STUDY GUIDE	
PROGRAM	**BDS**
COURSE TITLE	**Pathology**
ACADEMIC YEAR	**2nd year 2023**
INTRODUCTION	• Pathology is the discipline of the medicine that investigates the causes, processes and effects of diseases to aid in the diagnosis. It Impacts nearly all aspects of patient care, from diagnosing to managing diseases through accurate laboratory testing. • Histopathology, Microbiology, hematology and chemical pathology are the important branches of Pathology
RATIONALE	The students of BDS will have basic concepts of pathology (Histopathology and Microbiology. The discipline of Pathology forms a vital bridge between the underlying basis of diseases and the clinical manifestation of diseases. Learners will not be able to understand the rationale for approach to patients till they have clear concepts of the pathology afflicting patients.
OUTCOMES	By the end of this course, 3rd year MBBS students shall be able to discuss general pathological and microbiological processes of common infectious, inflammatory, neoplastic diseases etc.
DEPARTMENTS INVOLVED	Department of Pathology (Histopathology and Microbiology)
COURSE OBJECTIVES	By the end of the course, the students will be able to: **GENERAL PATHOLOGY** CELL INJURY • Define cell injury • Describe causes, mechanism and pathogenesis of cell injury • Describe cellular adaptations, hyperplasia, metaplasia, dysplasia, atrophy and hypertrophy • Describe the sequence of the ultrastructural and biochemical changes that occur in the cell in response to cell injury • Differentiate between irreversible and reversible injuries

	• Define necrosis and apoptosis
	• Differentiate between/among:
	  - various types of necrosis
	  - apoptosis and necrosis
	• Discuss the pathogenesis and significance of apoptosis
	• Describe various types of intracellular accumulations
	• Differentiate between dystrophic and metastatic calcifications
	• Describe the clinical significance of dystrophic and metastatic calcifications
	<u>INFLAMMATION AND WOUND HEALING</u>
	• Describe the role of inflammation in the defense mechanisms of the body
	• Differentiate between acute and chronic inflammation
	• Describe the vascular changes and cellular events of acute inflammation
	• Discuss the vascular changes of acute inflammation considering the morphological and tissue effects
	• List the important chemical mediators of inflammation
	• Describe the complement and coagulation pathways
	• Discuss the Archidonic Acid metabolism and its role in inflammation
	• Describe the mechanism for development of fever
	• Differentiate between exudate and transudate
	• Describe the systemic effects of acute and chronic inflammation and their possible outcomes
	• Describe chronic inflammation
	• Define granuloma
	• Discuss the different types and causes of granuloma
	• Discuss repair and regeneration
	• Describe wound healing by first and second intention
	• Explain the formation of granulation tissue
	• Describe the complications of wound healing

	DISORDERS OF FLUID and HEMODYNAMICS • Define edema, ascites, hydrothorax and anasarca • Discuss the pathophysiological features of edema with special emphasis on congestive heart failure • Discuss hemorrhage, hyperemia and congestion • Discuss the pathogenesis of thromboembolism • Describe the types and outcomes of thromboembolism • Describe Thrombus, its types with examples SHOCK • Describe shock and its types of shock • Discuss disseminated intravascular coagulation • Discuss the pathogenesis and etiology of four major types of shock (Hypovolemic, cardiogenic, vasovagal and septic) • Discuss the compensatory mechanisms involved in shock NEOPLASIA • Define neoplasia • Classify tumors • Discuss the various characteristics of benign and malignant tumors • Discuss the local and systemic effects of tumor • Describe the molecular basis of cancer • List carcinogenic agents including chemical, physical agents and microorganisms related to human cancer • Discuss grading and staging system of tumors • Describe various tumor markers briefly ENVIRONMENTAL PATHOLOGY • Discuss the following: - Nutritional deficiency; - Alcohol abuse; - Burns and Radiation; - Smoking

	GENETICS • Define mutations and various types of mutations, Mendelian disorder, Autosomal dominant, autosomal recessive, heterozygous, homologous transmissions its various types • Enumerate and Discuss the various common genetic disorders **SYSTEMIC PATHOLOGY** • Classify anemia • Discuss briefly various types of anemia (Iron deficiency and Sickle cell anemia) • List investigations required to diagnose anemia • Discuss various bleeding disorders • Discuss Blood transfusions briefly • Discuss the disorders of WBCs: Neoplastic and proliferative disorders • Discuss the causes and clinical features of the following - Atherosclerosis; Hypertension; - Ischemic Heart Diseases (IHD);Rhd; Endocarditis; - COPD definitions asthma definition - Diabetes; Thyroid disorders • Discuss Peptic ulcers, GERD and IBD briefly • Interpret Urine DR, CBC and workup of Diabetes • Discuss tissue processing and biopsies IMMUNOLOGY • Describe specific and nonspecific defense mechanisms of the following: - Innate and acquired immunity; - Active and passive Immunity • Discuss antigen antibodies and complement system with their clinical significance • Differentiate between cell mediated and antibody mediated immunities • Discuss various auto-immunity

	• Discuss the practical applications of immunology • Discuss MHC Class 1 and MHC Class 2 • Discuss transplants • Discuss the various types of hypersensitivity reactions • Discuss the basic concepts underlying serological tests (agglutination, precipitation) • Differentiate among the various serological tests: - Typhi dot; and why its obsolete in high endemic settings - ELISA; - ICT eg Malaria; Dengue, Anti HCV, HbsAg - Covid antibodies • Discuss immunodeficiency disorders and autoimmunity **MICROBIOLOGY** GENERAL BACTERIOLOGY • Classify microorganisms • Differentiate between eukaryotes and prokaryotes • Differentiate bacteria on the basis of staining, shapes, procedure and accessory structures • List essential and non-essential structures of bacterial cell wall with their function • Differentiate between gram positive and negative cell walls • List different aerobic, anaerobic, microaerophilic and carboxyphilic organisms • Discuss oxygen and nutritional requirements of various types of bacteria • Describe the growth curve • Classify medically important bacteria • Discuss different methods of transfer of genetic material between bacterial cells • Discuss the normal flora of oral cavity briefly • Discuss the significance of various normal flora of human body • Classify physical and chemical methods of sterilization

	• Differentiate between disinfection and sterilization • Discuss various methods and sources of transmission • Explain the stages of pathogenesis • Describe the various virulence factors • Discuss endotoxins and exotoxins <u>IMMUNOLOGY</u> • Describe specific and nonspecific defense mechanisms of the following: - Innate and acquired immunity; - Active and passive Immunity <u>SPECIAL BACTERIOLOGY</u> • Discuss the morphology, pathogenesis and diagnosis of following bacteria: - Streptococcus; - Staphylococcus; - C diphtheria; - Bacillus; - Clostridia (C tetani and C difficile); - Neisseria; - Enteric Rods; - E coli and Salmonella; - Vibrio Cholera; - Campylobacter enterocolitis; - Helicobacter Gastritis, peptic ulcer; - Bordetella pertussis; - Mycobacterium tuberculosis; - Mycobacterium leprae • Summarize the characteristics of: - Pseudomonas - Bacteroides

	- Klebsiella • Enumerate protozoal diseases transmitted by feco oral route (Entamoeba histolytica, Giardia) • Explain vector borne protozoal infections (malaria, leishmania) • Discuss the following types of nematodes and Cestodes, Hookworms (Necator, Ankylostoma); - Ascaris lumbricoides; - Enterobius vermicularis (pinworms); - Tenia solium/saginata; • List major groups of DNA and RNA viruses that infect humans • Discuss the structure, pathogenesis and replication of viruses • List the various lab investigations required to diagnose viral diseases • Discuss the following viral infections - Hepatitis; symptoms and transmission by Hep A,B,C,D,E - HIV; - Dengue; - Mumps virus; - Influenza virus; Covid - Herpes family - Polio • Discuss diseases/infections caused by the following yeasts and mold: - Yeasts: Candida; Cryptococcus - Molds: Aspergillus, Dermatophytes; • List common fungal infections (Dermatophytes, Opportunistic infections, cryptococcus) • Explain the morphology of yeasts and molds
TUTORIALS/ PRACTICALS	**HISTOPATHOLOGY** • Cell injury • Inflammation and wound healing • Disorders of fluid and hemodynamics • Shock

	• Neoplasia • Discuss Lab investigation and interpretation of - Anemia (CBC, ESR, C Reactive Protein) - Bleeding Disorders - Infection /neoplastic diseases **MICROBIOLOGY** • Discuss specimen collection and transport for culture (throat swabs, blood cultures) • Discuss various types of staining in direct microscopy o Simple staining, Gram's staining o Ziehl Nelson staining • Discuss culture and sensitivity testing • Explain the various biochemical testing methods (coagulase, catalase, oxidase, TSI and Urease • Discuss sensitivity testing and media use • Discuss the use of sensitivity plates • Explain the use of various unstained preparations in Wet mount • Discuss the different culture media with their use • Describe anaerobic culture and cooked meat media (Thioglycolate broth and gas pack jar) • Discuss the serological tests of bacterial diseases [Mountox test
INTERNAL ASSESSMENT	10% (Pre-professional Examination, Midterm Examination, Assignments and Class Presentations)
ANNUAL EXAMINATION	90% (MCQS, OSPE)
COURSE EVALUATION	This course will be evaluated as per JSMU & HEC policies