		
9	Immunization	<ol style="list-style-type: none"> 1. Define various vaccines. 2. Classify various vaccines. 3. Discuss EPI schedule. 	<ol style="list-style-type: none"> 1. Lectures 2. SGD 3. Practicals 	<ol style="list-style-type: none"> 3. BCQS 4. OSPE

10	Serological testing	1. Discuss the concept of agglutination/ Precipitation test along with commonly used serological techniques: <ul style="list-style-type: none">• ELISA• ICT e.g. Malaria• Typhidot• PCR basic concept		
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HISTOPATHOLOGY AND MICROBIOLOGY PRACTICALS:

Second Year Practicals

Thirty-One Weeks

Orientation Session:

- Introduction to the department
- Introduction to demonstrators/lecturers
- Effective communication
- Code of conduct
 - Lab timings (Punctuality)
 - Lab coat
- Briefing about:
 - Microscopes
 - Instruments,
 - Journal maintenance

WEEK No. 1

DAY 1:

2:00 PM to 2:10 PM (Orientation)

2:10 PM to 3:10 PM Demonstration & Practical performance

3:10 PM to 03:30 PM (Illustration in Journals)

SCHEDULE OF PATHOLOGY PRACTICAL

By the end of the second year, the student should be able to demonstrate the following procedural skills:

S. No.	WEEKS	TIME	PRACTICAL DESCRIPTION	TEACHING METHODOLOGY	ASSESSMENT TOOLS
1.	One	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> ● Use of light microscope ● To study tissue processing and preparation of slide ● Discuss various types of biopsies 	Demonstration on microscope & multimedia	<ul style="list-style-type: none"> ● OSCEs ● Direct observation of procedure skills will be

					assessed during:
2.	Two	2pm to 2:30 pm	Practical Microbiology: • Introduction to microbiology	Demonstration on multimedia	• Mid and end of teaching practical test
		2.30pm to 3pm	• Use of oil immersion lens	Practical demonstration	
		3pm to 3:30 pm	• To observe stained bacterial smear	Practical demonstration	
3.	Three	2 pm to 3:30 pm	Practical Histopathology: • To study microscopic slide of lymphoid hyperplasia	Demonstration and observation on glass slide	
4.	Four	2pm to 2:45pm	Practical Microbiology: • To make bacterial smear from given culture	Practical demonstration and performance	
		2:45 to 3:30pm	• Perform Simple staining	Practical demonstration and performance	
5.	Five	2 pm to 3:30 pm (Practical Histology)	Practical Histopathology: • To study the gross specimen of left ventricular hypertrophy & atrophy of brain	Demonstration and observation	
6.	Six	2pm to 2:30 pm	Practical Microbiology: • Demonstration of Gram staining of given bacterial smear	Demonstration	
		2.30pm to 3:30 pm	• To perform Gram staining of given bacterial smear	Performance	

7.	Seven	2 pm to 3:30pm	Practical Histopathology: <ul style="list-style-type: none"> To study metaplasia To study fatty change 	Demonstration and observation on glass slide
8.	Eight	2pm to 3:30 pm	Practical Microbiology: <ul style="list-style-type: none"> To perform Acid fast staining (Ziehl-Neelsen staining) for <i>M. tuberculosis</i> 	Demonstration
9.	Nine	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> To study the gross specimen of Coagulative necrosis To study slide of Caseous necrosis 	Demonstration and observation on glass slide
10.	Ten	2pm to 3:30 pm	Practical Microbiology: <ul style="list-style-type: none"> To study specimen collection for lab diagnosis 	Demonstration
11.	Eleven	2 pm to 3:30pm	Practical Histopathology: <ul style="list-style-type: none"> To study gross specimen of gangrene finger 	Demonstration
12.	Twelve	2pm to 3:30 pm	Practical Microbiology: <ul style="list-style-type: none"> To study different culture media: Un-inoculated and inoculated: Nutrient agar, Blood, Chocolate & MacConkey's agar, α-hemolysis & β-hemolysis, Lactose and non-lactose fermentation, Green growth of pseudomonas, LJ medium, TSI medium, SDA 	Demonstration

			<ul style="list-style-type: none"> To study different methods of anaerobic culture: <ol style="list-style-type: none"> Cooked meat medium Thioglycollate broth Gas pack jar 		
13.	Thirteen	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> To study morphological pattern of acute inflammation 	Demonstration and observation on power point	
14.	Fourteen	2pm to 2:30pm	Practical Microbiology:	Demonstration	
		2:30 to 3:30pm	<ul style="list-style-type: none"> Inoculation of culture media 	Practical performance	
15.	Fifteen	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> To study acute appendicitis gross specimen To study acute appendicitis microscopic slide 	Demonstration and observation on glass slide	
16.	Sixteen	2pm to 3:30 pm	Practical Microbiology: <ul style="list-style-type: none"> Antibiotic sensitivity testing 	Demonstration	
17.	Seventeen	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> To study chronic cholecystitis microscopy & gross 	Demonstration on glass slide & gross specimen	
18.	Eighteen	2pm to 3:30 pm	Practical Microbiology: <ul style="list-style-type: none"> To study various serological tests in lab diagnosis of infectious diseases: <ol style="list-style-type: none"> ELISA–Hepatitis (A,B,C,D,E,G) HIV, Rubella and CMV 	Demonstration on multimedia	

			<ul style="list-style-type: none"> iii. Haemagglutination – TPHA iv. Western blot – HIV v. ICT – Malaria Montoux test		
19.	Nineteen	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> • To study gross specimen of tuberculous lymphadenitis • To study the gross specimen of keloid 	Demonstration	
20.	Twenty	2pm to 3:30pm	Practical Microbiology: <ul style="list-style-type: none"> • To study briefly the basic concept of PCR 	Multimedia demonstration	
21.	Twenty-one	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> • To study pulmonary (saddle) embolism 	Demonstration and observation on power point	
22.	Twenty-two	2pm to 3:30 pm	Practical Microbiology: <ul style="list-style-type: none"> • To study various methods of Sterilization & Disinfection 	Demonstration	
23.	Twenty-three	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> • To study infarct and its types 	Demonstration and observation on power point	
24.	Twenty-four	2pm to 2:30 pm	Practical Microbiology: <ul style="list-style-type: none"> • To observe gram positive cocci: Staphylococci & Streptococci 	Demonstration	
		2.30 pm to 3:30 pm	<ul style="list-style-type: none"> • Gram staining of Staphylococci & Streptococci 	Practical performance and observation of glass slide	

25.	Twenty-five	2 pm to 2:30 pm	Practical Microbiology: <ul style="list-style-type: none"> To observe gram negative bacilli: E. coli To study the commensals of GIT including Klebsiella, and Pseudomonas 	Demonstration	
		2.30 pm to 3:30 pm	<ul style="list-style-type: none"> Gram staining of gram-negative bacilli: E. coli 	Practical performance and observation of glass slide	
26.	Twenty-six	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> To study the microscopic slide of leiomyoma & lipoma To study the gross specimen of leiomyoma & lipoma 	Demonstration & Observation on glass slide	
27.	Twenty-seven	2 pm to 3:30 pm	Practical Microbiology: <ul style="list-style-type: none"> To examine blood slides for malarial parasites 	Demonstration and observation on glass slide	
28.	Twenty-eight	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none"> To study the microscopic slide of adenocarcinoma and squamous cell carcinoma 	Demonstration and observation on glass slide	
29.	Twenty-nine	2pm to 3:30 pm	Practical Microbiology: <ul style="list-style-type: none"> To examine the sample of stool for ova & cysts To study the gross specimens of Helminths: Ascaris lumbricoides 	Practical demonstration	

30.	Thirty	2 pm to 3:30 pm	Practical Histopathology: <ul style="list-style-type: none">• CBC: To study the microscopic slides of leucopenia, neutrophilia, lymphocytosis, eosinophilia.• To study microscopic slides of iron deficiency anaemia	Demonstration and Observation on glass slides	
31.	Thirty-one	2 pm to 3:30 pm	Practical Microbiology: <ul style="list-style-type: none">• Urine analysis	Interpretation of Urine DR report & demonstration on multimedia	

RECOMMENDED BOOKS (Latest editions):**TEXT BOOKS:**

General Pathology: Basic Pathology by Robbins.

Microbiology & Immunology: Review of Medical Microbiology & Immunology- Levinson

REFERENCE BOOKS:

General Pathology: Pathological basis of disease by Robbins & Cotran.

Microbiology: Medical Microbiology- Jawetz