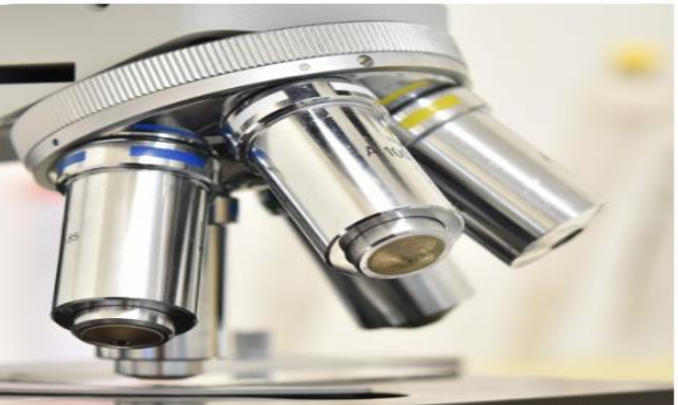
BUCM
Islamabad

CURRICULUM
PRE CLINICALS & PARA CLINICALS
SESSION 2025-2026



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Bahria University College of Medicine Curriculum

Bahria University College of Medicine (BUCM) offers an outcome-based, integrated, and problem/case-based medical curriculum designed to prepare students for the complexities of modern healthcare practice. The curriculum blends various learning styles, including pre-and para-clinical studies and clinical clerkships, while also incorporating humanities, professionalism, and technological advancements like AI. This comprehensive approach aims to cultivate well-rounded physicians who possess both clinical expertise and exemplary qualities in leadership, communication, ethical conduct, and research.

Vision of University

To become a knowledge and creativity-driven international university that contributes towards the development of society

Mission of BUCM

To develop competent medical professionals through the promotion of excellence in medical education and research, nurturing individuals who embody compassion, responsibility, professionalism, ethical conduct, lifelong learning, and leadership qualities with the expectation that our graduates will contribute to the improvement of healthcare in society and drive national development through national and international linkages.

Curriculum Framework and Organization

Pre-Clinical Years

1

BUCM's preclinical curriculum utilizes an Outcome-based, Integrated, Modular, and Problem/Case-based approach. This blended learning style ensures students develop a strong foundation in basic sciences while also making connections between different disciplines and applying their knowledge to real-world scenarios.

Clinical Years

2

During the clinical years, the curriculum transitions to a Clerkship-based, Community-oriented, and Experiential approach. Students gain practical experience in various hospital departments, focus on community health and preventive care, and apply their knowledge in real-world settings to develop essential patient care skills.

PLACE

3

The "PLACE" (Professionalism, Leadership, Applied Research, Communication Skills, and Ethics) component is strategically integrated throughout the five-year MBBS program, ensuring students are equipped with the essential attributes required for their future roles as healthcare professionals.

Competencies and Program Outcomes

PMDC Seven-Star Doctors

The MBBS program curriculum of Bahria College of Medicine serves as a carefully crafted framework designed to attain specific competencies and outcomes outlined as follows:

Knowledgeable

- Develop the ability to distinguish normal from abnormal body structures, describe molecular mechanisms governing health and disease, correlate abnormal behaviors with psychological causes, and assess cost effective treatment options using the latest scientific evidence.

Community Health Promoter

- Enhance community health by addressing diverse factors, collaborate within healthcare teams to analyze global disease trends and implement multidisciplinary interventions, and utilize health system fundamentals to ensure equitable access to quality healthcare.

Critical Thinker

- Analyze complex data, navigate challenging situations, make informed decisions, reflect on evolving practice standards, embrace change, and advocate for patients and the broader community.

Skillful

- Possess exceptional skills in patient clinical assessment and procedures, advocate for healthcare access and inclusivity, and demonstrate time management, prioritization, and resource optimization skills.

Professional

Embody core values like altruism and clear communication, becoming trusted role models who uphold the highest ethical standards and build public trust in the medical profession.

Scholar and Researcher

Represent a research-oriented mindset, embrace constructive criticism, curiosity, and creativity, and conduct high-quality, evidence-based research to guide medical practice

Leader and Role Model

Exemplary Conduct

- Represent exemplary conduct and strong leadership potential, championing progress in healthcare and education by embracing innovative solutions and basing their decisions on scientific evidence.

Ethical Standards

- Demonstrate high ethical standards to inspire public trust and be equipped to step into leadership roles and tackle societal health issues, upholding professionalism in all aspects of their lives.

RATIONALE

Bahria University is a dynamic institution committed to meeting global health standards and continuously evolving to embrace innovative methodologies. The need was for a curriculum that was responsive to societal changes and necessary to cater to emerging needs. The BUCM's curriculum is built upon Outcome-Based Medical Education (OBME) principles. This educational approach focuses on ensuring graduates achieve learning outcomes based on the competencies of a “seven-star doctor” that are essential for successful medical practice. The curriculum aims to align with the latest medical education standards set by the Pakistan Medical and Dental Council (PM&DC) and the World Federation of Medical Education (WFME) Standards for Basic Medical Education.

To equip medical students with the latest technological advances, the curriculum includes AI alongside humanities. This integration ensures that students not only gain cutting-edge technical skills but also develop a deep understanding of ethical, cultural, and social aspects of healthcare. This approach prepares students for the future of healthcare, where technology and humanistic care are intertwined. Thus, the curriculum fosters both technical proficiency and empathetic patient care.

Year I & II

The curriculum for Anatomy, Physiology, and Biochemistry takes an innovative approach by utilizing integrated modules. This format ensures each subject receives balanced attention while fostering a deep understanding of their interconnectedness. These modules not only integrate these foundational sciences horizontally with each other but also vertically with Clinical Sciences, creating a strong foundation for future medical knowledge.

Understanding of Anatomy, Physiology, and Biochemistry is evaluated through integrated assessments. These include "Integrated Theory Papers" and "Practical Examinations" that test how students apply combined knowledge from these disciplines.

Year III

Pharmacology & Pathology: Dive deep into interconnected concepts of pharmacology and pathology through integrated modules. Subject matter receives balanced attention, while modules weave these disciplines together, preparing you for future clinical applications. Assessments mirror this integration with "Integrated Papers" and "Practical Examinations" evaluating your ability to apply combined knowledge. Forensic

Medicine: the fundamentals of forensic medicine and toxicology will be taught in the modules throughout the year. This approach ensures focused learning, with crucial connections to other disciplines incorporated when relevant to provide a holistic understanding.

Years IV & V

The year four delves deeper into pathology with a subject-specific curriculum, ensuring a strong foundation in this crucial field. The program strategically integrates insights from Community Medicine (C. Med) and other clinical sciences whenever relevant, giving a more holistic picture of disease and its impact.

This student-centered program is based on experiential learning and provides exposure to the healthcare system. The students would tackle real-world problems through problem-based learning, participate in community initiatives, and gain invaluable experience during hospital rotations.

Using a theme and system-based, modular approach the curriculum integrates teachings from various disciplines. This approach aligns with Harden's Step 8 (Complementary), meaning students will learn to link different subjects and understand the human body under a theme as a complex, interconnected system.

ASSESSMENTS

Internal Assessment

Formative assessments (low stakes) will be at the faculty's discretion and may include mid-module tests, assignments, quizzes, and presentations.
In the first three years, there will be end-of-block exams while in the last two years, there will be an end-of-rotation exam and one pre-annual examination. These will collectively contribute 20% to the internal assessment for the professional MBBS Examination.

Annual Professional Examination

The University will conduct the professional examination at the end of the academic year.
The examination will consist of block-wise papers with a 70:30 ratio of multiple-choice questions (MCQs) to short answer questions (SAQs).
Practical exams and structured viva examinations will be part of the annual professional exams.
Islamiat and Pakistan Studies will be assessed by the University in the second professional exam.
Expository writing, AI & Medical Anthropology will be assessed by the institute itself. Pass marks will be 50%. The institute will provide the result of the assessment to the Controller of Examination.

Implementation of Curriculum

a. The Medical college will develop and provide the academic calendar, block-wise distribution of modules, learning outcomes, table of specifications, and assessment policy (following the BU policy) to the University for approval before implementation.
b. The implementation of the curriculum, including the timetable, content distribution across the years, and rotation plans, will be at the discretion of the medical college.
c. Early clinical exposure can be achieved by allocating hours to skill labs and Medicine & Surgery ward visits within each module, or by bringing patients before the students, as decided by the institute.

Curriculum, Teaching Learning & Assessment Strategies

1

Integrated Curriculum

The curriculum is organized into Blocks and Modules, with each focusing ona specific theme or body system. This integrated approach highlights the interconnectedness of different disciplines and prepares students for thecomplexities of modern medicine.

2

Teaching Strategies

The curriculum utilizes a variety of teaching and learning strategies, including joint and interactive lectures, problem-based learning, case-based learning, small group discussions, group work, seminars, microlearning (videos), flipped classrooms, clinical-pathological conferences, and hands-on experiences in skills labs, laboratory work, dissections, bedside teaching, roleplays, workshops, hospital wards, and community settings.

3

Assessments

Assessments go beyond testing factual recall, focusing on higher-order thinking skills like understanding, application, interpretation, analysis, and decision-making. Formative and summative assessments include MCQs,EMQs, SAQs, OSCEs, OSPEs, Mini-CEX, DOPS, and other tools to evaluate cognitive, psychomotor, and affective domains. Internal evaluation comprises of 20% and external /end of year evaluation comprises of 80% of total weightage of the exams.

Curriculum Evaluation

Formal External Evaluation

Every 2 years, the curriculum shall be evaluated by an external evaluator appointed by Bahria University to provide an objective assessment of its effectiveness and identify areas for improvement.

Formal Internal Evaluation

Every year (or upon the principal's directive), an internal BUCM team assesses the curriculum's alignment, identifies areas for refinement, and ensures adherence to national standards.

Feedback

- Faculty evaluations, module/block/clerkship evaluations, and student feedback are regularly collected to monitor individual components of the curriculum and ensure continuous improvement and alignment with overall learning objectives. Feedback will be taken anonymously through LMS on standard proforma as per HEC regulations.

CURRICULUM MAP

Curriculum Map																	
Professionalism, Leadership, Applied Research, Communication skills, and Ethics will be part of all five years. (PLACE)																	
Year 1	**Block 1**				**Block 2**			**Block 3**				PRE PROFF	PROFF				
	Orient	FDN I	Hematology I	EOB	SMS I	EOB		CVS I	RESPIRATION I	EOB							
	1 week	5 weeks	5 weeks		10 weeks			6 weeks	4 weeks								
Humanities & AI Clinical Rotations in Skills Lab																	
Year 2	**Block 1**				**Block 2**			**Block 3**				PRE PROFF	PROFF				
	GIT I	KUB I		EOB	Neuroscience	EOB		MF & SS	E & R I	EOB							
	6 weeks	4 weeks			10 weeks			4 weeks	6 weeks								
Humanities & AI Clinical Rotations in Skills Lab																	
Year 3	**Block 1**				**Block 2**				**Block 3**				PRE PROFF	PROFF			
	FDN II	Hematology II	CVS II	EOB	KUB II	GIT & Hepat II	Resp II	EOB	E & R II	CNS & SS II	SMS II	EOB					
	4 weeks	3 weeks	3 weeks		3 weeks	4 weeks	4 weeks		3 weeks	3 weeks	4 weeks						
Clinical Rotation in the Hospital (KRL & PNS HAFEEZ) EOR assessment in General Surgery and Allied, General Medicine, and Allied Electives																	
Year 4	**Community Medicine, Pathology Rotations & their EORs will continue throughout the year.**															PRE PROFF	PROFF
	ENT	EOR	EYE	EOR	Pediatrics	EOR	OBS/Gynae	EOR	Medicine	Med Allied	EOR	Surgery	Surgery Allied	EOR			
	4 weeks		4 weeks		4 weeks		4 weeks		4 weeks	4 weeks		4 weeks	4 weeks				
Clinical Rotation in the Hospital (KRL & PNS HAFEEZ) Electives																	
Year 5	Medicine and Allied	EOR	Surgery and Allied	EOR	OBS/Gynae	AI in Healthcare	EOR	Pediatrics	Entrepreneurship	EOR						PRE PROFF	PROFF
	12 weeks		12 weeks		5 weeks	1 week		5 weeks	1 week								

FDN: Foundation Module
SMS: Skin Musculoskeletal
CVS: Cardiovascular System
KUB: Kidney Ureter & Bladder
GIT & HEPAT: Gastrointestinal & Hepatobiliary

TEACHING HOURS

Sr. No	SUBJECT	YEAR I	YEAR II	YEAR III	YEAR IV	YEAR V	Total
1.	Anatomy	250	250	0	0	0	500
2.	Physiology	225	225	0	0	0	450
3.	Medical Biochemistry	125	125	0	0	0	250
4.	Pharmacology and Therapeutics	5	5	290	0	0	300
5.	Pathology	18	9	240	233	0	500
6.	Forensic Medicine and Toxicology	0	0	100	0	0	100
7.	Otorhinolaryngology (ENT)	0	4	6	140	0	150
8.	Ophthalmology (EYE)	0	4	6	140	0	150
9.	Gynaecology & Obstetrics	4	2	2	96	200	304
10.	Community Medicine and Public Health	10	10	15	165	2	202
11.	Research and Evidence-Based Medicine (EBM)	20	20	20	20	20	100
12.	Quran Kareem (Tajweed-Tafseer- Seerat)	8	21	9	8	4	50
	Pakistan Studies	10	15	0	0	0	25
	Islamic Studies/ Ethics	10	15	0	0	0	25
	PLACE (Professionalism, Leadership-25, Applied Research, Communication skills, Ethics)	25	25	15	30	5	100
	Expository Writing	22	0	3	0	0	25
	Introduction to Computer/AI	9	9	5	2	35	60
	Humanities-Medical Anthropology	9	8	8	0	0	25

	Co-curricular activities - 200 hours	40	40	40	40	40	200
	Entrepreneurship	0	0	0	0	35	35
13.	General Surgery	2	4	72	156	366	600
14.	Anaesthesia	1	2	7	20	20	50
15.	Emergency Medicine/Critical Care	0	0	0	0	25	25
16.	Orthopaedics &Trauma	4	0	10	36	50	100
17.	Urology	0	4	10	26	35	75
	Vascular Surgery	2	0	8	25	40	75
	Paediatric Surgery	0	0	10	25	40	75
18.	General Medicine	6	8	88	144	354	600
19.	Neurology	0	5	10	30	30	75
	Endocrinology	0	6	15	20	34	75
	Infectious Diseases	0	0	5	30	40	75
20.	Psychiatry	0	0	0	25	50	75
	Behavioural Sciences	20	17	5	8	25	75
21.	Dermatology	0	0	2	48	0	50
22.	Cardiology	4	0	5	16	25	50
23.	Pulmonology	4	0	0	16	30	50
24.	Nephrology	0	4	10	16	20	50
25.	Gastroenterology	0	4	5	16	25	50
26.	Paediatrics and Neonatology	4	0	0	100	200	304
27.	Family Medicine	0	0	25	25	25	75
28.	Infection Control	0	0	8	8	9	25

29.	Patient Safety	0	0	6	6	13	25
30.	Behavioural Sciences	Refer to Sr. No 20					
31.	Medical Oncology	0	0	5	15	5	25
32.	Basics of Radiology	1	4	2	0	18	25
33.	Self-Directed Learning	100	100	100	100	100	500
	TOTAL	938	945	1140	1688	2023	6755

ANATOMY CURRICULUM

GENERAL ANATOMY					
S. No	**TOPIC**	**LEARNING OUTCOMES**	**LEARNING OBJECTIVES**	**INSTRUCTIONAL STRATEGIES**	**ASSESSMENT TOOLS**
1	**Introduction To General Anatomy**	Learners will demonstrate a comprehensive understanding of anatomical planes and terms of relationship, effectively applying this knowledge to describe spatial orientation and relationships within the human body.	• Provide a concise overview of practical applications of branches of Anatomy. • Demonstrate the "Anatomical position" • Describe the anatomical planes of body. • Describe the terms of relationship commonly used in Anatomy.	LGIS Tutorials SGDs	MCQ SEQ SAQ OSPE
2	**General Anatomy of Bones and Cartilage**	The learners will be able to • Classify the bone, joints, and muscles according to their structure, function, and evolutionary origin. • Describe and demonstrate various bony landmarks.	• Describe, identify, and exemplify the general morphological features of bones. • Describe the developmental classification of bones. • Describe and give examples of Sesamoid, Pneumatic, Wormian and Heterotopic bones. • Explain how the direction of nutrient foramen relates to the growing ends of bones. • Describe the blood supply, innervation, and lymphatic	LGIS Tutorials SGDs	SAQ MCQ OSPE

			drainage of various types of bones. • Describe the utilization of bone tissue in bone biopsies and bone grafting. • Outline the distinctive characteristics of common types of fractures. • Explain the general features of cartilage and its significance in gross anatomy		
3	**Joints**	The learners will be able to • Describe the varieties of joints and correlate them to the mechanisms of movement. • Describe the relationship between joint structure and function, and how variations in joint anatomy contribute to differences in range of motion, strength, and stability.	• Describe and provide examples of structural classification of joints (synovial, cartilaginous & fibrous) as well as their sub-classification. • Outline the components and distinguishing features of a synovial joint. • Enumerate the factors stabilizing a synovial joint. • Describe the mechanism of movements	LGIS Tutorials SGDs	MCQ SAQ Structured Viva OSPE

4	**Integumentary System**	The learners will be able to • Identify and describe the structures of the integumentary system including skin, hair, nails, glands, and associated structures.	• Describe the structure and function of skin based on its two primary layers: epidermis and dermis. • Discuss the surface irregularities of skin, highlighting its variations and texture. • Describe the anatomical structure of sweat and sebaceous glands. • Describe the structure and function of Superficial and Deep Fascia • Explain and categorize burns	LGIS Tutorials SGDs	MCQ SAQ Structured Viva OSPE
5	**Muscle Tissue (Myology)**	The learners will be able to • Describe structures associated with muscles and their significance. • Identify and classify various types of muscles in human body, including skeletal, smooth, and cardiac muscles, and differentiate between voluntary and involuntary muscle tissue.	• Define and classify muscle tissue based on structure, function, and development. • Differentiate somatic and visceral muscles. • Explain and distinguish between the red and white varieties of skeletal muscles. • Classify and describe the skeletal muscles based on architecture. • Classify skeletal muscles based on their action. • Describe approaches used to study skeletal muscle activity. • Define Myasthenia Gravis and Polymyositis	LGIS Tutorials SGDs	MCQ SAQ SEQ Structured Viva OSPE

6	**Vascular System (Angiology)**	The learners will be able to • Classify and describe blood vascular system and correlate it functionally. • Identify and classify different types of blood vessels in the human body, including arteries, veins, and capillaries, and differentiate between their structural and functional characteristics.	• Classify and exemplify various types of blood vessels. • Explain and provide examples of different types of anastomoses. • Elucidate the significance of end arteries. • Describe the general organization of Lymphatic Circulation	LGIS Tutorials SGDs	MCQ SEQ Structured Viva OSPE

7	**Nervous Tissue**	The learners will be able to • Describe the general layout of autonomic nervous system. • Identify and classify various components of nervous system.	• Explain the anatomical structure of neurons. • Categorize neurons according to their structural characteristics. • Explain the elements comprising the central nervous system. • Describe the components of the peripheral nervous system. • Identify the neuroglial cells that provide support in the central nervous system. • Explain the structure and roles of the neuroglial cells within the central nervous system. • Explain the varieties of nerve fibres transported by the cranial nerves and their distribution. • Describe the formation, modalities carried, and distribution of the spinal nerves. • Define and explain Dermatome and Myotome. • Distinguish between the somatic and visceral nervous systems. • Define and • explain the roles of receptors. Categorize sensory receptors by modality (including their locations). • Explain autonomic nervous system (ANS) and distinguish between the sympathetic and parasympathetic divisions.	LGIS Tutorials SGDs	MCQ SAQ Structured Viva OSPE

S. No	TOPIC/ THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLS
1.	**Cell**	The learners will be able to • Correlate various cell organelles with their function. • Correlate microscopic structure of cytoskeleton with variation in cellular modifications. • Describe structure and function of plasma membrane.	• List various cell organelles along with their functions • Describe the electron microscopic structure and fluid mosaic model of plasma membrane. • Draw and label the structure and function of glycocalyx coat and lipid raft. • Explain the structure and functions of various components of cytoskeleton. • List the membranous and non-membranous cellular organelles. • Describe the clinical presentation of lysosomal storage diseases and correlate with their histological basis. • Explain the structure and role of cell cytoskeleton.	LGIS	MCQ SEQ SAQ OSPE STRUCTURED VIVA
2.	**Epithelial Tissue**	The learners will be able to • Correlate the microstructure of various types of epithelia with their functions and dysfunctions.	• Define epithelium. • Classify epithelium with examples of each type. • Classify Glands with examples. • Define polarity. • Differentiate among various epithelial cells. • List the structural modifications of apical, lateral and basal domains of the cell.	LGIS Practical	MCQ SEQ SAQ OSPE STRUCTURED VIVA

			• Classify apical cell modifications. • Identify the cytoskeletal component associated with each apical modification. • Categorize different types of cell junctions based on their functions and give examples of each type. • Define metaplasia and its clinical significance. • Illustrate different types of epithelia and write two points of identification of each. • Define metaplasia and its clinical significance. • Compare the histological features of serous and mucus acini under light microscope.		
3.	**Microscope Handling**	The learners will be able to • Operate a microscope correctly according to standard operating procedures	• Explain how a microscope operates, including the process of focusing slides at various magnifications.	Practical	Structured Viva
4.	**Connective Tissue**	The learners will be able to • Correlate microscopic structure of various types of connective tissue with their function and dysfunction	• List various CT cells and fibres • Classify connective tissue • Describe the characteristic features of each type of connective tissue. • Elaborate on the function of fibroblasts in the process of wound contraction.	LGIS Practical	MCQ SEQ SAQ OSPE Structured Viva

			• Clarify the role of macrophages in the immune defence system. • Identify different types of connective tissue under microscope • Illustrate the types of connective tissue.		
5.	**Muscular Tissue**	The learners will be able to • Establish a relationship between the microstructure of different muscle types and their respective functions.	• Describe the light microscopic characteristics of skeletal, cardiac, and smooth muscles. • Tabulate the microscopic differences between three types of muscles. • Identify the histological structure of three types of muscles under the light microscope. • Provide a description of the light microscopic structure of three muscle types.	LGIS Practical	MCQ SEQ SAQ OSPE STRUCTURED VIVA
6.	**Lymphoid Organs**	The learners will be able to • Differentiate the light microscopic structure of lymph node, thymus, spleen, and palatine tonsils from each other	• Describe the light microscopic features of lymph node, thymus, spleen, palatine tonsil on slides. • Identify and describe the light microscopic features of lymph nodes, thymus, spleen and palatine tonsils on slides.	LGIS Practical	MCQ SEQ SAQ STRUCTURED VIVA OSPE

7.	**Histology of Circulatory System**	The learners will be able to • Establish a correlation between the light microscopic structure of various components of the cardiovascular system (elastic and muscular arteries, small and large veins, capillaries, and heart) and their respective functions and dysfunctions	• Define capillaries and categorize them according to their structure. • Classify arteries and veins. • Explain the histological alterations occurring in the intima during atherosclerosis or arteriosclerosis. • Recognize different types of vessels under a light microscope. Illustrate elastic and muscular arteries, small and large veins and capillaries.	LGIS Practical	MCQ SEQs SAQ STRUCTURED VIVA

8.	**Bone**	The learners will be able to • Establish a relationship between the microscopic structure of bone and cartilage and their respective functions, as well as dysfunctions.	• Differentiate between primary and secondary bone. • Utilize histological knowledge to elucidate clinical conditions such as osteocalcin, osteopetrosis, and osteitis fibrosa cystica. • Illustrate the microscopic structure of compact and spongy bone.	LGIS Practical	MCQ SEQ OSPE Structured Viva

1.	**Gametogenesis**	The learners will be able to
		• Describe gametogenesis and numerical and structural chromosomal abnormalities that result from aberrations in this process.
			• Explain the sequence of events of mitosis and meiosis.
			• Define the following terms in relation to spermatogenesis and oogenesis.
			  • Haploid
			  • Diploid
			  • Euploid
			  • Aneuploid
			  • Triploid
			  • Polyploid
			  • Nondisjunction
			  • Monosomy
				LGIS	MCQ SEQ
					SAQ OSPE
					STRUCTURED
					VIVA

			• Trisomy • Mosaicism • Translocation		
2.	**Chromosomal Aberrations**	The learners will be able to • Explain the embryological basis of common numerical and structural chromosomal aberrations	• Explain the embryological basis and clinical presentation of following syndromes: • Down's • Kleinfelder • Turner • Angelman • Prader Willi • Cri du chat	LGIS	MCQ SEQ SAQ OSPE STRUCTURED VIVA
3.	**Ovulation, Fertilization, Development 1st Week**	The learners will be able to • Elucidate the embryological phenomena related to normal and abnormal processes of ovulation, fertilization, and implantation	• Correlate the menstrual and ovarian cycles with each other. • Describe the process of ovulation. • Define corpus luteum and corpus albicans. • Define fertilization. • Describe and illustrate the steps, and outcomes of fertilization. • Describe the basic principles behind various techniques of in vitro fertilization. • Describe the process of implantation. • List the sites of abnormal implantation and describe their clinical significance. • Define cleavage, morula, blastula.	LGIS	MCQ SEQ SAQ OSPE STRUCTURED VIVA

			• Identify the various phases of development on the given model.		
4.	**Second Week of Development**	The learners will be able to • Describe the sequential events of human development during second week	• Explain the events of second week of development in a sequence. • Justify the statement that the second week is known as "Week of two's". • Identify the various phenomenon during third week of development on the given model and diagrams	LGIS	MCQ SEQ OSPE STRUCTURED VIVA
5.	**Third Week of Development**	The learners will be able to • Clarify the embryological phenomenon of gastrulation occurring during third week of development	• List the successive stages of human development occurring in the third week. • Explain the process of notochord formation and the establishment of body axes. • Identify the various phenomenon during third week of development on the given model and diagrams	LGIS	MCQ SEQ SAQ OSPE STRUCTURED VIVA
6.	**The Embryonic Period (Third to Eight Weeks)**	The learners will be able to • Correlate the developmental events during the embryonic period with relevant congenital anomalies	• Define neurulation and describe process of formation of neural plate, neural tube and neural crest cells.	LGIS	MCQ SEQ SAQ

			• Enlist derivatives of Surface ectoderm Neuroectoderm Neural crest cells Intraembryonic mesoderm Endoderm • Explain somitogenesis and differentiation of somite. • Explain the development of Intraembryonic coelom. • Define haemangioma and explain its embryological basis.		OSPE STRUCTURED VIVA
7.	**Foetal Period**	The learners will be able to • Correlate the developmental events of placenta & foetal membranes with relevant congenital anomalies	• Enlist foetal membranes. Describe their important functions & fate in humans Enlist types of chorion and & give fate of each. • Define decidua. Enlist its types and give fate of each. • Differentiate between stem, anchoring and terminal villi. • Describe the structure of placenta and enumerate its functions. • Differentiate between features of maternal and foetal surfaces of placenta. • Enumerate the layers forming placental barrier. • Describe development of umbilical cord • Identify causes, complications and diagnostic features of poly & oligohydramnios.	LGIS	MCQ SEQ SAQ OSPE STRUCTURED VIVA

			• Describe embryological basis of amniotic bands and umbilical cord defects		
8.	**Multiple Pregnancies**	The learners will be able to • Distinguish various types of multiple pregnancies based on fertilization, foetal membranes, and placental circulation	• Elucidate the mechanism behind the occurrence of various types of multiple pregnancies. • Explain the arrangement of foetal membranes in various types of multiple pregnancies. • Explain the embryological basis of foetus papyraceus, twin transfusion syndrome and conjoined twins.	LGIS	MCQ SEQ SAQ STRUCTURED VIVA
9.	**Development Of Body Cavities**	The learners will be able to • Correlate the development of body cavities with their congenital anomalies	• Describe the formation of intraembryonic coelom and its divisions. • Correlate the effects of folding with relocation of different parts of intraembryonic coelom. • Elucidate the processes involved in partitioning of intraembryonic coelom into definitive body cavities.	LGIS	MCQ SAQ SEQ STRUCTURED VIVA OSPE

			• Correlate the anomalies of ventral body wall and diaphragm with normal development		
10.	**Birth Defects**	The learners will be able to • Identify the congenital malformations associated with various common teratogens	• Enlist the congenital malformations associated with the teratogens. •	LGIS	MCQ SEQ OSPE STRUCTURED VIVA
11.	**Bones Of Shoulder Girdle And Upper Limb**	The learners will be able to • Correlate the bony features of long bones of upper limb (clavicle, scapula, humerus, radius and ulna) with their articulations, attachments, and anatomical basis of relevant clinical presentations in case of injury and fractures	• Determine the side of clavicle, scapula, humerus, radius ulna. • Locate attachments of major muscles and ligaments attached on these bones. • Discuss the clinical implications in fractures of these bones.	SGD	MCQ SEQ OSPE STRUCTURED VIVA

12.	**Pectoral Region And Breast**	The learners will be able to • Correlate the knowledge of gross anatomy of pectoral region with relevant clinical presentations.	• Comprehend the structure of breast tissue. • Justify the importance of fibrous septa in breast in relation to its carcinoma. • Describe the blood supply and lymphatic drainage of breast. • Justify the clinical importance of sentinel lymph node. • Trace the possible routes of metastasis of breast cancer. •	LGIS	MCQ SEQ SAQ STRUCTURED VIVA
13.	**Axilla**	The learners will be able to • Correlate the topographic arrangement of axillary walls and its contents with anatomical basis of various relevant clinical presentations	• Appraise the shape and extent of axilla. • Enumerate different structures forming various walls of axilla and identify their inter-relationship. • Illustrate the brachial plexus. • Elucidate the drainage area of each group of axillary lymph nodes	SGD	MCQ SAQ SEQ OSPE STRUCTURED VIVA

14.	**Arm & Forearm**	The learners will be able to • Correlate the knowledge of gross anatomy of arm and forearm with common clinical presentations.	• Tabulate the attachments, nerve supply and actions of muscles of arm and forearm. • Trace the route and relations of the neurovascular structures of arm and forearm. • Analyse the anatomical basis of clinical presentation in case of injury to various nerves of arm and forearm. • Explain the movements of these joints with reference to axis and muscles performing these movements. • Describe the blood supply and nerve supply of elbow joint. • Justify the anatomical basis of carrying angle. • Correlate the anatomy of these joints with clinical presentations of their dislocation. • Outline the boundaries and contents of cubital fossa in a sequential order. • Recognize the boundaries of anatomical snuff box. • Elucidate the anatomical basis of clinical presentation of compartment syndrome of forearm. • Highlight the clinical significance of radial artery.	SGD	MCQ SAQ SEQ STRUCTURED VIVA

15.	**Hand**	The learners will be able to • Correlate the knowledge of gross anatomy of hand with common clinical presentations.	• Identify bones of an articulated hand • Explain the clinical significance of injury to scaphoid and hamate. • Elucidate the salient features of skin of palm and dorsum of hand. • Describe palmar aponeurosis. • Enumerate the small muscles of hand with their actions and nerve supply. • Explain the carpal tunnel with reference to its formation and contents. • Analyse the anatomical basis of Dupuytren's contracture, carpal tunnel syndrome, trigger finger and tenosynovitis. • Analyse the anatomical basis of palmar spaces. • Describe the blood supply of Hand. • Trace the pathway and distribution of radial, median, and ulnar nerves in hand.	SGD	MCQs SAQ SEQ STRUCTURED VIVA

16.	**Wrist Joint**	The learners will be able to • Correlate the knowledge of gross anatomy of wrist joint with common clinical presentations.	• Describe the type, capsule, and ligaments of wrist joint. • Explain the movements, blood supply and nerve supply of wrist joint. • Correlate the anatomical knowledge with clinical presentation of wrist joint dislocation.	SGD	MCQs SAQ SEQ STRUCTURED VIVA
17.	**Cutaneous Innervation of Upper Limb**	The learners will be able to • Predict the area of sensory loss in case of injuries of different nerves of upper limb based on anatomical knowledge of cutaneous innervation.	• Correlate the dermatomes with the cutaneous innervation of specific nerves in Arm & forearm. • Illustrate cutaneous innervation and dermatomes of upper limb.	SGD	MCQs SAQ SEQs STRUCTURED VIVA
18.	**Injuries To Brachial Plexus and Its Branches**	The learners will be able to • Analyse the areas of motor and sensory loss in case of injuries to brachial plexus and its branches at various anatomical sites	• Identify the anatomical sites where different branches of brachial plexus are vulnerable to injury / compression.	SGD	MCQ SAQ SEQ STRUCTURED VIVA

			• Correlate the lesion of nerves of upper limb with respective areas of sensory and motor loss and peculiar positions of different parts of upper limb.		
19.	**Venous And Lymphatic Drainage of Upper Limb**	The learners will be able to • Summarize the lymphatic and venous drainage of upper limb in totality	• Recap the veins in various parts to describe the venous drainage of upper limb. • Identify the veins commonly used for cannulation. • Discuss the lymphatic drainage of upper limb.	SGD	MCQs SAQ SEQ STRUCTURED VIVA
20.	**Surface Marking**	The learners will be able to • Recognize the muscular, tendinous, and bony landmarks of upper limb to Utilize the knowledge of topography of important neurovascular structures of upper limb	• Take consent from the subject. • Expose the relevant part properly • Examine the part • Cover the exposed part and thank the subject		
21.	**Skills**	The learners will be able to • Correlate various parts of upper limb with topographic arrangement	• Identify various muscular and neurovascular, structures of upper limb on models and prosected specimens	SGD	OSPE

22.	**Hip Bone, Femur Tibia, Fibula Patella**	The learners will be able to • Appraise the topographic orientation of major bones of lower limb, their attachments and their articulations.	• Identify important bony landmarks and attachments of hip bone, Femur, tibia and fibula on gross inspection and radiographs. • Appraise the importance of blood supply of head of femur in relation to age related complications of fractures of femoral neck	SGD	MCQ SEQ OSPE STRUCTURED VIVA
23.	**Hip Joint**	The learners will be able to • Apply anatomical knowledge of hip joint in various clinical scenarios.	• Analyse movements of hip joint (muscles responsible for these movements, axis of movements, limiting factors)	SGD	MCQ SEQ OSPE STRUCTURED VIVA

24.	**Fascia Of Lower Limb**	The learners will be able to • Correlate the attachments, and modifications of superficial & deep fascia of lower limb with their clinical significance	• Trace the lining of fascia Lata on the skeleton • Describe the formation, extent & importance of iliotibial tract		MCQ SEQ OSPE STRUCTURED VIVA
25.	**Gluteal Region**	• Correlate the topographic anatomy of muscles and neurovascular structures of gluteal region with their clinical conditions.	• Demonstrate the major functions of muscles of gluteal region. • Describe formation of greater and lesser sciatic foramina and enumerate structures passing through them. • Describe the effects of injury to superior, inferior gluteal and sciatic nerves. • Enumerate structures deep to gluteus Maximus. • Locate appropriate site of intragluteal injection.	SGD	MCQ SEQ OSPE STRUCTURED VIVA

26.	**Thigh**	The learners will be able to • Correlate the muscular and neurovascular contents of all compartments of thigh with relevant clinical scenarios.	• Explain the contents of all fascial compartment of thigh. • Describe the extent, boundaries, & contents of adductor canal. • Appraise the precautionary measures in development of femoral hernia. • Describe the functions of muscles of thigh.	SGD	MCQ SEQ OSPE STRUCTURED VIVA
27.	**Femoral Triangle**	The learners will be able to • Correlate the gross anatomy of femoral triangle and femoral sheath with its clinical significance	• Recognize the topography and contents of femoral triangle. • Relate anatomical knowledge of Femoral canal and femoral ring with femoral hernia. • Justify anatomical basis of presence of femoral nerve outside the femoral sheath.	SGD	MCQ SEQ OSPE STRUCTURED VIVA
28.	**Popliteal Fossa**	The learners will be able to • Explain the location, boundaries & contents of popliteal fossa	• List the structures forming various boundaries of popliteal fossa. • Identify the contents of popliteal fossa in a sequential order • Illustrate the genicular anastomosis	SGD	MCQ SEQ OSPE STRUCTURED VIVA

29.	**Knee Joint**	The learners will be able to • Relate the gross anatomical knowledge of knee joint to relevant injuries	• Describe the type, articular surfaces, capsule, ligaments synovial membrane, nerve supply, blood supply, important relations of knee joint. • Demonstrate various movements of knee joint. • Explain mechanism of locking and unlocking of knee joint.	SGD	MCQ SEQ OSPE STRUCTURED VIVA
			• Correlate various types of bursae to their clinical significance. • Explain various meniscal injuries • Explain the structure and mechanism of knee joint movements	SGD	MCQ SEQ OSPE STRUCTURED VIVA

30.	**Leg**	The learners will be able to • Apply the knowledge of gross anatomy of leg in analysing relevant clinical scenarios	• Describe the contents of three fascial compartments of leg. • Justify the role of soleus as peripheral heart. • Justify various clinical presentations in injury to lateral side of knee joint.	SGD	MCQ SEQ OSPE STRUCTURED VIVA
31.	**Ankle Joint**	The learners will be able to • Correlate the anatomical knowledge of ankle joint with relevant ankle injuries	• Describe the articular surfaces, type, capsule, ligaments, synovial membrane, nerve supply, blood supply of ankle joint • Elucidate the various movements of the joint. • Explain important relations of ankle joint. • Justify the sensory /motor loss associated with tibial nerve entrapment in tarsal tunnel syndrome. • Describe the anatomical basis of ankle sprain. • Identify the arrangement of tendons, arteries, and nerves in the region of ankle joint.	SGD	MCQ SEQ OSPE STRUCTURED VIVA

32.	**Foot**	The learners will be able to • Correlate the anatomical knowledge of foot with its clinical significance	• Explain the topographic anatomy of dorsum of foot. • Explain various layers of sole of foot in a sequence • Describe the arches of foot	SGD	MCQ SEQ OSPE STRUCTURED VIVA
33.	**Nerves & Plexuses of Lower Limb**	The learners will be able to • Correlate the distribution of lower limb nerves with effects of relevant nerve injuries.	• Outline the location and formation of lumbar and sacral plexus. • Illustrate lumbar & sacral plexus. • Interpret the clinical presentation of various nerve injuries. • Correlate the lower limb nerve injuries to common fractures.	SGD	MCQ SEQ OSPE STRUCTURED VIVA
34.	**Arterial Supply of Lower Limb**	The learners will be able to • Correlate the blood supply of lower limb with effects of occlusion or damage.	• Describe the origin, relations, and main branches of arteries. • List the vessels participating in trochanteric and cruciate anastomosis.	SGD	MCQ SEQ OSPE STRUCTURED VIVA

35.	**Venous Drainage of Lower Limb**	The learners will be able to • Correlate the anatomical knowledge of superficial & deep veins of lower limb with their surgical significance.	• Describe the venous drainage of lower limb • Describe the course of great and small saphenous veins. • Explain a case of varicose veins with emphasis on predisposing factors • Describe the importance of great saphenous vein in CABG.	SGD	MCQ SEQ OSPE STRUCTURED VIVA
36.	**Lymphatic Drainage of Lower Limb**	The learners will be able to • Appreciate the clinical importance of lymphatics in lower limb	• Apply the knowledge of lymphatic drainage to locate the site of infection or malignancy	SGD	MCQ SEQ STRUCTURED VIVA
37.	**Prosected Specimens/ Models**	The learners will be able to • Demonstrate gross anatomical features of lower limb on the models & prosected specimens	• Skill: • Identify muscles & neurovascular structures of lower limb on the given models & prosected specimen.	SGD	OSPE
38.	**Surface Marking**	The learners will be able to • Locate the site of deeply placed structures of lower limb on skin	• Attitude: • Mark the nerves and vessels of lower limb on the surface of given subject exhibiting	SGD	OSPE

			effective communication skills, professionalism & ethics		
39.	**Osteology Of Ribs, Sternum and Thoracic Vertebrae**	The learners will be able to • Explain the general concept of anatomical organization of cardiovascular system	• Describe general plan of systemic, pulmonary, and portal circulatory system. • Classify blood vessels on anatomical and functional basis • Differentiate between anatomical end arteries and functional end arteries. • Explain the anatomical basis and clinical significance of collateral/potential circulation	LGIS SGD	MCQs SEQs SAQs
40.	**Thoracic Wall**	The learners will be able to • Explain the features of thoracic inlet and outlet, sternum, sternal angle, thoracic vertebrae, and ribs	• Identify structures forming the thoracic inlet and outlet/costal margin. • Mark sternal angle and discuss its importance in clinical practice. • Identify basic features of thoracic vertebrae, ribs, sternum	LGIS SGD	MCQ SEQs SAQs OSPE STRUCTURED VIVA
41.		The learners will be able to • Correlate the gross Anatomy of thoracic wall, lungs, pleura and diaphragm with relevant clinical conditions	• Revisit basic features of thoracic skeleton • Describe structures forming the thoracic inlet and outlet/costal margin	LGIS SGD	MCQs SAQs OSPE STRUCTURED VIVA

			• Mark sternal angle • Describe the joints of thorax • Describe and differentiate between the pump handle and bucket handle movements • Describe the role of the respiratory muscles during inspiration and expiration • Justify the selection of a site for invasive chest procedures. • Describe the arterial supply, lymphatic and venous drainage of the thoracic wall. • Skill: Identify cardio phrenic angle, cardiothoracic angle, hilar shadow and aortic knuckle on chest x ray PA view. • Identify Lung consolidation on X ray chest PA view		
42.	**Anterior Mediastinum**	The learners will be able to • Recognize the boundaries and contents of anterior mediastinum with special emphasis on thymus	• Outline the boundaries of anterior mediastinum • Describe the shape, relations, and blood supply of thymus	LGIS SGD	MCQs SAQs OSPE STRUCTURED VIVA
43.	**Superior Mediastinum**	The learners will be able to • Correlate the anatomical knowledge of the anterior mediastinum with relevant clinical conditions	• Outline the boundaries of superior mediastinum and describe its general topography • Describe immediate relations, blood, and nerve supply of thoracic part of trachea	LGIS SGD	MCQs SAQ OSPE STRUCTURED VIVA VOCE

			• Justify the right bronchus being the most probable site of foreign body impaction in respiratory tract • Interpret the clinical scenarios related to compression of trachea and damage/irritation to phrenic nerve.		
44.	**Middle Mediastinum and Heart**	The learners will be able to • Correlate the anatomical knowledge of the middle mediastinum with relevant clinical conditions	• Recognize anatomical position, borders, surfaces, apex and base, chambers of heart • Describe internal features of various chambers of heart • Describe the arterial supply, venous drainage and nerve supply of heart • Locate the sites for auscultation of various heart sounds on the chest wall • Describe the anatomical basis of valvular heart diseases • Define angina pectoris and myocardial infarction. and explain their anatomical basis in case of coronary artery disease • Explain the anatomical basis of cardiac referred pain • List various diagnostic procedures for coronary artery disease • Differentiate between coronary angiography and angioplasty	LGIS SGD PBL	MCQs SAQs OSPE STRUCTURED VIVA

45.	**Posterior Mediastinum**	The learners will be able to • Correlate the anatomical knowledge of the posterior mediastinum with relevant clinical conditions • Explain posterior mediastinum in detail	• Outline the boundaries of posterior mediastinum and describe its general topography • Enumerate the contents of posterior mediastinum Describe the relations and branches of descending aorta • Describe the thoracic duct with reference to its formation, course, tributaries, termination, and area of drainage • Interpret the clinical scenarios related to chylothorax with the help of your knowledge of Anatomy • Describe the course, relations, and distribution of both vagii in thorax • Describe the azygos system of veins. • Describe the role of azygos vein in case of caval obstruction	LGIS SGD	MCQ SEQ SAQ OSP/ STRUCTURED VIVA
46.	**Pericardium**	The learners will be able to • Correlate the anatomical features of pericardium with its clinical abnormalities	• Describe the layers, innervation, blood supply and functions of pericardium • Define pericarditis and identify the layers of pericardium involved • Explain the anatomical basis of cardiac tamponade and pericardial rub • Identify the ideal site for pericardiocentesis.	LGIS/SGD	MCQs SEQs SAQ OSPE STRUCTURED VIVA

47.	**Histology Of Cardiovascular System**	The learners will be able to • Correlate the light microscopic structure of different components of cardiovascular System (elastic and muscular arteries, small and large veins, capillaries, heart) with their function and dysfunction.	• Define capillaries & classify them based on their structure. • Classify arteries and veins • Describe histological changes in intima in atherosclerosis or arteriosclerosis	LGIS	MCQs SEQs SAQs STRUCTURED VIVA
			• Identify various vessels under light microscope and enlist at least two identification points for each. • Illustrate elastic and muscular arteries, small and large veins, capillaries, emphasizing the differences amongst them.	Practical	OSPE/ Structured Viva voce

48.	**Development Of Heart**	The learners will be able to • Correlate the development of heart with its congenital anomalies	• Explain the formation, division of heart tube • Elucidate the mechanism of cardiac looping, • Explain methods of septal formation in atria and ventricles • Describe the formation of left atrium and pulmonary veins • Appraise the embryological basis of the heart defects.	LGIS	MCQ SEQ SAQ OSPE STRUCTURED VIVA
49.	**Development Of Vascular System**	The learners will be able to • Correlate the development of vascular system with its congenital anomalies	• Explain the development and fate of aortic arches • Enumerate the developmental sources of aorta	LGIS	MCQs SEQ SAQ OSPE

			• Explain the congenital anomalies of arterial system • Explain the fate of vitelline, umbilical and cardinal veins. • Describe the development of superior & inferior vena cava.		STRUCTURED VIVA
50.	**Foetal Circulation**	The learners will be able to • Use the knowledge of foetal circulation for interpreting cardiovascular congenital anomalies	• Identify the sites of mixing of oxygenated and deoxygenated blood in a foetus • List the changes occurring in human circulation after birth • Explicate the embryological basis of various congenital anomalies of CVS.	LGIS	MCQ SEQ SAQ OSPE STRUCTURED VIVA
51.	**Skills**	The learners will be able to • Recognize the developmental events of foetal period and cardiovascular system on the given models	• Identify the developmental events of embryonic and foetal • Identify the developmental events of cardiovascular system on the given models.	SGD	OSPE Structured Viva

52.	**Lungs**	The learners will be able to • Correlate the development of lungs with its structure and function	• Describe the blood supply, nerve supply, and relations of various surfaces of lungs • Correlate bronchopulmonary segments with their significance. • Describe clinical presentation of bronchogenic carcinoma and lung trauma	LGIS/SGD	MCQ SEQ SAQ OSPE STRUCTURED VIVA
53.	**Pleura**	The learners will be able to • Correlate the development of pleura with its anatomy, functions, and diseases	• Identify various parts of pleura • Relate the innervation of the visceral and parietal layers of the pleura.	LGIS/SGD	MCQs SEQs SAQs OSPE STRUCTURED VIVA

			• Describe the clinical significance of reflections and recesses of pleura and pleural cavity		
54.	**Diaphragm**	The learners will be able to • Correlate the development of diaphragm with its structure and function	• Identify parts of diaphragm and their embryological origin • List the apertures in diaphragm with their levels. • Describe the role of diaphragm and scalene muscles in increasing the vertical diameter of thoracic cavity • Justify anatomical basis of referred shoulder tip pain	LGIS/SGD	MCQs SEQs SAQs OSPE STRUCTURED VIVA
55.	**Thorax**	The learners will be able to • Correlate the gross anatomy of thoracic wall with its movements, relevant clinical conditions, and requisite surgical interventions	• Recognize signs, symptoms and radiological findings of pleural effusion, pneumothorax, empyema and haemothorax. • Justify the selection of a site for invasive chest procedures giving anatomical reasons.	SGD	MCQ SAQ SEQ Structured Viva OSPE

56.	**Surface Marking**	The learners will be able to • Recognize the muscular, tendinous, and bony landmark of thorax to utilize the knowledge of topography of important neurovascular structures of thorax in plotting the same on body surface	• Mark the following structures on surface of a subject or mannequin correctly • Parietal pleura • Lungs • Borders of the heart • Auscultatory areas		
57.	**Histology Of Respiratory System**	The learners will be able to • Recognize the light microscopic features of different parts of respiratory system. • Correlate the microscopic structure of respiratory system with its function and dysfunction.	• Differentiate between the light microscopic structure of conducting and gas exchange portion of respiratory system. • Relate progressive structural modifications of wall of respiratory tract with its function • Describe the components of respiratory membrane • Explain the histological basis of immotile cilia syndrome. • Identify the role of interalveolar septa in preventing alveolar collapse. • Describe histological basis of haemoptysis in cardiac failure. • Skill: Illustrate histological structure of different parts of respiratory system	LGIS, Practical	MCQ SAQ SEQ OSPE Structured Viva

58.	**Development Of Respiratory System**	The learners will be able to • Correlate the development of respiratory system with its congenital anomalies.	• Describe the development of trachea. • Correlate the various types of tracheoesophageal fistulae • Explain different stages of lung maturation. • Enumerate factors important for normal lung development • Explain embryological basis and prevention of respiratory distress syndrome in a premature infant.	LGIS, Practical	MCQ SAQ SEQ OSPE Structured Viva
	Development Of Vertebral Column, Ribs, And Sternum	The learners will be able to • Correlate the development of vertebral column, ribs and sternum with their related congenital anomalies	• Describe the development of vertebral column, ribs, and sternum. • Explain the embryological basis of Vertebral defects.	LGIS	MCQ SAQ SEQ Structured Viva OSPE

SPECIAL HISTOLOGY

Sr No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1	**Introduction To GIT Histology**	The learners will be able to • Relate the normal microscopic structure of digestive tract and associated glands with their functions and common clinical disorders.	• Describe the general structural plan of alimentary canal. • Outline basic histological layers of Gastrointestinal tract	LGIS, Practical	SAQ MCQ OSPE
2	**Histology Of Esophagus**	The learners will be able to • Explain the esophagus based on its histological features. • Corelate the histological structure of esophagus with clinical conditions.	• Describe the histomorphological features of esophagus. • Identify a slide of esophagus under a microscope.	LGIS, Practical	SAQ MCQ OSPE Structured Viva

			• Enlist two points of identification		
3	**Histology Of Stomach**	The learners will be able to • Explain and identify the stomach based on its histological features. • Corelate the histological structure of stomach with common clinical disorders.	• Differentiate between a gastric gland and pit. • Describe the structure and function of cells forming gastric glands. • Correlate a case of gastritis with pernicious anemia on basis of histology. • Identify slides of different regions of stomach under light microscope	LGIS, Practical PBL	SAQ MCQ OSPE Structured Viva
4	**Histology Of Small Intestine**	The learners will be able to • Explain and identify the small intestine based on its histological features. • Corelate the histological structure of small intestine with common clinical conditions.	• Describe the mucosal modifications of small intestine for conducting its functions effectively (adaptive measures) • Describe the light microscopic structure of duodenum, jejunum, and ileum. • Tabulate the histological differences between duodenum, jejunum, and ileum. • Identify the slides of duodenum, jejunum, and ileum under microscope.	LGIS, Practical	SAQ MCQ OSPE Structured Viva
5	**Histology Of Large Intestine**	The learners will be able to • Explain and identify the large intestine based on its histological features. • Corelate the histological structure of large intestine with common clinical conditions.	• Describe the histological structure of large intestine. • Justify the increase in number of goblet cells in comparison with the decrease in the absorptive cells down the tract.	LGIS, practical	SAQ MCQ OSPE Structured Viva

			• Identify the slides of appendix, and colon under microscope.		
6	**Histology Of Liver & Gall Bladder**	The learners will be able to • Explain and identify the liver & gall bladder based on its histological features. • Corelate the histological structure of liver & gall bladder with common clinical conditions	• Describe the histological structure of liver & gall bladder • Correlate the common clinical conditions of liver and gall bladder with their normal histological features. • Identify the slides of liver and gall bladder under microscope.	LGIS, practical	SAQ MCQ OSPE
7	**Histology Of Pancreas**	The learners will be able to • Explain and identify the Pancreas based on its histological features. • Corelate the histological structure of Pancreas.	• Describe the light microscopic structure of pancreas. • Identify the section of pancreas on given slide under microscope.	LGIS, Practical	SAQ MCQ OSPE Structured Viva

Sr No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1	**Histology Of kidney**	The learners will be able to • Corelate the histological structure of Kidney with common clinical conditions	• Locate the various parts of uriniferous tubule in cortex and medulla of kidney topographically. • List the components forming filtration membrane and juxtaglomerular apparatus. • Differentiate between cross section of PCT and DCT	LGIS, practical	SAQ MCQ OSPE Structured Viva

			• Identify the histological features of kidney on a slide under microscope.		
2	**Histology Of Ureter and Urinary Bladder**	The learners will be able to • Corelate the histological structure of ureter and urinary bladder with common clinical conditions	• Describe the light microscopic structure of ureter (upper and lower parts) and urinary bladder. • Identify the histological features of Ureter & Urinary bladder under microscope.	LGIS, practical	SAQ MCQ OSPE Structured Viva

Sr No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1	**Cells Of Nervous System**	The learners will be able to • Describe the structure of various cells of nervous system. • Relate the function of these cells with clinical conditions.	• Differentiate between the varieties of neurons based on morphology and size. • Differentiate between types of chemical synapsis. • Classify the neuroglial cells • Relate the role of axonal transport with viral diseases such as Rabies, Herpes zoster and poliomyelitis.	LGIS	SAQs MCQs
2	**Histology Of Nervous Tissue**	The learners will be able to • Recognize different parts of nervous system based on their histological features.	• Recognize various slides of nervous system by focusing them under the light microscope at various magnifications. • Illustrate histological features of peripheral. nerve, ganglia, spinal cord, cerebrum and	Practical	OSPE

			cerebellum under light microscope.		

Sr No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1	**Histology of Lip &Tongue**	The learners will be able to • Explain and identify the lips and tongue based on their histological features. • Corelate the structure of Lip & Tongue with different clinical conditions.	• Explain the histological features of dorsal and ventral surfaces of tongue, with particular focus on tongue papillae, their shape, location, keratinization, and presence or absence of taste buds. • Identify H&E-stained slides of lip and tongue	LGIS, Practical	SAQ MCQs OSPE
2	**Histology Of Salivary Glands**	The learners will be able to • Explain and identify salivary glands based on their histological features. • Corelate the structure of Salivary glands with different clinical conditions	• Classify salivary glands on basis of morphology and nature of secretion. • Describe the histo morphological features of salivary glands. • Identify H&E-Stained slides of parotid, submandibular and sublingual glands.	LGIS, Practical	SAQ MCQ OSPE
3	**Histology Of Ear**	The learners will be able to	• Identify the histological structure of various parts of ear.	LGIS, Practical	SAQ MCQ

		• Explain and identify various parts of ear based on their histological features.	• Describe the histological structure of sensory receptor areas of internal ear like Organ of Corti, maculae acousticae and crista ampullaris. • Identify H&E-Stained slide of pinna and cochlea.		OSPE
4	**Histology of Eye**	The learners will be able to • Explain and identify various parts of eye based on their histological features.	• Describe the detailed structure and function of sclera and cornea, with special emphasis on corneal transparency and its fusion with sclera at corneoscleral junction. • Describe the light microscopic structure of uveal tract, different layers of retina, correlating the arrangement of neuronal cells.	LGIS, Practical	SAQ MCQ OSPE
5	**Histology of Integumentary system**	The learners will be able to • Explain and identify various parts of integumentary system based on their histological features.	• Explain histological differences between thick and thin skin. • Describe the histological differences of mammary gland between inactive, active, and lactating phase. • Describe the involution of mammary gland in old age. • Describe the histological basis of carcinoma of mammary gland.	LGIS, Practical	SAQs, MCQs, OSPE

			• Identify H & E-stained slides of thick and thin skin and mammary gland		

Sr No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1	**Pituitary gland**	The learners will be able to • Explain and identify the Pituitary gland	• Describe the microscopic features of pituitary gland.	LGIS, Practical	SAQ MCQ OSPE
2	**Thyroid Gland**	The learners will be able to • Corelate the histological structure of Thyroid gland with common clinical conditions	• Describe the microscopic features of thyroid gland. • Identify the slide of thyroid gland under light microscope.	LGIS, Practical	SAQ MCQ OSPE
3	**Parathyroid Gland**	The learners will be able to • Corelate the histological structure of Parathyroid gland with common clinical conditions	• Describe the microscopic features of parathyroid gland. • Identify the slide of parathyroid gland under light microscope.	LGIS, Practical	SAQ MCQ OSPE
4	**Adrenal Gland**	The learners will be able to • Explain and identify the Adrenal gland based on its histological features. • Corelate the histological structure of Adrenal gland with common clinical conditions	• Describe the microscopic features of adrenal gland. • Identify the slide of adrenal gland under light microscope.	LGIS, Practical	SAQ MCQ OSPE
5	**Endocrine Part of Pancreas**	The learners will be able to • Corelate the histological structure of Endocrine part of pancreas with common clinical conditions	• Explain the microscopic features of the endocrine part of pancreas. • Identify the slide of pancreas under light microscope.	LGIS, Practical	SAQ MCQ OSPE Structured Viva

6	**Histology Of Male Reproductive System**	The learners will be able to • Corelate the histological structure of male reproductive system with common clinical conditions	• Describe the histological features of testes. • Correlate the blood-testes barrier with its functions. • Explain the light microscopic features of male genital ducts. • Explain the light microscopic features of accessory glands of the male reproductive system. • Apply the knowledge of histology to explain the clinical scenarios of Immotile cilia syndrome, benign prostatic hypertrophy, and carcinoma of prostate.	LGIS, Practical	SAQ MCQ OSPE Structured Viva
7	**Histology Of Female Reproductive System**	The learners will be able to • Corelate the histological structure of female reproductive system with common clinical conditions	• Describe the light microscopic features of Ovaries, Fallopian tubes, Uterus, Cervix, Vagina, Mammary gland.	LGIS, Practical	SAQ MCQ OSPE Structured Viva

GROSS ANATOMY

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Anterior Abdominal Wall**	The learners will be able to • Correlate the topographic and structural anatomy of anterior abdominal wall with common clinical conditions.	• Explain the clinical importance of membranous layer of superficial fascia with anatomical reasoning. • Describe the formation of rectus sheath at various levels of abdomen and enlist its contents. • Describe several types of abdominal hernias	SGD	SAQ MCQ OSPE Structured Viva
2.	**Inguinal Canal**	The learners will be able to • Explain the structural framework of inguinal canal. • Corelate the structure and function of inguinal canal with inguinal hernias	• Analyze the functions & mechanics of inguinal canal. • List the structures passing through the inguinal canal in males and females. • Differentiate between direct & indirect inguinal hernia. • Describe extent, coverings & contents of spermatic cord	SGDs	SAQ MCQ OSPE Structured Viva
3.	**External Male genitalia**	The learners will be able to • Explain the structure, blood, and nerve supply of male external genitalia. • Corelate the structure and coverings of testis with common clinical conditions.	• Explain the significance of pampiniform plexus. • Describe the blood supply, lymphatic drainage, and innervation of testis. • Trace the route for the involvement of different group of lymph nodes in the carcinoma of testis and scrotum	SGDs	SAQ MCQ OSPE
4.	**Peritoneum**	The learners will be able to	• Describe Peritoneum and its modifications.	LGIS SGDs	SAQ MCQ

		• Outline the peritoneal reflections on various abdominal viscera. • Corelate the modifications of peritoneum with common clinical conditions.	• Demonstrate the vertical and horizontal disposition of peritoneum on the model of abdomen and pelvis. • Explain peritoneal infection, adhesions & anatomical basis of spread of pathological fluid in various peritoneal compartments along with their surgical approach. • Describe the basis of peritoneal pain with reference to its parietal and visceral layers		OSPE
5.	**Abdominal Esophagus**	The learners will be able to • Corelate the gross features of abdominal esophagus with common clinical conditions	• Describe abdominal esophagus regarding its relations, blood supply, nerve supply and lymphatic drainage. • Describe the anatomical basis of bleeding esophageal varices	LGIS SGDs	SAQ MCQ OSPE
6.	**Stomach**	The learners will be able to • Corelate the gross features of stomach with common clinical conditions	• Demonstrate the position & gross features of stomach on he given model and identify the omenta attached. • Enumerate the structures lying in stomach bed. • Explain gastric and peptic ulcers.	LGIS SGDs	SAQ MCQ OSPE
7.	**Small Intestine**	The learners will be able to • Corelate the gross features of small intestine with common clinical conditions	• Describe the gross features, relations, blood supply nerve, supply, and lymphatic drainage of various parts of small intestine. • Differentiate between gross features of jejunum and ileum in tabulated form. • Explain the common sites and the effects of perforation of ulcers	LGIS SGDs	SAQ MCQ OSPE

8.	**Large Intestine**	The learners will be able to • Corelate the gross features of large intestine with common clinical conditions	• Explain the topographic Anatomy of large intestine with the help of a model. • Analyze the clinical presentation of a scenario of appendicitis applying your knowledge of gross anatomy	LGIS SGDs	SAQ MCQ OSPE
9.	**Sigmoid Colon & Rectum**	The learners will be able to • Corelate the gross features of sigmoid colon with common clinical conditions	• Describe relation, blood supply, lymphatic drainage, and nerve supply of sigmoid colon. • List the structures palpated in males and females while performing rectal examination	LGIS SGDs	SAQ MCQ OSPE
10.	**Anal Canal**	The learners will be able to • Corelate the structure of anal canal with common clinical conditions	• Describe the relations, internal features, blood supply, lymphatic drainage, & innervation of anal canal • Differentiate between clinical presentation of internal and external hemorrhoids on anatomical basis. • Justify the anatomical reasoning of anorectal incontinence. • Describe the boundaries, contents & recesses of ischiorectal fossa	LGIS SGDs	SAQ MCQ OSPE
11.	**Blood Supply of Intestinal Tract**	The learners will be able to • Explain blood supply of various parts of GIT, with associated clinical conditions.	• Describe coeliac trunk with reference to its origin, branches, and distribution. • Correlate the clinical problems occurring due to occlusion of GIT blood vessels with anatomical basis	LGIS SGDs	SAQ MCQ OSPE
12.	**Hepatic Portal System**	The learners will be able to • Explain portal circulation. • Outline different sites of portosystemic anastomosis, with its	• Describe the sites of portosystemic shunts mentioning the names of veins involved. • Explain the role of portosystemic anastomosis in portal hypertension	LGIS SGDs CBL	SAQ MCQ OSPE

		importance in portal hypertension			
13.	**Liver**	The learners will be able to • Describe gross structure of liver and relate it with common clinical conditions.	• Describe the dual blood supply lymph drainage and nerve supply of liver. • Correlate the concept of hepatic lobectomies and segmentectomy with anatomical reasons. • Identify the preferred site for liver biopsy	LGIS SGDs	SAQ MCQ OSPE
14.	**Hepatic Biliary Apparatus**	The learners will be able to • Outline the biliary apparatus and associate it with common clinical conditions.	• Enumerate the components of Intra & Extra Hepatic Biliary Systems • Correlate the clinical presentation of gall stones and cholecystitis with anatomical knowledge	LGIS SGDs	SAQ MCQ OSPE
15.	**Pancreas**	The learners will be able to • Relate the gross structure and relations of Pancreas with common clinical conditions.	• Correlate the clinical scenario of obstructive jaundice with pancreatitis, obstruction of hepatopancreatic ampulla, cancer of head of pancreas & bile duct. • Justify the referred pain of acute pancreatitis with anatomical reasoning	LGIS SGDs	SAQ MCQ OSPE
16.	**Spleen**	The learners will be able to • Relate the gross structure and relations of spleen with common clinical conditions.	• Justify the direction of splenomegaly with anatomical knowledge of its ligaments. • Justify the possibility of splenic rupture in case of fracture of lower left ribs	LGIS SGDs	SAQ MCQ OSPE
17.	**Skills**	The learners will be able to • Demonstrate various anatomical landmarks on the models.	• Identify the various organs, impressions, ligaments, nerves, muscles, blood vessels related to digestive system on given models and specimens	SGDs	OSPE

18.	**Surface Anatomy**	The learners will be able to • Demonstrate topographical anatomy of GIT on subject/model	• Mark the following on the surface of given subject: • Stomach • Liver • Pancreas • Duodenum • Spleen • Large intestine • McBurney's point	SGDs	OSPE

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Kidney**	The learners will be able to • Corelate the gross features of kidneys with common clinical conditions	• Draw and label the relations of anterior and posterior surfaces of both kidneys. • Describe the possible routes of spread of perinephric abscess. • Explain the anatomical basis of typical renal colic	LGIS SGDs	SAQ MCQ OSPE
2.	**Ureter**	The learners will be able to • Corelate the gross features and relations of ureters with common clinical conditions	• Describe the blood and nerve supply of ureter. • Explain the anatomical basis of ureteric stone impaction. • Justify referred pain of ureteric colic with anatomical reasoning	SGDs	SAQ MCQ OSPE
3.	**Lumbar Vertebral Column**	The learners will be able to • Demonstrate features of Lumbar vertebrae	• Describe anatomical features of a typical lumbar vertebra. • Corelate the structure of lumbar spine with lordosis, disc prolapse, herniation and ageing.	SGDs	SAQ MCQ OSPE

4.	**Muscles Of Posterior Abdominal Wall**	The learners will be able to • Outline the structural framework of posterior abdominal wall	• Describe the fascia of posterior abdominal wall. • Describe the fascial lining of the abdominal walls. • Analyze the anatomical basis of a case of psoas abscess and its spread	SGDs	SAQ MCQ OSPE
5.	**Major Vessels Of Posterior Abdominal Wall**	The learners will be able to • Discuss blood vessels of posterior abdominal wall with their common clinical conditions	• Describe the obliteration of abdominal aorta & iliac arteries. • Explain formation, & tributaries of inferior vena cava • Explain the collateral routes for abdominopelvic venous blood & compression of inferior vena cava. • Identify the common site of abdominal aortic aneurysm	LGIS SGDs	SAQ MCQ OSPE
6.	**Lymphatic Drainage Of Abdomen**	The learners will be able to • Outline the lymphatic drainage of abdominal and pelvic viscera	• Describe the lymphatic trunks, cisterna chili & commencement of the thoracic duct. • Differentiate between the location and area of drainage of pre- and para-aortic lymph nodes. • Explain the continuity of abdominal lymphatic system with other regions with reference to spread of malignancy and infection of various abdominal organs	LGIS SGDs	SAQ MCQ OSPE
7.	**Urinary Bladder**	The learners will be able to • Corelate the gross structure of urinary bladder with common clinical conditions	• Identify the anatomical routes of spread of bladder cancer. • Enumerate the structures visualized during cystoscopy. • Identify the site commonly selected for suprapubic aspiration of urine	LGIS SGDs CBL	SAQ MCQ OSPE

8.	**Skills**	The learners will be able to • Identify the structure of urinary systems on models.	• Demonstrate the features of kidneys, ureters, and bladder on the given models.	SGDs	OSPE
9.	**Surface Anatomy**	The learners will be able to • Identify the structure of urinary systems on body.	• Mark the following on the surface of given subject: • Kidneys • Suprarenal glands • Ureter • Abdominal aorta • Inferior vena cava	SGDs	OSPE

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Introduction & Organization Of The Nervous System**	The learners will be able to • Interpret the anatomical basis of common neurological clinical presentations by correlating the structures forming the nervous system with their functions	• List the major divisions, components, and functions of the central nervous system. • Explain the process of lumbar puncture. • Enumerate the structures through which a needle will pass while performing spinal tap	LGIS SGDs	SAQ MCQ OSPE
2.	**Gross Anatomy Of Skull**	The learners will be able to • Identify bony features of skull. • Relate the foramina of the skull with the structures passing through it.	• Describe and demonstrate the boundaries and gross. features of cranial fossae. • Identify the bones forming the boundaries of orbit, nasal cavity, oral cavity, temporal, infratemporal fossa & pterygopalatine fossa	LGIS SGDs	SAQ MCQ OSPE
3.	**Gross Anatomy of Spinal Cord**	The learners will be able to	• Explain the gross appearance and the nerve cell groups in the anterior,	LGIS SGDs	SAQ MCQ

		• Explain the gross structure of spinal cord. • Associate the distribution of white and grey matter with lesions of spinal cord	posterior, and lateral gray columns of spinal cord. • Explain the given clinical conditions. ➢ Pyramidal tracts (upper motor neuron) lesions ➢ Extrapyramidal tracts (upper motor neuron) lesions ➢ Lower motor neuron lesions ➢ Acute spinal cord injuries Spinal shock syndrome ➢ Destructive spinal cord syndromes ➢ Complete cord Transection syndrome ➢ Anterior cord syndrome ➢ Central cord syndrome • Trace all ascending and descending pathways of spinal cord.		OSPE
4.	**Gross Anatomy Of The Brainstem**	The learners will be able to • Explain gross features of brainstem. • Relate the distribution of white and grey matter with lesions of brainstem	• Illustrate the cross sections of medulla oblongata at various levels. • Explain the effects of raised pressure in posterior cranial fossa on the structures contained within it. • Illustrate cross section. of pons at different levels showing major. structures at each level. • Analyze the anatomical basis of clinical presentation in case of	LGIS SGDs	SAQ MCQ OSPE

			tumors of pons, Pontine hemorrhage, and Infarction of pons. • Describe vascular. lesions of the midbrain • Illustrate cross. sections at the level of superior colliculus and inferior colliculus		
5.	**Gross Anatomy Of Cerebellum & Its Connections**	The learners will be able to • Explain gross structure of cerebellum. • Relate the pathways of cerebellum with its functions	• Enumerate afferent. and efferent fibers of superior, middle and inferior cerebellar peduncles. • List intracerebellar nuclei and types of fibers constituting white matter of cerebellum and explain. their routes of entry and exit. • Apply the knowledge. of anatomy to explain the cerebellar syndromes • Demonstrate different. parts of cerebellum on given model	LGIS SGDs CBL	SAQ MCQ OSPE
6.	**Gross Anatomy Of Cerebrum**	The learners will be able to • Explain the gross structure of cerebrum. • Associate different areas and pathways of cerebrum with	• Describe the topographic anatomy of diencephalon and demonstrate its gross features on a given model. • List main sulci and gyri of cerebral hemispheres and describe the extent of each of them.	LGIS SGDs	SAQ MCQ OSPE

		common clinical conditions.	• Explain the effects of lesions of various parts of internal capsule. • Explain the signs, symptoms, microscopic changes, diagnosis, and treatment of Alzheimer disease. • Identify commissural, projection and association fibers on brain prosected. specimen • Describe the effects of lesions in the motor cortex on voluntary movements and speech. • Describe the changes in personality due to lesions in the frontal eye field of cerebral hemisphere. • Explain the sign and symptoms due to lesions of sensory cortex, prefrontal cortex and somesthetic association areas. • Explain the effects of lesion in the primary and secondary visual cortex.		
7.	**Gross Anatomy Of Reticular Formation & Limbic System**	The learners will be able to • Discuss the components of reticular formation and limbic system	• Describe the general arrangement and functions of reticular formation. • List afferent and efferent projections of reticular formation. • Enumerate components of limbic system • Explain the effects of destruction of amygdaloid complex on behavior.	LGIS SGDs	SAQ MCQ OSPE
8.	**Gross Anatomy Of Basal Nuclei & Their Connections**	The learners will be able to • Explain the structure of basal nuclei. • Relate their function with common clinical conditions	• Describe connections and functions of different nuclei constituting basal ganglia. • List hyperkinetic disorders related with various basal nuclei.	LGIS SGDs PBL	SAQ MCQ OSPE

			• Identify different components of basal ganglia on given model/specimen		
9.	**Gross Anatomy Of Cranial Nerves**	The learners will be able to • Discuss the pathways of cranial nerves, with their functions and common clinical conditions	• Describe the nuclei and intracranial course of all cranial nerves. • Apply the knowledge of neuroanatomy to explain the following clinical conditions regarding the lesions of various cranial nerves: • Unilateral/bilateral anosmia • Lesions of visual pathway • Circumferential blindness • Total blindness of one eye • Nasal hemianopia • Bitemporal hemianopia • Contralateral homonymous hemianopia • Diplopia • Ptosis	LGIS SGDs CBL	SAQ MCQ OSPE
10.	**Gross Anatomy Of Thalamus, Hypothalamus & Their Connections**	The learners will be able to • Relate the nuclei of thalamus & hypothalamus with their functions and clinical disorders	• Enlist the divisions, nuclei, and connections of thalamus. • List nuclei, functions, and connections of hypothalamus. • Describe the Hypothalamohypophyial portal system and tract. • Describe the clinical presentation of following clinical disorders. ○ Obesity and wasting ○ Sexual disorders ○ Hyper and hypothermia ○ Diabetes insipidus ○ Emotional disorders ○ Thalamic pain ○ Thalamic hand	LGIS SGDs	SAQ MCQ OSPE

11.	**Gross Anatomy Of Meninges And Dural Venous Sinuses Of Brain & Spinal Cord**	The learners will be able to
		• Discuss different meningeal layers and dural venous sinuses.
		• Outline the venous drainage of cerebrum
			• Define meninges of brain and describe the dural reflections in brain.
			• Explain the meninges of spinal cord.
			• Enumerate the nerves and blood vessels supplying the meninges.
			• Define and enumerate paired and unpaired.
			• Dural venous sinuses along with their attachments.
			• Describe the clinical presentation of following clinical disorders associated with meninges.
			  • Dural venous sinuses:
			  • Epidural hemorrhage
			  • Subdural hemorrhage
			  • Subarachnoid hemorrhage
			  • Cerebral hemorrhage
				LGIS
				SGDs
					SAQ
					MCQ
					OSPE

12.	**Ventricular System**	The learners will be able to • Discuss Gross anatomy of ventricular system, the CSF, & the blood-brain & blood-CSF barriers	• Describe the anatomical organization of ventricular system of brain. • Explain formation, circulation, and absorption of CSF. • Define arachnoid villous and explain the role of arachnoid villi in absorption of CSF. • List the structures forming blood brain and blood CSF barriers. • Explain causes & varieties of Hydrocephalus	LGIS SGDs	SAQ MCQ OSPE
13.	**Blood Supply Of The Brain & Spinal Cord**	The learners will be able to • Outline the blood supply of brain & • spinal cord	• Describe the blood supply of various parts of brain and spinal cord. • Enumerate the vessels taking part in the formation of circle of Willis.	LGIS SGDs	SAQ MCQ OSPE

		• Associate the lesions of brain with its blood supply	• Relate the interruption of cerebral circulation to cerebral artery syndromes due to anterior, middle, and posterior cerebral artery occlusion.		

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Skull**	The learners will be able to • Discuss bony structure of the skull	• Identify the bones forming the boundaries of orbit, nasal cavity, oral cavity, temporal, infratemporal fossa &pterygopalatine fossa on the given bone. • Explain the anatomical basis of Clinical presentation of different fractures of mandible	SGDs	MCQ OSPE
2.	**Scalp**	The learners will be able to • Discuss the features of different layers of scalp	• Correlate gross features of each layer with anatomical basis of black eye, profuse bleeding, gaping wound, spread of scalp infection and shape of hematoma.	LGIS SGDs	SAQ MCQ OSPE
3.	**Face**	The learners will be able to • Discuss the muscles of face with their actions, blood, nerve supply and clinical conditions	• Elucidate the cutaneous innervation of face. • Group facial muscles according to the orifices they are guarding.	LGIS SGDs	SAQ MCQ OSPE

			• Describe the nerve supply of muscles of facial expressions. • Describe the course of arteries, veins, lymphatics, and nerves of the face with the help of model. • Explain the anatomical basis of following clinical conditions relevant to face. • Facial lacerations and incisions • Compression of facial artery		
4.	**Parotid Region**	The learners will be able to • Relate the structure of parotid gland with its function and common clinical conditions	• List contents of parotid region • Elucidate the surfaces, borders, shape, location, parts, relations, and drainage of parotid gland. • Trace the pathway of autonomic supply of parotid gland. • Correlate the extracranial course of facial nerve with Bell's palsy.	LGIS SGDs	SAQ MCQ OSPE
5.	**Facial Nerve**	The learners will be able to • Trace the facial nerve pathway and relate it with the lesions	• Revisit the effects of lesion of facial nerve at various levels	LGIS SGDs CBL	SAQ MCQ OSPE
6.	**Temporomandibular Joint**	The learners will be able to • Discuss the structure and movements of temporomandibular joint	• Describe movements of TMJ with reference to axes and muscles producing them • Correlate a case of dislocation and reduction of TMJ with anatomical knowledge of TMJ. • Apply the knowledge of anatomy to explain following: Mandibular and inferior alveolar nerve block	LGIS SGDs	SAQ MCQ OSPE
7.	**Temporal And Infra-Temporal Region**	The learners will be able to • Describe the boundaries and	• Describe the course and distribution of mandibular nerve from origin to distribution.	LGIS SGDs	SAQ MCQ OSPE

		contents of Temporal and Infra-temporal region	• Tabulate the attachments, actions, and nerve supply of muscles of mastication. • Trace location, various routes, and distribution of ottic ganglion. • Justify role of lateral pterygoid as a peripheral heart on anatomical basis of pterygoid venous plexus • Elucidate importance of pterygoid venous plexus in case of intracranial spread of infection to cavernous sinus.		
8.	**Pterygopalatine Fossa**	The learners will be able to • Outline the boundaries and contents of Pterygopalatine fossa	• Identify the location of pterygopalatine fossa on skull. • Describe the distribution of third part of maxillary artery, nerve, and pterygopalatine ganglion. • Justify the role of pterygopalatine ganglion in hay fever/allergies	LGIS SGDs	SAQ MCQ OSPE
9.	**Pharynx**	The learners will be able to • Relate the muscles and nerves of pharynx with its functions.	• Describe anatomical route of spread of infections from nasopharynx to middle ear. • Relate boundaries of tonsillar fossa and tonsillar bed with significant structures that must be protected during tonsillectomy	LGIS SGDs	SAQ MCQ OSPE
10.	**Radiography**	The learners will be able to • Discuss radiological anatomy of face	• Identify the important bony landmarks of skull and mandible on X ray.	LGIS SGDs	SAQ MCQ OSPE
11.	**Surface Marking**	The learners will be able to • Discuss topographical anatomy of facial structures on subject/model	• Mark following structures on subject. • Parotid Gland and duct Facial artery and nerve External jugular vein	LGIS SGDs	SAQ MCQ OSPE

12.	**Oral Cavity And Tongue**	The learners will be able to • Outline the boundaries of oral cavity, with the structure of tongue	• Differentiate a case of UMN and LMN lesion of hypoglossal nerve (course and branches) • Correlate Lymphatic drainage of various parts of tongue with spread of malignancy and infection of tongue.	LGIS SGDs	SAQ MCQ OSPE
13.	**Salivary Glands**	The learners will be able to • Relate the structure and function of salivary glands with their neural pathways	• Trace the secretomotor nerve supply of major salivary glands. • Discuss the anatomical basis of clinical presentation of mumps. • Justify involvement of facial nerve in various clinical conditions of Parotid gland • Enumerate the structure endangered by the stone in submandibular duct and its surgical removal	LGIS SGDs	SAQ MCQ OSPE
14.	**Nose And Paranasal Sinuses**	The learners will be able to • Discuss the boundaries of nose. • Relate the structure of nose with drainage of paranasal sinuses	• Describe the features, vascular supply, nerve supply and openings in lateral wall of nose. • Describe the features, vascular supply, nerve supply of medial wall of nose. • Highlight the significance of little's area in a case of epistaxis. • Apply the knowledge of anatomy to explain clinical presentation of sinusitis	LGIS SGDs CBL	SAQ MCQ OSPE
15.	**External Ear**	The learners will be able to • Discuss the structural framework of external ear	• Correlate nerve supply of external ear and tympanic membrane with clinical significance (perforation of tympanic membrane)	LGIS SGDs	SAQ MCQ OSPE
16.	**Middle Ear**	The learners will be able to • Relate the structure of middle ear with the conduction of sound	• Highlight the importance of infection in middle ear cavity in relation to its communications. • Apply the knowledge of anatomy to explain following clinical conditions -	LGIS SGDs	SAQ MCQ OSPE

			Otitis media and mastoiditis, Blockage of pharyngotympanic tube		
17.	**Inner Ear**	The learners will be able to • Discuss the structure of inner ear with its functions and common clinical conditions	• Identify the bony and membranous parts of inner ear on model. • Apply the knowledge of anatomy to explain following clinical conditions – Motion sickness, Hearing loss, • Meniere disease	LGIS SGDs	SAQ MCQ OSPE
18.	**Orbit**	The learners will be able to • Outline the structure framework and contents of orbit	• Describe the skeletal framework of bony orbit and its communications. • Tabulate the attachments, nerve supply and actions of extraocular muscles. • Justify the movements of extraocular muscles based on their attachments. • Trace the route and distribution of ciliary ganglion. • Enumerate different components of lacrimal apparatus. • Describe the nerve supply of Lacrimal gland. • Define Horner's Syndrome	LGIS SGDs CBL	SAQ MCQ OSPE

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Gross Anatomy of Neck: Hyoid Bone & Cervical Vertebrae**	The learners will be able to • Describe the bony features of hyoid and cervical vertebrae	• Give distinguishing features of each cervical vertebra. • Identify type and movements of atlantoaxial and atlantooccipital joints. • Outline ligamentous attachments on cervical vertebrae.	SGDs	MCQ OSPE
2.	**Superficial Fascia**	The learners will be able to • Discuss the structure of Superficial Fascia of neck	• Outline contents of superficial fascia of neck (platysma, external jugular vein)	LGIS SGDs	SAQ MCQ OSPE
3.	**Deep Cervical Fascia**	The learners will be able to • Outline the layers of Deep cervical fascia	• Enumerate the layers of deep cervical fascia. • Trace the attachments of investing, pre-tracheal, carotid sheath, and prevertebral layers of fascia. • Comprehend the clinical importance of neck spaces in spread of infection	LGIS SGDs	SAQ MCQ OSPE
4.	**Triangles Of Neck**	The learners will be able to • Discuss the boundaries and contents of triangles of neck	• Identify boundaries and contents of triangles of neck on model. • Describe the origin, course and distribution of vessels and nerves of neck (cervical plexus, Ansa cervicalis, Common carotid artery, Internal jugular vein, subclavian vessels) • Analyze a case of lesion of accessory, glossopharyngeal and vagus nerve on anatomical basis. • Describe the clinical features of torticollis	LGIS SGDs	SAQ MCQ OSPE

5.	**Submandibular Region**	- The learners will be able to • Outline the structures present in Submandibular region	• Revisit boundaries of submandibular triangle • Trace the roots of submandibular ganglion. • Describe the distribution of submandibular ganglion. • Correlate the anatomy of submandibular fascial space with Ludwig's angina	LGIS SGDs	SAQ MCQ OSPE

6.	**Larynx**	The learners will be able to
		• Outline the structural framework of larynx.
		• Associate the movements of vocal cords with common clinical conditions
			• Analyze mechanism of abduction and adduction of vocal cords
			• Distinguish clinical presentations of injury to external, internal, and recurrent laryngeal nerves.
			• Recognize Clinical significance of piriform fossa.
			• Apply the knowledge of anatomy to explain:
			  • Laryngoscopy
			  • Aspiration of foreign body from laryngopharynx
				LGIS
				SGDs
					SAQ
					MCQ
					OSPE

7.	**Cervical Part Of Trachea, Esophagus And Cervical Chain**	The learners will be able to • Discuss the structure of trachea, esophagus, and cervical chain	• Identify gross features of Cervical part of trachea, esophagus and cervical chain and relevant clinical conditions	LGIS SGDs	SAQ MCQ OSPE
8.	**Thyroid And Parathyroid Glands**	The learners will be able to • Explain the gross structure of thyroid & parathyroid glands	• Justify anatomical basis of movement of thyroid gland during deglutition. • Discuss surgical precautions in thyroid surgery while ligating vessels and enucleation. • Correlate the compression/shifting of surrounding structures in case of benign and malignant enlargement of thyroid gland in various directions	LGIS SGDs PBL	SAQ MCQ OSPE

9.	**Lymphatic Drainage Of Neck**	The learners will be able to • Trace the Lymphatic drainage of neck	• Describe the formation of jugular lymph trunk. • Describe the clinical importance of lymphatic drainage of neck.	LGIS SGDs	SAQ MCQ OSPE
10.	**Great Vessels Of Neck**	The learners will be able to • Discuss the vessels present in neck	• Describe the course and branches/tributaries of the respective vessels: • Common carotid artery • External carotid artery • Internal carotid artery • Internal Juglar vein	LGIS SGDs	SAQ MCQ OSPE
11.	**Cranial Nerves**	The learners will be able to • Outline the course distribution and lesions of CN X and XI	• Revisit the course of X & XI CNs and their distribution along with injuries	LGIS SGDs	SAQ MCQ OSPE
12.	**Radiography**	The learners will be able to • Analyze bony structures of neck through radiographs	• Identify the important bony. landmarks of hyoid bone cervical vertebrae on x ray.	SGD	OSPE
13.	**Surface Marking**	The learners will be able to • Elaborate the topographical anatomy of viscera of neck on given models	• Mark following structures. on subject: • Thyroid Gland • Common carotid artery • Internal jugular vein	SGD	OSPE
14.	**Gross Anatomy Of Endocrine Glands**	The learners will be able to • Outline the basic structure of endocrine glands	• Define and classify the glands. • Describe the location structure and function of all endocrine glands in the body	LGIS SGDs	SAQ MCQ OSPE

15.	**Pituitary Gland**	The learners will be able to • Corelate the structure and relations of pituitary gland with common clinical conditions	• Describe the gross anatomy, neurovascular supply, and clinical importance of pituitary gland	LGIS SGDs	SAQ MCQ OSPE
16.	**Parathyroid Glands**	The learners will be able to • Corelate the structure of Parathyroid gland with common clinical conditions	• Describe the gross anatomy, neurovascular supply, and clinical importance of parathyroid glands	LGIS SGDs	SAQ MCQ OSPE
17.	**Adrenal Cortex**	The learners will be able to • Corelate the structure of adrenal gland with common clinical conditions	• Describe the gross anatomy, neurovascular supply, and clinical importance of adrenal gland	LGIS SGDs	SAQ MCQ OSPE
18.	**Pancreas**	The learners will be able to • Corelate the structure of endocrine portion of pancreas with common clinical conditions	• Describe the gross anatomy, neurovascular supply, and clinical importance of endocrine portion of pancreas	LGIS SGDs	SAQ MCQ OSPE
19.	**Pelvic Walls**	The learners will be able to • Outline the structural framework of pelvic walls.	• List the anatomical landmarks measured while performing internal pelvimetry. • Justify occurrence of low back pain in sacroiliac joint disease • Describe the type, articulations, ligaments & movements of joints of pelvis. • Enumerate the structures forming pelvic diaphragm. • Explain the functional significance of pelvic floor in females.	LGIS SGDs	SAQ MCQ OSPE

			• Analyze the clinical presentation of a case of injury to pelvic floor with anatomical reasoning		
20.	**Male Reproductive Organs**	The learners will be able to • Corelate the structure and relations of prostate seminal vesicles and male ducts with common clinical conditions	• Trace the passage of epididymis and vas deferens. • Define vasectomy and its clinical importance. • Identify the parts of prostate most likely to be involved in benign and malignant growths of prostate. • Justify the metastasis of carcinoma of prostate to vertebral column & cranial cavity on basis of venous drainage	LGIS SGDs	SAQ MCQ OSPE
21.	**Female Reproductive Organs**	The learners will be able to • Corelate the structure and relations of uterus, ovaries, and fallopian tubes with common clinical conditions	• Correlate the anatomy of female genital tract with hysterosalpingography, ligation of uterine tubes, ectopic tubal pregnancy. • Describe the parts, ligaments, relations, and support of uterus. • Comprehend a case of uterine prolapse based on gross anatomy of uterus and its supports. • Define hysterectomy and explain the precautionary measures to be taken necessarily during this procedure. • Identify the anatomical routes for spread of malignancies of uterus, cervix, and ovary	LGIS SGDs CBL	SAQ MCQ OSPE
22.	**Perineum**	The learners will be able to • Elaborate boundaries and contents of perineum with its clinical importance	• Explain the boundaries of superficial and deep perineal pouches and enumerate their contents in all genders. • Illustrate the cutaneous nerves of the perineum.	LGIS SGDs	SAQ MCQ OSPE

			• List structures attached with perineal body. • Justify the possible routes of spread of ischiorectal abscess with anatomical reasoning. • Explain area of anesthesia, indications, & list steps of pudendal nerve block • Apply the anatomical knowledge in analyzing a case of vaginal prolapse, and vaginal fistula. • Define culdocentesis and describe its diagnostic and therapeutic importance. • Apply anatomical reasoning in justifying the route of extravasation of urine in case of injury to various parts of male urethra. • List the anatomical structures encountered while performing urethral catheterization. • Provide the anatomical basis of presentation of Bartholin cyst		
23.	**Nerves & Vessels of Pelvis**	The learners will be able to • Explain neurovascular structures present in pelvis	• Illustrate sacral plexus showing its branches. • Explain the role of lymphatics and lymph nodes in spread of malignancies of pelvis	LGIS SGDs	SAQ MCQ OSPE
24.	**Skills**	The learners will be able to • Demonstrate various pelvic structures on models	• Identify the various organs, impressions, ligaments, nerves, muscles, blood vessels related to renal system, pelvis, and perineum on given models and specimens. • Differentiate b/w anatomical features of male & female pelvis in the given model.	LGIS SGDs	SAQ MCQ OSPE

			• Demonstrate boundaries of pelvic inlet and pelvic outlet		

SPECIAL EMBRYOLOGY

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Development Of Foregut**	The learners will be able to • Relate the developmental events of foregut with embryological basis of relevant congenital anomalies	• Describe the development of esophagus. • Explain the embryological basis of the trachea- esophageal fistula, esophageal atresia, and hiatal hernia. • Describe the development of stomach with special reference to its rotations and relocation of both vagi. • Explain the formation of lesser Sac. • Explain the embryological basis of pyloric stenosis. • Describe the development of liver, biliary apparatus, and spleen. • Explain the embryological basis of accessory hepatic ducts, duplication of gall bladder, extra and intra hepatic. • Explain the embryological basis of Annular pancreas and accessory pancreatic tissue.	LGIS SGDs	SAQ MCQ OSPE
2.	**Development Of Midgut**	The learners will be able to • Relate the developmental events	• List derivatives of mid gut • Describe physiological.	LGIS SGDs	SAQ MCQ OSPE

		of midgut with embryological basis of relevant congenital anomalies	herniation with emphasis upon rationale behind its occurrence and reduction • Correlate the rotation of midgut loop with definitive positioning of mid gut derivatives in abdomen. • Correlate development of midgut with abnormalities of mesenteries, vitelline duct abnormalities, gut rotation defects, gut atresia & stenosis		
3.	**Development Of Hindgut**	The learners will be able to • Relate the developmental events of hindgut with embryological basis of relevant congenital anomalies	• List derivatives of hindgut • Describe the partitioning of cloaca and its consequences. • Describe the development of derivatives of anorectal canal	LGIS SGDs	SAQ MCQ OSPE
4.	**Development Of Digestive System**	The learners will be able to • Correlate the knowledge of development of digestive tract with three-dimensional spatial arrangement of developing structures with help	• Identify parts of developing digestive system on given models and diagrams	LGIS SGDs	SAQ MCQ OSPE

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS

1.	**Development Of Urinary System**	The learners will be able to
		• Correlate the developmental process of urinary system with embryological basis of relevant congenital anomalies.
			• Interpret the following stages of development of kidneys briefly.
			  ○ Pronephros
			  ○ Mesonephros
			  ○ Metanephros
			• Describe the development of definitive kidney with reference to the sources of various parts of uriniferous tubule, rotation and ascent of kidneys.
			• Correlate following congenital anomalies with normal development.
			• Wilm's tumor
			• Horseshoe kidney
			• Pelvic kidney
			• Poly cystic kidneys
			• Ectopic/accessory kidney
			• Malrotated kidney
			• Agenesis of kidney
			• Enumerate various parts and derivatives of urogenital sinus.
			• Describe the development of urinary bladder.
			• Explain the anatomical relationship of ductus deferens with ureter with embryological reasoning
			• Correlate various urachal. anomalies, exstrophy of bladder and exstrophy of cloaca with normal development
				LGIS
				SGDs
					SAQ
					MCQ
					OSPE

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS

1.	**Development Of Central Nervous System and Skull**	The learners will be able to
		• Compare the developmental events of central nervous system and interpret the embryological basis of relevant congenital anomalies
			• Describe the development of neural tube with reference to neurulation, vesicles, brain flexures and ventricles.
			• Describe the development and positional changes of spinal cord.
			• Comprehend the embryological basis of several types of Spinae bifida.
			• Enumerate the derivatives of
			  • rhombencephalon,
			  • mesencephalon
			  • prosencephalon.
			• Summarize the characteristic developmental events of the following
			  • Medulla oblongata
			  • Midbrain
			  • Pons
			  • Cerebellum
			  • Pituitary gland
			  • Supra renal gland
			  • Diencephalon
			  • Telencephalon
			  • Meningohydroencephaloceles
			  • Holoprosencephaly
			  • Craniorachiscisis
			  • Pheochromocytoma
			  • Congenital megacolon
			  • Anencephaly
			  • Schizencephaly
				LGIS	SAQ
					MCQ
					OSPE

			• Describe the development of skull. • Explain the Embryological basis of cranioschisis and several types of craniosynostosis. • Identify various parts of developing brain and spinal cord on the given model /diagrams.		

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Development of Head Region**	The learners will be able to • Correlate the development events of head and neck with embryological basis of their related congenital anomalies.	• List components of pharyngeal apparatus. • Tabulate the nerve supply and derivatives of all arches, pouches, clefts, and membranes. • Describe the embryological basis of first arch syndromes (Treacher Collins, Pierre Robin, DiGeorge and Goldenhar) • Apply the knowledge of developmental anatomy to explain Branchial fistulas, sinuses, and cysts. • Correlate the normal development of tongue with its congenital anomalies (tie, macro- and micro- glossia and bifid tongue) • Justify the relative anatomical location of parathyroid gland. • Apply the knowledge of developmental anatomy to explain ectopic thyroid tissue.	LGIS	SAQ MCQ OSPE

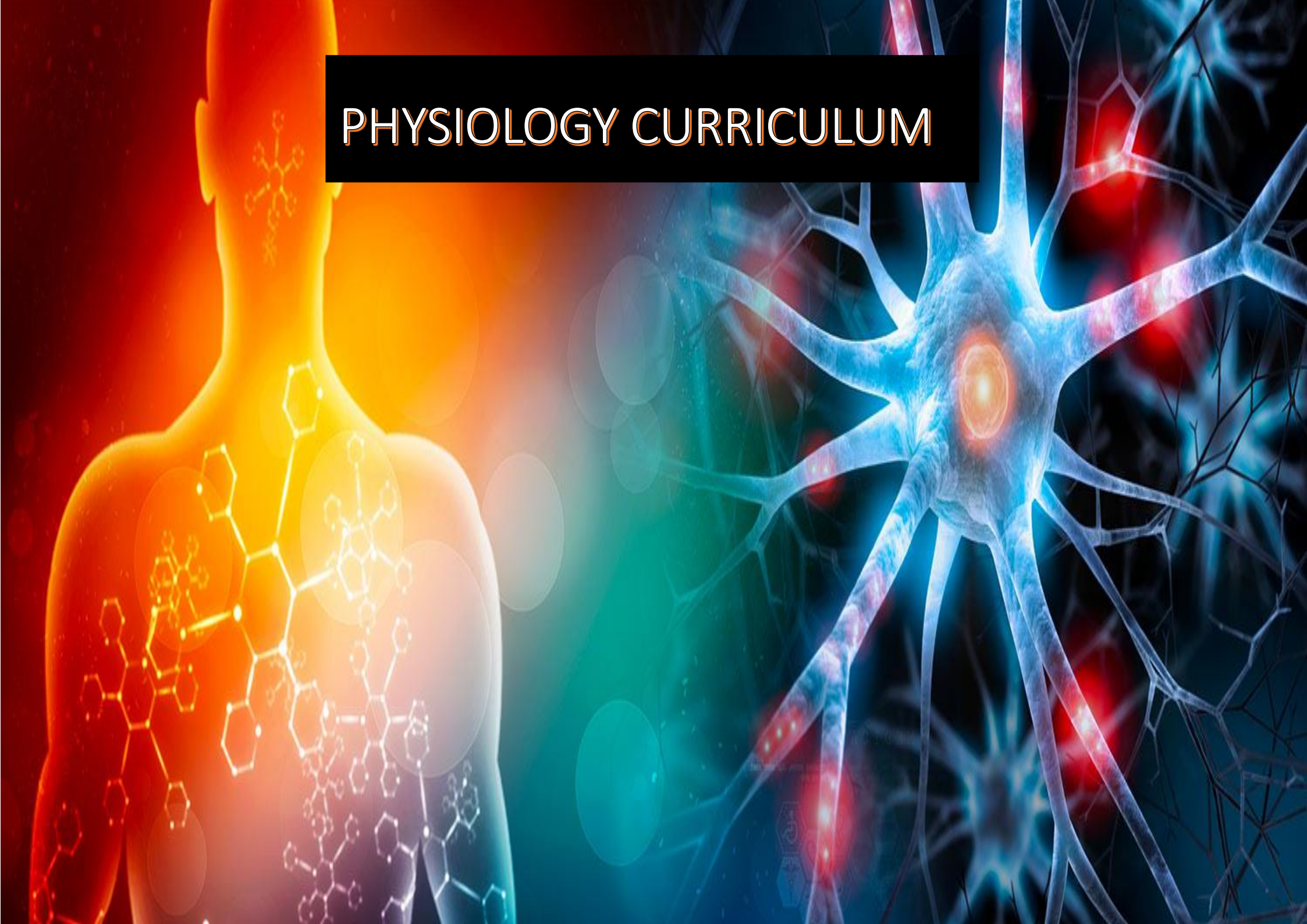
			• Enumerate the prominences of facial development. • Elucidate the embryological phenomenon of development of face, and palate. • Correlate various facial and palatal clefts including anterior and posterior clefts of lip and palate with normal development. • Apply the knowledge of developmental anatomy to explain anomalies of nasolacrimal duct		
2.	**Development of Ear**	The learners will be able to Explain the development of ear and embryological basis of their related congenital anomalies	• Revisit the role of first and second pharyngeal apparatus in development of ear. • Describe the differentiation of ottic capsule into inner ear. • Correlate the anomalies of external ear with neural crest cells (deafness and external ear abnormalities)	LGIS	SAQ MCQ OSPE
3.	**Development of Eye**	The learners will be able to Explain the development of eye and embryological basis of their related congenital anomalies	• Describe the development of the optic cup. • Relate the differentiation of wall of optic cup into definitive structures. • Correlate the common congenital anomalies of eye (colobomas, congenital cataracts, cyclopia) with normal development.	LGIS	SAQ MCQ OSPE
4.	**Development of Integumentary System**	The learners will be able to Explain the development events of integumentary	• Describe the development of skin, hair, nails, mammary gland.	LGIS	SAQ MCQ OSPE

		system and embryological basis of their related congenital anomalies	Describe the embryological basis of relevant congenital anomalies (vitiligo, ichthyoses, disorders of keratinization, Hypertrichosis, hemangiomas and dermatoglyphics and mammary gland anomalies		

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Pituitary gland**	The learners will be able to • Explain the development events of Pituitary gland and embryological basis of their related congenital anomalies	• Describe the development and congenital anomalies of pituitary gland	LGIS	SAQ MCQ OSPE
2.	**Thyroid gland**	The learners will be able to The learners will be able to • Explain the development events of Thyroid gland and embryological basis of their related congenital anomalies	• Describe the development and congenital anomalies of thyroid gland (thyroglossal duct and other congenital abnormalities as congenital hypothyroidism, accessory thyroid, and thyroid agenesis	LGIS	SAQ MCQ OSPE
3.	**Parathyroid Glands**	The learners will be able to • Explain the development events of parathyroid gland and embryological basis of their related congenital anomalies	• Describe the development and congenital anomalies of parathyroid glands	LGIS	SAQ MCQ OSPE

4.	**Adrenal Glands**	The learners will be able to • Explain the development events of Adrenal Glands and embryological basis of their related congenital anomalies	• Describe the development and congenital anomalies of adrenal gland	LGIS	SAQ MCQ OSPE
5.	**Development Of Reproductive System**	The learners will be able to • Explain the indifferent stage of gonad development. • Correlate the knowledge of development of genitourinary system with three-dimensional spatial arrangement of developing structures	• Explain the development of ovaries. • Describe the indifferent stage of genital ducts. • Explain the development of genital ducts in the male and female. • Apply the knowledge of • embryology to explain the • following congenital anomalies: o Uterus didelphys o Uterus arcuatus o Uterus bicornes. • Vaginal atresia • Describe the indifferent stage of external genitalia. • List common anomalies of the male genitalia. • Describe the embryological basis of hypospadias and epispadias. • Apply the knowledge of embryology to explain the basis and clinical presentation of following disorders of sexual development: o Ambiguous genitalia o Hermaphrodites o Congenital adrenal hyperplasia. o Gonadal dysgenesis.	LGIS	SAQ MCQ OSPE

			• Identify parts of developing genitourinary system on given models and diagrams showing different developmental phenomena		


PHYSIOLOGY CURRICULUM

S. NO	TOPIC/ THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLS
1.	**Homeostasis**	The learners will be able to • Appreciate the role of homeostatic feedback mechanisms in maintaining the functional organization of the Human Body and Control of the "Internal Environment".	● Discuss the functional organization of human body. ● Describe the division of body fluids into intracellular, extracellular and intravascular compartments. ● List the typical value and normal range for plasma Na+, K+, H+(pH), HCO3-, Cl-, Ca2+, and glucose, and the typical intracellular pH and concentrations of Na+, K+, Cl-, Ca2+, and HCO3-.	LGIS SGD	MCQs SAQs Structured viva
2.	**Homeostasis**		● Explain Homeostasis and the factors which are regulated through homeostasis. ● Recognize the interplay of various organ systems in maintaining homeostasis. ● Compare and contrast positive, negative and feed forward feedback mechanisms as the control systems of the body. ● Discuss the outcomes of failure for the feedback of control system of homeostasis.		

3.	**Cell membrane**	The learners will be able to • Relate the structure of cell and its various components to metabolic processes and locomotion	● Describe the composition of a human cell membrane. ● With the help of fluid mosaic model of cell membrane relate the structure of different cell membrane components with its functions. ● Enlist the various functions of integral and peripheral proteins in the cell membrane	LGIS SGD Flipped classroom	MCQs SAQs Structured viva
4.	**Cell Organelle – II**		● Summarize the structure & functions of secretory vesicles. ● Discuss the physiological anatomy of mitochondria & ● discuss its functions in special relation to energy synthesis. ● Compare and contrast the functions of lysosomes & peroxisomes.	LGIS SGD Flipped classroom	MCQs SAQs Structured viva

5.	**Cytoskeleton & Locomotion of cells**		● Discuss the structure & function of cell cytoskeleton (microtubules, microfilaments & intermediate filaments). ● Relate the different movements of cell with its function.	LGIS SGD	
6.	**Transport of Micro molecules**	The learners will be able to Differentiate the different type of transport mechanism across the cell membrane for the movement of micro & macromolecules.	● Classify various modes of transport of substances across the cell-membrane. ● Compare and contrast amongst the processes of osmosis, osmotic pressure, surface tension, viscosity diffusion & facilitated diffusion (transport of micro molecules).	LGIS SGD	MCQs SAQs Structured viva

7.	**Transport of Macromolecules**		Compare and contrast the process of exocytosis & endocytosis (transport of macromolecules)		
8.	**Primary active transport**	The learners will be able to Differentiate the different type of transport mechanism across the cell membrane for the movement of micro & macromolecules	• Explain the process of primary active transport with examples. • Give an account on the structure, working and important functions of Na+ / K+ pump. • Enlist other active transport pumps present in human body e.g. sarcoplasmic reticulum Ca2+ pump, and gastric H+ pump	LGIS SGD	MCQs SAQs Structured viva

9.	**Secondary active transport**		• Understand the concept of Secondary active transport. • Differentiate co-transport & counter-transport with examples.	LGIS SGD	MCQs SAQs Structured viva
10.	**Skill**	The learners will be able to • Introduction to physio lab working and safety • Introduction to microscope	• Concept of skill lab work in physiology. • Demonstrate the protocols of working in physiology lab. • Appreciate the important precautionary measures require to work in physiology lab. • Demonstrate the importance of teamwork while working in lab. • Appreciate the importance of discipline, punctuality and professional attitude with faculty, classmates and lab staff. • Correlate the practical work performed in physiology lab with clinical aspects (patient examination and diagnosis). • Identify different parts of the compound/binocular microscope and give the functions of each. • Describe and demonstrate the	Practical Demonstration	OSPE Structured viva

			different techniques for care and use of the microscope. • Carefully handle the microscope and set its coarse and fine adjustments and magnifications using different lenses. • Demonstrate proper focusing technique		

S. NO	TOPIC/THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLS
1.	**Nerve**	The learners will be able to ● Review the physiological structure and working of nerve	● Correlate the structure of following components of neurons with its functions: dendrites, axon, axon hillock, soma, and an axodendritic synapse. ● Classify the nerve fibre types according to myelination, diameter and conduction velocity.	LGIS SGD	MCQs SAQs Structured viva
2.	**RMP- Resting Membrane Potential**	The learners will be able to ● Explain the ionic and mechanical mechanisms of generation of resting membrane potential & action potential in excitable tissue (nerves & muscle).	● Explain the concept of Nernst potential and its importance in generation of resting membrane potential. ● Elucidate different mechanisms responsible for the genesis of membrane potential (role of channels, carrier proteins). ● Describe the normal distribution of Na^+, K^+, and Cl^- across the cell membrane, and using the Goldman equation, explain how the relative permeability of these ions creates a resting membrane potential. ● Correlate the abnormal functions of ion channels (channelopathies) with alteration of the resting membrane potential. ● Distinguish the effects of hyperkalaemia, hypercalcemia, and hypoxia on the resting membrane potential & action potential. ● Discuss the process of generation of nerve impulse and its transmission in	LGIS SGD	MCQs SAQs Structured viva Assignment

	NMJ **Skeletal muscle contraction and relaxation**	● Correlate the physiological mechanism of Neuromuscular transmission and excitation- contraction Coupling with various neuromuscular diseases. ● Discuss the morphology and physiological processes of the skeletal muscle contraction. ● Differentiate the characteristics of skeletal and smooth muscle	different types of nerve fibres (myelinated and non-myelinated nerve fibres) with their characteristics. ● Discuss the characteristic properties of a nerve Fiber on the basis of: strength duration curve, all or one law, summation, conductivity, excitability, in fatiguability, refractory period, accommodation. ● Explain the concept of saltatory conduction. ● Discuss the properties of contiguous conduction ● Differentiate between myelinated and non-myelinated nerve Fibers based on their structure and characteristics. ● Identify different types of polyneuropathies ●With the help of labelled diagram of neuromuscular junction outline the sequence of events taking place during neuromuscular transmission. ●Describe the factors/drugs affecting this process ●Describe the types of muscular disorders ● Describe the ionic and chemical basis of muscle contraction and relaxation. ● Explain how the cross-bridge cycle results in shortening of the muscle. ● List the steps in excitation-contraction coupling in skeletal muscle, and describe the roles of the sarcolemma,	LGIS SGD LGIS SGD	MCQs SAQs Structured viva

			transverse tubules, sarcoplasmic reticulum, thin filaments, and Ca++ ● Describe the roles of ATP in skeletal muscle contraction and relaxation. ● Identify postmortem changes of muscles after death		
3.	**Types of muscle fibers & contraction**	The learners will be able to ● Describe different types of muscle contraction along with its energy expenditure and properties.	● Outline the energy expenditure during muscle contraction ● Appreciate the characteristics and differences between isometric and isotonic contraction with the help of examples. ● Compare and contrast slow and fast muscle fibers ● Explain the relationship of preload, afterload and total load in the time course of an isotonic contraction.	LGIS SGD	MCQs SAQs Structured viva
4.	**Properties of muscle contraction** **Properties of muscle contraction**		Explain the motor unit and its physiological importance. Explain the concept of: • Summation • Treppe • Skeletal muscle tone • Muscle fatigue • Tetanization • Contracture remainder Muscle dystrophy	PBL	

5.	**Muscle remodelling** **Rigor mortis**		• Enlist types of muscle remodelling • Summarize the effects of hypertrophy, hyperplasia & atrophy on the skeletal muscle structure and function • Explain the physiological basis of rigor mortis		
6.	**Smooth muscle morphology & characteristics** **Smooth muscle contraction and relaxation**	The learners will be able to Correlate the characteristics of smooth muscle contraction and relaxation with their physiological ffunctions.	• Comprehend the types of smooth muscles. • Differentiate between types of action potentials produced in different smooth muscles and appreciate the role of autonomic innervation, mechanical and humoral factors in their generation • Appreciate characteristics of smooth muscles (slow cycling of myosin cross-bridge, low energy requirement to sustain contraction, latch mechanism & stress relaxation). • Illustrate the sequence of events leading to smooth muscle contraction and relaxation. Differentiate between the contraction of smooth, skeletal and cardiac muscle.	LGIS SGD LGIS SGD	MCQs SAQs Structured viva

S. No	TOPIC/ THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLS
1.	**Composition & Functions of blood**	The learners will be able to ● Describe the Morphology and Genesis of blood cells Discuss the composition and functions of blood	● Construct a flow sheet diagram of cellular and fluid composition and general functions of blood. ● Classify plasma proteins & compare their functions & importance for human body. ● Explain hematocrit or packed cell volume (PCV).	LGIS SGD	MCQs SAQs Structured viva
2.	**Hemopoiesis** **Anemia Polycythemia & RBC indices**		● Enlist sites of hemopoiesis in the body during different stages of life. ● Construct a flow sheet diagram of various stages of erythrogenesis with explanation of their relevant features and sizes during different stages of differentiation of RBC's. ● Enlist different growth & differentiation inducers involved in erythropoiesis ● Explain the importance of stem cells, progenitor cells, reticulocyte count ● Classify anemia based on their morphological findings, RBC indices & etiology. ● Compare and contrast different types of anemia based on etiology, pathophysiology, clinical presentations and blood picture. ● Explain the effect of anemia on circulatory system. ● Classify polycythemia into primary and	PBL	

			secondary polycythemia and discuss its effects on circulatory system. ● Describe etiology, pathophysiology and clinical presentation of polycythemia		

3.	**Skill**	● Study Neubauer's chamber in detail using compound Microscope judiciously	● Identify different parts of the compound/binocular microscope. ● Carefully handle the microscope and set its coarse and fine adjustments and magnifications using different lenses. ● Identify the counting chambers and dimensions of different squares on the counting grid and recall the principle of hemocytometry. ● Focus the counting grid for RBC and WBC counting under low and high magnification ● Analyse the role of diluting fluids and their composition in hemocytometry.	Practical Demonstrations	Structured viva
4.		The learners will be able to ● Determination of Haemoglobin in the blood. (Sahli's method)	● Apply correct technique for pricking ● Identify Sahli's pipette and apparatus with its parts ● Correctly use the stirrer ● Avoid errors during estimation of haemoglobin by taking proper precautions ● Measure the Hematocrit by properly centrifuging the blood	Practical Demonstrations	Structured viva

		• Estimate hematocrit (PCV) levels	and using Hematocrit reader • Avoid errors in PCV estimation • Identify buffy coat • Practice the art of taking consent from the subject prior to performance of the procedure. • Communicate the procedure effectively to the patient. • Use aseptic technique to prick and draw blood.		

5.	**WBC-Morphology** **Skill**	The learners will be able to • Classify different types of immunity based on cell types involved and their role in defense mechanism • Classify different types of immunity based on cell types involved and their role in defense mechanism. • Classify different types of immunity based on cell types involved and their role in defense mechanism. • Determine the Total leukocyte Count	• Enlist different types of white blood cells and discuss their physiological characteristics. • Differentiate among leukopenia, leukocytosis, neutrophila, neutropenia, eosinophilia, eosionpenia, basophilia & basopenia. • Make a flow sheet diagram showing steps involved in leukopoiesis. • Enlist the factors necessary for leukopoiesis. • Relate the secondary lymphoid tissues in the body with their clinical importance • Estimate total leukocyte count (TLC) by Hemocytometer using Turk's fluid for dilution • Apply the method of charging Neubauer's chamber. • Practice the art of taking consent from the subject prior to performance of the procedure.	LGIS SGD Flip classroom Practical demonstration	MCQs SAQs Structured viva OSPE

	Innate immunity + complement system	● Differentiate among different types of immunity.	• Communicate the procedure effectively to the patient. • Use aseptic technique to prick and draw blood for the procedure ● Describe the role and functions of white blood cells in providing protection to the body against invading Organism. ● Discuss innate immunity and the mechanisms involved in it. ● Elucidate the basis of innate immune system of the body and tissues related with innate immunity. ● Discuss the role of natural killer cells & interferons in innate immunity. ● Identify the specific role of interferons against virus infected cells and discuss their mechanism of action	LGIS SGD	MCQs SAQs
6.	**Monocyte-macrophage system Line of defense against infection & phagocytosis**	The learners will be able to ● Describe reticuloendothelial system and different line of defense.	● Appraise the composition and functions of reticulo- endothelial system. ● Explain the lines of defense against infection: role of neutrophils & macrophages. ● Discuss the role of eosinophils & basophils.	LGIS SGD	MCQs SAQs
7.	**Inflammation**		● Explain the process of inflammation. ● Discuss causes, cellular features and five cardinal signs of inflammation. ● Give an account on process of “walling-off” involved in inflammation. ● Describe pathophysiology of necrosis	LGIS SGD	MCQs SAQs

8.	**General concept of T & B lymphocytes** **Active & passive immunity**		● Enlist the types of immunity. ● Discuss the mechanism involved in development of immunity. Discuss the processing of T & B lymphocytes in human body. ● Give a brief account on lymphocyte cloning. ● Discuss the role of memory cells involved in the process of immunization. ● Compare & contrast active and passive immunity. ● Describe the physiological basis of vaccination.	LGIS SGD	MCQs SAQs
9.	**B-cell immunity**		● Describe the concept of humoral immunity. ● Classify antibodies. Discuss their structure and functions. ● Explain the role of antibodies in B-cell immunity	LGIS SGD	MCQs SAQs

10.	**Mechanism of action of antibodies**		• Discuss the mechanisms through which antibodies directly attack an invading agent. • Give an account on the indirect action of antibodies on invading agent through complement system. • Enlist the various complement proteins and their functions.		
11.	**Allergy**		• Explain different types of allergies.		

	/Hypersensitivity		• Discuss different types of allergies and the mechanism involved in development of an allergy & hypersensitivity. • Explain the role of basophils and mast cells in the release of inflammatory mediators in response to allergens reagent binding. • Discuss the anti-allergic role of eosinophil.		
12.	**T-cell immunity**		• Discuss the role of antigen presenting cells in cell- mediated immunity. • Explain role of helper T cells, cytotoxic T cells and suppressor T cells in T cells immunity. • Discuss the role of interleukins released by helper T cells in facilitating both B & T cell immunity. • Correlate immune tolerance with MHC complex and HLA typing.	LGIS PBL	MCQs SAQs
13.	**Autoimmunity & Transplant rejection**		• Discuss the pathophysiological process involved in development of autoimmunity • Discuss the pathophysiological process involved in transplant rejection of tissues by human body. • Discuss the mechanisms involved in immune tolerance.		

14.	**Blood groups**	The learners will be able to Differentiate among the different types of blood groups	• Describe the principles of blood grouping and cross matching. • Tabulate the genotype & phenotypes of ABO blood group system.	LGIS SGD Flipped classroom	MCQs SAQs Structured viva
15.	**Rh blood group system & Erythroblastosis Fetalis** **Transfusion reactions**		• Describe Rh blood group system and its significance • Tabulate the genotype & phenotypes of Rh blood group system. • Discuss the pathophysiology of Erythroblastosis Fetalis, its treatment and precautions. • Discuss the hazards of blood transfusion.		
16.	**Hemostasis**	The learners will be able to • Correlate the physiological mechanism for hemostasis & role of pro-coagulants and anti- coagulants in it. • Compare and contrast various bleeding disorders.	• Discuss the four steps involved in blood coagulation. • Discuss the morphology, development & functions of platelets in all the four steps of blood coagulation. • Discuss the role of alpha & dense granules in platelet plug formation.	LGIS SGD	MCQs SAQs Structured viva
17.	**Coagulation pathway**		• Comprehend the physiology of clotting factors and mechanism of blood clotting. • Compare & contrast intrinsic and extrinsic pathway of clotting. • Explain the fibrinolytic system of the body & factors affecting it	LGIS SGD	MCQs SAQs/SEQs

18.	**Bleeding disorder**		• Discuss the effect of deficiency of platelets and clotting factors in haemostasis. • Discuss the pathophysiology of blood dyscrasias like Vitamin K deficiency, Haemophilia and Thrombocytopenia • Compare & contrast Haemophilia with Thrombocytopenia. • Recall the functioning/changes in the coagulation pathway in case of deficiency of clotting factors.		
19.	**Skill**	The learners will be able to • Determine Platelet count	• Apply manual method for platelet counting in a blood sample • Count platelets on the counting chamber • Identify pipette for platelet count and recall its diluting fluid composition • Practice the art of taking consent from the subject prior to performance of the procedure. • Communicate the procedure effectively to the patient. Use aseptic technique to prick and draw blood for the procedure	Practical Demonstration	OSPE Structured viva

20.	**Skill**	The learners will be able to • Estimate ESR Determine ABO & Rh blood groups	• Estimate ESR with Westergren and Wintrobe tubes • Practice the art of taking consent from the subject prior to performance of the procedure. • Communicate the procedure effectively to the patient. • Use aseptic technique to prick and draw blood for the procedure. • Use correct technique for prick • Determine blood groups by using anti-sera and precautions to be observed. • Identify haemolysis after adding antisera to the sample • Mix the blood drops with anti-sera with separate stirrers for each drop/sample (A, B, D) • Practice the art of taking consent of patient prior to performance of procedure and communicate the procedure effectively to the patient.		

S. No	TOPIC/THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL
1.	**Introduction to CVS**	The learners will be able to • Relate the function of various components of circulatory system in maintaining body homeostasis	• Compare pulmonary and systemic circulation • Relate the basic principles of circulation (blood flow, cardiac output and arterial pressure) with the functions of circulatory system. • Analyse the interrelationship of pressure, blood flow and resistance with reference to management of tissue blood circulation	LGIS, SGDs	MCQs, SAQs , Structured viva
2.	**Functions Of Arterial and Venous System**		• Relate the concept of vascular dispensability of the Arteries and the Veins in relation to Venous resistance and Peripheral Venous Pressures • Discuss the role of specific Blood reservoirs of circulatory system for maintaining blood pressure	LGIS, SGDs	MCQs, SAQs, Structured viva
3.	**Arterial Pressure Pulsation**	The learners will be able to • Relate arterial pressure pulsations to various clinical conditions	• Define arterial pressure pulsation • Discuss the transmission of Pressure pulses to peripheral arteries. • Relate the development of abnormal pressure pulse contours in Peripheral Arteries with	LGIS, SGDs	MCQs, SAQs, Structured viva

			reference to clinical conditions		
4.	**History taking and General Physical examination/ Examination of precordium**		• Demonstrate the basic skills of history taking and general physical examination on a standardized patient. • Perform precordial examination on a standardized patient (S) • Demonstrate a professional attitude, and good communication skills while examining the patient (A)	Skill Lab	OSPE
5.	**Radial Pulse**	The learners will be able to • Demonstrate steps of radial pulse examination in each subject	• Perform the steps for radial artery palpation of the given subject • Narrate your observation • Observe gentleness while examining the patient	Skill lab	OSPE
6.	**Microcirculation-I**	The learners will be able to • Correlate the structure of microcirculation to its role in exchange of nutrients and prevention of edema	• Relate the structure of capillary system with its functioning for exchange of water, nutrients and other substances between blood and interstitial fluid	Skill lab	OSPE

7.	**Microcirculation-II**		• Describe the starling forces acting across capillary • Relate the role of starling forces in determining fluid filtration across the capillaries in clinical condition of edema	LGIS, SGDs	MCQs, SAQs, Structured viva
8.	**Microcirculation-III**		• Classify edema. • Relate the structure of lymphatics to its functioning. • Relate the prevention of lymph edema with the role of lymphatic system	LGIS, SGDs	MCQs, SAQs, Structured viva
9.	**Action Potential in Cardiac Muscle**	The learners will be able to • Correlate action potential with excitation contraction coupling	• Explain the phases of action potential in a cardiac muscle • Correlate the role of different ion channels with the propagation of action potential • Correlate the action potential to excitation contraction coupling in cardiac muscle	LGIS, SGDs	MCQs, SAQs, Structured viva
10.	**Conductive System of Heart-I**	The learners will be able to • Relate the structure of conducting system of heart to in functioning	• Describe the components of cardiac conductive system • Relate the mechanism of sinus nodal activity to maintain heart rate with reference to its rhythmicity	LGIS, SGDs	MCQs, SAQs, Structured viva

			• Relate the transmission of cardiac impulse from atria to ventricle with reference to A.V nodal delay.		
11.	**Conductive System of Heart-II**		• Relate the effects of ions and ANS on cardiac conductive system • Describe the importance of resting heart rate, maximum heart rate and cardiac reserve.	LGIS, SGDs	MCQs, SAQs, Structured viva
12.	**Conductive System of Heart-III**		• Compare the mechanism of normal and abnormal pacemaker in transmission of cardiac impulse • Differentiate between the effect of parasympathetic and sympathetic stimulation on the cardiac rhythm conduction	LGIS, SGDs	MCQs, SAQs Structured viva
13.	**Cardiac Cycle-I**	The learners will be able to • Relate the electrical and mechanical events that take place during cardiac cycle with ventricular volume and pressure changes	• Correlate electrical and mechanical changes that take place during cardiac cycle along with volume and pressure changes	LGIS, SGDs	MCQs, SAQs Structured viva
14.	**Cardiac Cycle-II**		• Correlate the ECG changes with heart sounds during systolic and diastolic phases of cardiac cycle (K) Correlate normal and abnormal heart	Skill lab	MCQs, SAQs Structured viva

			sounds with cardiac cycle(K)		

15.	**Cardiac Cycle-III**		• Correlate the regulation of heart pumping with the Frank Starling mechanism of heart contractility
			• Discuss the role of following in Cardiac Performance:
			  ● Potassium ions
			  ● Calcium ions
			• Temperature (S)
				LGIS, SGD	MCQs, SAQs
					Structured viva

16.	**Jugular Venous Pressure**	The learners will be able to • Examine the JVP if given patient	• Perform the steps of measuring Jugular venous pressure on the given subject. • Narrate your observation of • JVP obtained from given subject (S) • Maintain Privacy while examining the patient (A)	Skill lab	OSPE
17.	**ECG-I**	The learners will be able to • Justify the physiological basis of segments, waves and intervals during obtained in ECG	• Relate the conduction of electric current with development of normal ECG waves. • Calculate the heart rate on normal ECG	LGIS, SGDs	MCQs, SAQs Structured viva
18.	**ECG-II**		• Describe the Einthoven's triangle and recording of 12 lead ECG on the basis of it.	LGIS, SGDs	MCQs, SAQs Structured viva

19.	**ECG-III**		• Interpret the information gained in normal electrocardiogram on a standardized patient **(S & A)** • Interpret ECG changes in health and angina, myocardial infarction, AV Blocks, and arrhythmias (S & A	Skill lab	OSPE
20.	**Heart Sounds**	The learners will be able to • Analyse various heart sound in relation to cardiac cycle	• Define heart sounds. • Differentiate amongst the different heart sounds based on characteristics during • cardiac cycle	Skill lab	OSPE
21.	**Heart Sounds**	The learners will be able to • Auscultate the precordium of given patients and interpret various heart sound in relation to cardiac cycle	• Performs the steps of auscultation of heart sounds on a given subject(S) • Observe Privacy while examining the patient(A)	SKILL LAB	OSPE
22.	**Apex Beat**		• Perform the steps of determining apex beat on the given subject. • Narrate your observation of • apex beat on given subject	Skill lab	OSPE
23.	**Local Control of Blood Flow-I**		• Explain hemodynamic mechanisms and correlate them with determinants of blood flow • Describe the various mechanism of local blood	LGIS, SGDs	MCQs, SAQs Structured viva

			flow control		
24.	**Local Control of Blood Flow-II**		• Correlate the mechanism of autoregulation of blood flow during changes in arterial pressure by metabolic and myogenic mechanism • Relate the mechanism of long- term control of blood flow in response to tissue needs of body. (K)	LGIS, SGDs	MCQs, SAQs Structured viva
25.	**Local Control of Blood Flow-III**		• Describe the humoral control of blood flow (K)	LGIS, SGDs	MCQs, SAQs Structured viva
26.	**Short Term Regulation of Blood Pressure-I**	The learners will be able to • Explain the role of various reflexes and kidney in regulation of blood pressure	• Define blood pressure, systolic, diastolic, pulse and mean arterial pressure. (K) • Describe role of vasomotor center in nervous control of blood pressure (K)	LGIS, SGDs	MCQs, SAQs Structured viva
27.	**Long Term Regulation of Blood Pressure-I**		• Explain the compensatory mechanisms (short, intermediate, and long-term) of blood pressure regulation. (K)	LGIS, SGDs	MCQs, SAQs Structured viva
28.	**Long Term Regulation of Blood Pressure-II**		• Relate the role of kidney in long term regulation of blood pressure (K) • Relate the role of blood pressure control	LGIS, SGDs	MCQs, SAQs Structured viva

			mechanism to the development of HTN		
29.	**Blood Pressure**	The learners will be able to • Examine the blood pressure of a given subjects	• Demonstrate the steps of measuring blood pressure on the given subject • Narrate your observation of blood pressure on a given Subject	Skill Lab	MCQs, SAQs Structured viva
30.	**Cardiac Output & Venous Return-I**	The learners will be able to • Relate the cardiac output with different physiological and pathophysiological states	• Define cardiac output, cardiac index, and cardiac reserve. • Document the main determinants of cardiac output (K) • Describe cardiac output, preload, after load and ejection fraction in relation with Frank-Starling law. • Justify the relation between venous return and cardiac output	LGIS, SGDs	MCQs, SAQs Structured viva
31.	**Cardiac Output & Venous Return-II**		• Differentiate the variations in cardiac output with reference to Physiological and pathological conditions	LGIS, SGDs	MCQs, SAQs, Structured viva
32.	**Angina and Cardiac Failure**	The learners will be able to • Outline the pathophysiology of cardiac failure	• Discuss causes and clinical manifestation of acute and chronic arterial ischemia. • Relate the pathophysiology of cardiac	LGIS, SGDs, CBL	MCQs, SAQs, Structured viva

			failure to the development of sign and symptoms		
33.	**CVS Changes During Exercise**	The learners will be able to • Relate the physiology changes in cardiovascular system to various intensities of exercise	• Relate coronary circulation (regulation) in various physiological (normal, exercise) conditions) • Relate the cardiovascular changes with physical activity. • Describe the cardiorespiratory fitness and its importance in health.	LGIS, SGDs	MCQs, SAQs, Structured viva
34.	**Shock**	The learners will be able to • Correlate the clinical findings of shock to its pathophysiology	• Differentiate between various stages of shock. • Correlate the pathophysiology of shock to sign and symptoms	LGIS, SGDs, flipped classroom	MCQs, SAQs, Structured viva
35.	**Fetal Circulation**	The learners will be able to • Describe the changes in transition from fetal to adult circulation after birth	• Compare the fetal circulation and transition to adult circulation after birth	LGIS, SGDs	MCQs, SAQs Structured viva

S. No	TOPIC/THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL
1.	**Mechanism of Pulmonary Ventilation-I**	The learners will be able to • Correlate various pressure changes with the mechanics of normal and deep breathing	• Outline the muscles that cause lung inflation and deflation • Correlate the contraction and expansion of muscle with the mechanism of lung inflation and deflation • Describe the role of various muscles involved in quiet and forceful breathing	LGIS, SGDs	MCQs, SAQs Structured viva
2.	**Mechanism of Pulmonary Ventilation-II**		• Correlate the role of the Pleural pressure, Alveolar pressure, Trans-pulmonary pressure to the movement of air in and out of the lungs with reference to diagram.	LGIS, SGDs	MCQs, SAQs Structured viva
3.	**Compliance**	The learners will be able to • Relate the compliance of lungs and that of lungs and thorax in chest expansion.	• Define surfactant. • Relate the role of surfactant in preventing alveolar collapse. • Relate the compliance of lungs and that of lungs and thorax in lung expansion in patient with chest wall injury • Explain the compliance diagram • Differentiate amongst the	LGIS, SGDs	MCQs, SAQs Structured viva

			following type of work of breathing: • Compliance • Tissue resistance • Airway resistance • Correlate the role of surfactant in development of acute respiratory distress syndrome		
4.	**Functions of lungs (respiratory and non-respiratory)**	The learners will be able to • Outline the functions of lungs	• Enlist the respiratory and non-respiratory function of lungs • Relate the structure of respiratory passages (Trachea, Bronchi and Bronchioles) to their functions.	LGIS, SGDs	MCQs, SAQs, Structured viva
5.	**Examination of respiratory system**	The learners will be able to • Demonstrate the ability to critically analyse and integrate patient history and physical examination findings	• Take a focused history of patient with respiratory symptoms. • Perform the general physical examination of patient with history of respiratory illness • Demonstrate a professional attitude, and good communication skills while examining the patient	Skill lab	OSPE
6.	**Alveolar Ventilation**	The learners will be able to	• Differentiate between physiological and anatomical dead space. • Describe alveolar	LGIS, SGDs	MCQs, SAQs Structured viva

		• Relate the changes in alveolar ventilation in physiological and pathological state	ventilation and pulmonary ventilation • Describe the effects of different breathing pattern son alveolar ventilation • Differentiate between dead space and shunt between anatomical and physiologicaldead space in tracheobronchial tree with reference to alveolar ventilation. • Discuss the alteration in respiratory mechanics after tracheostomy.		
7.	**Cough, Sneeze Reflex Phonation& Articulation**	The learners will be able to • Describe the protective reflexes in body	• Describe the mechanism of cough and sneeze reflex. • Define phonation and articulation. • Relate the role of respiratory system to mechanism yawning with reference to the respiratory centers.	LGIS, SGDs	MCQs, SAQs Structured viva
8.	**Lung volumes and capacities**	The learners will be able to • Interpret pulmonary function tests in individuals with obstructive and restrictive lung diseases	• Differentiate between lung volume and capacities. • Correlate the alteration in Lung volumes and capacities in health and disease.	LGIS, SGDs	MCQs, SAQs Structured vivo

9.	**PulmonaryPressures and BloodFlow I**	The learners will be able to • Relate the changes pf pulmonary pressure and blood flow in various physiological and pathological states	• Enlist the pulmonary pressure inthe: • Right ventricle • Pulmonary artery • Pulmonary capillary pressure • Left atrial and pulmonary venouspressure. • Discuss the effect of alteration in hydrostatic pressure indevelopment of pulmonary hypertension. • Analyze the alteration in pulmonary pressure in pulmonary edema.	LGIS, SGDs	MCQs, SAQs Structured viva
10.	**PulmonaryPressures and BloodFlow II**		• Correlate the blood flow through various lung zones with the cardiac cycle. • Relate the significance of negative interstitial fluid pressure in preventing pulmonary edema	LGIS, SGDs	MCQs, SAQs Structured viva
11.	**Diffusion of Gases**	The learners will be able to • Describe the principles of gas diffusion	• Describe the physics of gas diffusion partial pressures in mechanism ofbreathing. • Compare the composition of alveolar and expired air.	LGIS, SGDs	MCQs, SAQs Structured viva
12.	**Respiratory Membrane**	The learners will be able to • Relate the diffusion through RespiratoryMembrane in	• Identify the layers of respiratory membrane in each diagram.	LGIS, SGDs	MCQs, SAQs Structured viva

		physiological and pathological conditions	• Describe the factors affecting the rate of diffusion through 6 layers of respiratory membrane. • Discuss the diffusion of gases through respiratory membrane in emphysema and pneumonia.		
13.	**Study of Spirometer**	The learners will be able to • Identify the functions of various parts of a student spirometer	• Identify the various parts of a student spirometer. • Demonstrate the functions of various parts of spirometer. • Demonstrate the protocols of handling the student spirometer	Skill lab	OSPE
14.	**Lung FunctionTest-I**	The learners will be able to • Record the lung volumes and capacities by student spirometer	• Demonstrate the lung volumesand capacities by student spirometer on a given subject. • Calculate the lung volumes andcapacities on a given graph. • co-relate findings with physiological principles. • Practice professionalism and teamwork while working in the lab.	Skill lab	OSPE
15.	**Lung FunctionTest-II**	The learners will be able to • Record FEV1 by student spirometer	• Demonstrate the forced expiratory volume by student spirometer on a given subject.	Skill lab	OSPE

			• Calculate the forced expiratory volume on a given graph. • Co-relate findings with physiological principles. • Explain the role of spirometry in diagnosing obstructive and restrictive lung disease		
16.	**Ventilation perfusion ratio**	The learners will be able to • Relate the alterations in V/Q ratio in physiological and pathological conditions	• Define ventilation perfusion ratio. • Apply the abnormalities of ventilation perfusion ratio on mechanism of respiration • Compare/ correlate the changes in V/Q ratio in different parts of the lung with obstructive lung disease and pulmonary embolism (K)	LGIS, SGDs	MCQs, SAQs Structured viva
17.	**Oxygen and CO2 transport**	The learners will be able to • Analyse the process of oxygen transports an CO2 transport in the body	• Enlist the forms of Oxygen transport in body (K) • Discuss factors affecting oxygen binding to hemoglobin with reference to oxy hemoglobin curve. • Tabulate the factors the cause shit of oxy Hg to right and left • Describe Bohr effect • Relate the role of various factors that shift the Oxy-	LGIS, SGDs	MCQs, SAQs Structured viva

			Hb curve towards right and left with thehelp of given graph.		
18.	**Oxygen and CO2 Transport I**		• Describe the transport of 4 formsof carbon dioxide from tissues to blood. • Define respiratory exchange ratio. • Describe Haldane effect.	LGIS, SGDs	MCQs, SAQs Structured viva
19.	**Obstructive and restrictive lung diseases**	The learners will be able to • Compare obstructive and restive ling diseases	• Differentiate between Obstructive and restrictive lung diseases with reference to causes, sign and symptoms, and spirometry findings.	LGIS, SGDs/PBL	MCQs, SAQs Structured viva
20.	**Peak expiratory flow rate (PEFR)**	The learners will be able to • Perform PEFR and co-relate findings with physiological principles	• Record the PEFR of given subject. • Interpret the findings in various pathological conditions. • Exhibit teamwork while working in the lab	Skill lab	OSPE
21.	**Regulation of Respiration(nervous/ chemical) I**	The learners will be able to • Relate the regulation of respiration in physiological and pathological conditions	• Enlist various types of controls of respiration. • Distinguish amongst the role of following four respiratory centreson the basis of location and function in regulation of respiration. controlling respiration: ➢ Dorsal ➢ Ventral ➢ Pneumotach	LGIS, SGDs	MCQs, SAQs Structured viva

			➢ Apneustic • Outline the feedback inputs on Medullary Respiratory Centers from various sensory receptors to modify breathing.		
22.	**Regulation of Respiration(nervous/ chemical) II/**		• Differentiate between the role of central and peripheral chemoreceptors in regulation of respiration. • Relate the role of chemical and peripheral chemoreceptorssystem to regulate respiratory activity with reference to the respiratory centers. • Relate the role of chemoreceptors in regulating ventilation in acidosis.	LGIS, SGDs	MCQs, SAQs Structured viva
23.	**Abnormal breathing**	The learners will be able to • Analyse the pathophysiological mechanism of abnormal breathing patterns	• Analyse the neurological mechanisms underlying abnormal breathing patterns, including Chyne-Stokes breathing with reference to regulation of respiration.	LGIS, SGDs	MCQs, SAQs Structured viva
24.	**Hypoxia-types and its effects**	The learners will be able to • Differentiate between various types of hypoxias	• Classify Hypoxia • Discuss various types of hypoxias • Describe the systemic effects of hypoxia.	LGIS, SGDs	MCQs, SAQs Structured viva

25.	**Physiology of high altitude, space and deep sea diving**	The learners will be able to • Evaluate the complex physiological adaptations of the respiratory system to high-altitude and deep-sea environment	• Discuss the physiological adaptations of respiratory system at high altitude and deep sea. • Describe the mechanisms underlying high altitude sickness and decompression sickness.	LGIS, SGDs	MCQs, SAQs Structured viva
26.	**Respiration inExercise**	The learners will be able to • Relate the respiratory adaptions in moderate and high intensity physical activity	• Describe the physiological responses of the respiratory system to exercise. • Describe the alteration in V/Q ratio during exercise. • Explain the concept of oxygen debt.	LGIS, SGDs	MCQs, SAQs

S. No	TOPIC/THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL
1.	**Neuronal control of GI function**	The learners will be able to • Elaborate the electrical activity of GI smooth muscle and its functional significance	• Discuss the types of electrical activities in GI smooth muscle	LGIS	MCQ/SAQ
			• Construct a table to compare and contrast slow waves and spike potential in smooth muscles.		
			• Enlist the factors that depolarize & hyperpolarize the GIT membrane	SGD SDL	MCQs
		• Analyse the role of enteric nervous system in establishing motor and secretory activity of GIT	• Enlist the excitatory & inhibitory neurotransmitters of enteric nervous system • Justify the significance of syncytial action of smooth muscle in GI function relating it with the electrical activity		
		• Elaborate role of autonomic nervous system and various hormones in gastrointestinal function	• Classify the components of enteric nervous system • Discuss the location and significance of myenteric plexus and Meissner's plexus • Analyse their functional significance with respect to functions of GIT	LGIS	SAQ/MCQs/ Structured VIVA

	Mastication and swallowing	• Correlate the mechanisms and nervous control of mastication and swallowing with oral dysphagia	• Discuss the pathophysiology of achalasia & Mega esophagus • Enlist the features and treatment of achalasia	SGD	OSCE/MCQs /SAQ
			• Appreciate the role of sympathetic and parasympathetic nervous system in GI function	LGIS	MCQs/SAQ
		• Identify mechanical and hormonal factors involved in gastric emptying	• Enlist the gastrointestinal reflexes & explain the functions of these reflexes.		
			• Elaborate the hormones acting on GIT, their stimuli, site of release and actions. • Discuss the significance of hormones in GIT function	LGIS	MCQs/ SAQ Structured VIVA
			• Elaborate different types of movements that occur in small and large intestine • Discuss the functions and control of GIT movements with the role of reflexes in it	LGIS	SAQ /MCQs

	Stomach	• Explain the nervous and humoral control of gastric secretions • Relating it with associated clinical disorders • Identify the types of GIT movements in small and large intestine in relation with their functional properties • Discuss the clinical disorders related to digestion and absorption in small intestine and large intestine. • Performing Examination of GIT • Interpret parts of GIT and related organs on radiography • Correlate the functions of liver and gall bladder with reference to hepatobiliary disorders	• Discuss the effect of gut activity and metabolic factors on GIT blood flow. • Correlate the nervous control of GIT blood flow with its function. • Discuss the significance of mastication. • Trace the reflex arc of mastication. • Analyze the significance of stages of swallowing. • Trace the reflex arc of involuntary stage of swallowing. • Discuss the effect of swallowing on respiration.	SDL/SGD LGIS LGIS SGD	MCQs MCQs SAQ/MCQs Structured viva
			• Discuss the mechanism of esophageal stage of swallowing. • Appreciate the types and role of different peristalsis originating in esophagus. • Discuss the role of Lower Esophageal Sphincter • Discuss causes of dysphagia. • Elaborate the functions of stomach.	LGIS	MCQs

	Digestion and absorption in intestine	• Interpret lab report with altered hepatobiliary parameters	• Describe the basic electrical rhythm of stomach wall		
			• Explain the role of pyloric pump and pyloric sphincter in gastric emptying. • Explain the factors that promote Stomach Emptying • Discuss the duodenal (nervous & hormonal) factors that inhibit Stomach emptying. • Discuss the mechanism of action, regulation and actions of major gastrointestinal hormones. • Identify the risk factors for acid peptic disease relating it with the pathophysiology. • Outline role of drugs used in acid peptic disease. • Identify the types of GIT movements in small intestine. • Discuss the clinical disorders related to small intestine. • Analyze the mechanism of developing	SGD LGIS SGD LGIS SGD LGIS	MCQ SAQ/MCQ SAQ/MCQ Structured Viva

	Functions of Hepatobilia		movements in colon and their control through various Reflexes. • Enlist the defecation reflexes. • Explain the mechanism of defecation and the significance of involved reflexes. • Illustrate the reflex arc of defecation. • Correlate the abnormalities associated with dysfunction related to spinal cord injury. • Enlist the acute and chronic causes of diarrhea. • Enlist the features of intestinal and tropical sprue. • Explain the consequences of sprue on the body. • Explain the pathophysiology of constipation. • Describe the cause of Hirschsprung's disease. • Discuss the mechanism of vomiting and its clinical significance.	LGIS /Flipped classroom CBL LGIS LGIS Skill Lab/on simulated patient Skill Lab/on simulated patient Skill lab LGIS SGD	 OSCE OSCE/MCQ/Structured VIVA MCQ/SAQ OSCE/Structured VIVA MCQ/SAQ Str.uctured VIVA

			• Analyze the role of chemoreceptor trigger zone for initiation of vomiting by drugs and motion sickness. • Introduction and consent • General physical examination relevant to GIT • Introduction and Consent • Palpation of abdominal viscera • Examination for gut sounds • Identifying GIT components on Xray, CT and MRI • Explain the functions of liver. • Explain function and secretions of pancreas. • Discuss the liver and gall bladder bile and the hormones acting on them. • Correlate the significance of pancreatic function in digestion and absorption. • Discuss the common abnormalities and their	Skill Lab	OSCE

			effects associated with pancreatic dysfunction (acute and chronic pancreatitis) • Significance of altered AST, ALT, bilirubin, serum albumin, globulin, A/G ratio		

S.NO	TOPIC/ THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STR.	ASSESSMENT TOOL
1.	**Distribution and balance of Body fluids**	The learners will be able to • Elaborate the composition and processes involved in distribution and maintenance of total body water	• Construct a flow chart showing distribution of total body water. • Highlight the differences between intra and extracellular fluids. • Discuss the regulation of fluid exchange between extra and intracellular fluids. • Analyze the principles of measurement of body fluids relating it with concept of water balance. • Discuss the physiological mechanisms for regulation fluid and electrolyte balance in the body.	LGIS SGD	MCQ MCQ/structured VIVA
		• Relate the clinical abnormalities of fluid volume regulation with the signs and symptoms	• Identify the abnormalities of body fluid volume regulation. • Correlate the mechanism & pathophysiology of edema with its clinical presentation.	LGIS	MCQ/SAQ/ structured VIVA

2.	**Micturition**	The learners will be able to • Analyze the functions of nephron and the key processes that underlie its functioning • Discuss common pathologies related to micturition	• Enlist the functions of the kidney. • Elaborate the physiological anatomy and significance of increased blood flow to kidneys. • Describe the mechanism of micturition and its control. • Explain the causes, pathophysiology, and features of atonic bladder. • Discuss the causes, pathophysiology, and features of automatic bladder. • Elaborate the causes, pathophysiology, and features of uninhibited neurogenic bladder	LGIS LGIS SGD/Flipped classroom	SAQ/MCQ MCQ/SAQ MCQ
3.	**Urine formation and its regulation**	The learners will be able to • Elaborate the steps in urine formation relating it with common abnormalities	• Enlist the steps of urine formation. • Explain the physiological anatomy and functions of glomerular capillary membrane. • Discuss the composition of filtrate. • Explain the minimal change nephropathy and Increase permeability to plasma protein.	LGIS	SAQ/MCQ

	Glomerulofiltration Rate	• Explain the Physiological basis of GFR, its measurement and various factors regulating glomerular filtration rate	• Define Glomerular Filtration Rate (GFR). • Elaborate the determinants of GFR. • Analyze the role of factors affecting GFR. • Explain the effects of angiotensin II blocker on GFR during renal hypoperfusion. • Discuss the hormones and autocoids that affect GFR. • Discuss the tubuloglomerular feedback and Autoregulation of glomerular filtration rate • Discuss the role of autoregulation in maintaining blood pressure.	LGIS LGIS	MCQ/OSCE SAQ/MCQ/ structured VIVA
	Functions of Nephron	• Interpret the process of filtration, reabsorption and secretory functions of nephron	• Analyze the reabsorption and secretion along proximal convoluted tubule, loop of henle, distal convoluted tubule and medullary collecting duct. • Elaborate the mechanisms involved in regulation of tubular reabsorption. • Discuss mechanism of re-absorption of sodium • along various parts nephrons • Define and explain the term Transport maximum for the	SGD LGIS	SAQ/MCQ structured VIVA SAQ/MCQ

			substances the clearance methods to quantify kidney function.		
	Regulation of ECF volume by kidneys	• Explain the mechanism of dilute and concentrated urine formation	• Elaborate the renal mechanisms for excreting Dilute urine. • Explain the mechanism for forming a concentrated urine. • Outline the role of urea in the process of counter current multiplier mechanism. • Describe the countercurrent exchange in vasa Recta to preserve hyperosmolarity of renal medulla. • Define obligatory urine volume and its significance. • Define and explain free water clearance. • Define Urine specific gravity. • Construct a flow chart to show the Osmoreceptor antidiuretic hormone (ADH) feedback mechanism for regulating extracellular fluid osmolarity in response to a water deficit. • Describe the factors which increase and decrease the release of ADH.	LGIS SGD SGD SGD LGIS LGIS SGD	SAQ/MCQ MCQ SAQ/MCQ SAQ/MCQ Structured VIVA SAQ/MCQ

		• Analyze the role of kidneys in regulating electrolyte balance and blood Pressure(co)	• Explain the mechanism of thirst. • Elaborate the features of diabetes insipidus. • Discuss the pathophysiology of nephrogenic and central diabetes insipidus. • Relate the regulation of internal potassium distribution and potassium secretion with serum K levels. • Correlate the relationship between serum sodium lev els and ECF osmolarity. • Outline major detrimental e ffects of imbalance of sodiu m and potassium. • Explain the importance of pressure natriuresis and diuresis in maintaining body sodium and fluid balance. • Explain the renal handling of calcium concentration. • to regulate plasma calcium concentration Renal regulation of calcium • Enumerate the factors that alter renal calcium excretion.	SGD Flipped classroom SGD LGIS SGD	MCQ/SAQ/ structured VIVA MCQ/SAQ/Structured viva MCQ/ Structured viva MCQ

			• Enlist the factors that alter renal phosphate excretion. • Explain the nervous and hormonal factors that increase the effectiveness of renal body fluid feedback control.	SGD	MCQ
	Renal Failure	• Describe the pathophysiological changes in Acute and chronic renal failure, relate the changes with the need of dialysis and transplantation • Perform palpation of kidneys on a simulated person • Identify the parts of the urinary tract on radiography (X Rays and Ultrasound)	• Tabulate prerenal and renal causes of renal failure • Elaborate the pathophysiology of acute renal failure. • Enlist causes of chronic renal failure • Relate the acute and chronic renal failure with end stage renal disease. • Emphasize the significance of Dialysis in patients of renal failure. • Discuss the role of renal transplant in treatment of patients with end stage renal disease. • Introduction and Consent • Performing abdominal Palpation for kidneys • Recognition of Kidney and urinary tract on X rays (with contrast) and able to read an ultrasound report of KUB.	LGIS LGIS SGD SGD Flipped classroom/SGD Skill lab on simulated Pt Skill lab	MCQ/ Structured viva MCQ/SAQ MCQ/SAQ/ structured VIVA OSCE OSPE
	Renal regulation of acid base balance	• Discuss role of kidneys in maintaining acid base balance	• Explain the renal handling of H^+ion.	LGIS SGD	MCQ/SAQ

		• Elaborate the pathophysiology associated with abnormalities of acid base balance	• Appreciate the role of buffers in resisting the change in pH • Elaborate the role of kidneys in maintaining acid base balance. • Correlate the signs and symptoms of metabolic acidosis with its pathophysiology. • Explain the causes and compensation of metabolic alkalosis. • Discuss the causes and compensation of respiratory acidosis. • Explain the causes and compensation of respiratory alkalosis. • Define and explain anion gap.	PBL SGD/Flipped classroom SGD	OSCE/SAQ/MCQ MCQ/Structured VIVA MCQ
		• Analyze the results of normal and abnormal urine complete examination	• Interpretation of routine urine examination • Significance of altered specific gravity, WBCs, Red cells, glucose, bile salts in urine.	Skill Lab	OSPE/MCQ

S. NO	TOPIC /THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL
1.	**Organization of CNS and mechanism of sensory perception**	The learners will be able to • Relate the function of various components of central nervous system in maintaining body homeostasis	• Identify the various divisions of Nervous system. • Relate the major levels of Central Nervous System to their integrative functions. • Classify neuroglia. • Relate the structure of neuroglia to the functions	LGIS, SGDs	MCQs, SAQs, Structured viva
				LGIS, SGDs	MCQs, SAQs, Structured viva
		• Elaborate the functional significance of synapse	• Explain the physiology of synapse with its types. • Discuss the mechanism of its transmission Differentiate between chemical and electrical synapses with reference to the propagation of action potential. • Relate the role of ion channels of pre-synaptic terminal to the development of action potential in post-synaptic terminal	LGIS, SGDs	MCQs, SAQs, Structured viva
			• Classify the types of sensory receptors on the basis of location, adaptation and functions. • Classify Synaptic Transmitters based on site of release and their synthesis. • Relate the structure of mechanoreceptors to the generation of receptor potential. • Interpret the mechanisms by which the sensory receptors	LGIS, SGDs	MCQs, SAQs, Structured viva
				LGIS, SGD	MCQs, SAQs, Structured viva

			detect the stimulus relating it with their function		
			• Classify nerve fibers. • Correlate the structure of nerve fibers with their function	Skill lab	OSPE
		• Classify the sensory receptors relating with their functional significance • and mechanism of perception • Elaborate mechanism of impulse transmission in nerve fibers relating with their types	• Compare the role of signal relaying, convergence, divergence, synaptic inhibition, summation in the transmission of signals for optimal nervous system function. • Relate the role of reverberatory circuits in central nervous system. • Relate the prolongation of signals to its after discharge in the neuronal pool with reference to various physiological conditions	LGIS, SGDs	MCQs, SAQs, Structured viva
2.	**Somatic Sensations**	The learners will be able to • Elaborate Sensory pathways discuss their importance	• Describe the sensory pathways for the transmission of somatic signals. • Differentiate between dorsal column medial leminiscal system and anterolateral	LGIS, SGDs	MCQs, SAQs, Structured viva

			pathway based on the characteristic of signal transmission and analysis. • Explain the mechanism for touch, pain, temperature, vibration, proprioception transmission of somatic signals into the central nervous system		
3.	**Somatosensory cortex**	The learners will be able to • Discuss the significance of somatosensory cotex	• Relate the role of various layers of somatosensory cortex to their functions. • (Detection of pressure, weight, texture & shape of an object) • Enlist the functions of somatosensory area I	LGIS, SGDs	MCQs, SAQs, Structured viva
4.	**Examination for UMNL and LMNL**	• Identify role of somatosensory area II • Clinical tests to distinguish between upper and lower motor neuron disorders	• Relate functions of somatosensory association area to the development of amorphosynthesis • Enlist functions of somatosensory area II • Elicit babinski's sign for UMNL. • Elicit pendular knee jerk to identify UMNL. • TEST for tone and deep tendon reflexes	LGIS, SGDs Skill lab on simulated patient	MCQs, SAQs, Structured viva OSCE

5.	**Pain perception**	The learners will be able to • Identify the physiological mechanism in perception of pain	• Classify functioning of nociceptors based on their location. • Correlate the various types of pain receptors with the mechanism of their perception. • Differentiate between fast and slow pain on the basis of intensity, mechanism of perception in CNS, release of neurotransmitter	LGIS, SGDs, flipped classroom LGIS, SGDs, Flipped classroom	MCQs, SAQs, Structured viva MCQs, SAQs, Structured viva
6.	**Sensory System Examination**	• Examine the sensory system of a given subject	• Examination of subject for sense of touch, pressure and pain with proper protocol	Skill lab on simulated patient	OSPE
7.	**Analgesia system**	• Analyze the physiological basis of analgesia system of body and its significance	• Outline the components of analgesic system. • Relate the role of endorphinsand encephalin to the painsuppression in the body. • Relate the mechanism of referred pain with clinical conditions	LGIS, SGDs	MCQs, SAQs, OSVE

S. NO	TOPIC/ THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESMENT TOOLS
1.	**Optics of Vision**	The learners will be able to • Elaborate the physiological anatomy of eye and mechanisms involved in image formation • Explain the refractive errors and their remedies	• Outline the physiological anatomy of eye. • Discuss the mechanism involved in refraction of light rays for focusing on retina for image formation. • Define and elaborate the visual acuity. • Define Emmetropia • Relate the cause, features and correction of Hyperopia with normal refractive mechanism. • Elaborate the cause, features, physiological basis and correction of myopia. • Explain the cause, features, physiological basis and correction of astigmatism. • Relate the pathophysiology with the treatment of cataract.	LGIS CBL SGD/CBL	SAQ/MCQ SAQ/OSCE MCQ/OSCE
		• Perform visual acuity for near using Jagger's chart on a simulated patient.	• Consent and introduction. • Performing visual acuity on simulated patients/subjects • Interpretation of results • Treatment options • Consent and introduction. • Performing visual acuity on simulated patients/subjects • Interpretation of result	Skill lab session on simulated patients/subjects Skill lab	OSPE OSCE

		• Perform visual acuity for near far vision and snellen's charts	• Treatment options		OSCE
2.	**Fluid systems of Eye**	The learners will be able to • Describe the mechanism of formation and circulation of intraocular pressure	• Outline the mechanism of formation and outflow. • of aqueous humor • Relate the significance of normal intraocular pressure and its regulation with the function of eye • Discuss the clinical features of Open Angle and Angle Closure Glaucoma relate it with the treatment options	LGIS SGD	MCQ/SAQ MCQ OSCE/OSVE
3.	**Neurophysiology of Retina**	The learners will be able to • Elaborate the role of retina in image formation	• Outline the physiological anatomy and function of structural elements of retina • Enumerate different layers of retina • Explain the mechanism of photo transduction • Describe macula and foveal region of retina and their significance • Describe the structure of rods and cones • Elaborate the location of optic disc and its significance • Describe the rhodopsin-retinal visual cycle.	LGIS SGD PBL LGIS SGD	MCQ MCQ OSCE/MCQ SAQ/MCQ MCQ

		• Outline the common pathologies associated with retinal dysfunction • Perform test for color vision • Perform and interpreting the light reflex. • Perform Fundoscopy on subject and interpretation of results.	• Describe the cause, features, and treatment of retinal detachment • Elaborate the basis of color blindness and its different types • Consent and introduction • Testing color vision using Ishihara chart • Interpretation of results • Performing direct light reflex • Observing for intact direct and consensual light reflex • Interpretation of results • Consent and introduction • Fundus examination with proper protocols • Interpretation of possible results	Skill lab/ Simulated patients Skill lab/ Simulated patients Skill lab/ Simulated patients	OSCE OSCE OSPE
4.	**Central neurophysiology of vision**	The learners will be able to • Explain the visual pathways and associated defects and clinical pathologies	• Trace the visual pathway • Enlist and describe the abnormalities of visual pathway & visual field • Explain the effect of removal of primary visual cortex. • Define the physiological blind spot and describe its location • Define scotoma/ pathological blind spot and enlist its causes • Illustrate the pathophysiology of	LGIS	SAQ/MCQ

			• abnormalities of field of vision	SGD	MCQ
5.	**Eye movements and accommodation**	The learners will be able to • Elaborate the mechanism of eye movement and outline the associated defects • Explain the process involved in accommodation • Examine Field of Vision and its interpretation	• Describe the muscular and neural control of eye movements • Define and enlist the types of Strabismus • Explain the mechanism of accommodation for near and far vision • Describe the neural pathway for accommodation reflex • Describe the regulation of accommodation • Enlist the clinical features of Presbyopia • Trace the neural pathway for pupillary light reflex • Explain the pupillary light reflexes or reactions in CNS diseases • Examine Field of Vision and interpretation of visual field plotted	SGD LGIS PBL LGIS Skill lab/ Simulated patients	MCQ SAQ/MCQ OSCE/MCQ MCQ OSCE
6.	**Functions of Outer and Middle ear**	The learners will be able to • Determine transfer of sound waves from outer to inner ear and significance of middle ear in it	• Describe the physiological anatomy of outer and • middle ear • Elaborate the functions of middle ear • Describe the mechanism of impedance matching and its significance	LGIS SGD	SAQ/MCQ MCQ

			• Describe the mechanism of attenuation reflex and its significance • Enlist the causes of ear discharge		
7.	**Physiological significance of Inner ear** **Central auditory mechanisms**	The learners will be able to • Elaborate the mechanism involved in sound perception from receptor to the center • Elaborate the mechanism of determination of frequency and direction of sound • Outline the major causes of hearing loss with their pathophysiology	• Describe the physiological anatomy of inner ear. • Describe the mechanism of transmission of sound from middle ear to organ of Corti • Describe the physiological anatomy and function of organ of Corti. • Describe the mechanism of generation of endocochlear potential and its significance • Discuss the normal range of frequency for hearing • Determination of sound frequency • Describe the role of place principle in determination of sound frequency. • Describe the role of volleys principle in determination of sound frequency • Trace the normal auditory nervous pathway • Enlist the types of deafness • Discuss the clinical features and investigations of Congenital and Acquired hearing loss	LGIS LGID SGD LGIS SGD CBL	MCQ SAQ/MCQ MCQ SAQ MCQ,SAQ OSCE

		The learners will be able to • Perform hearing tests	• Introduction and consent • Performing Rinnie's Test • Interpretation of results	Skill lab/on simulated pt	OSCE
			• Introduction and consent • Performing Weber Test • Interpretation of results	Skill lab/on simulated pt	OSCE
			• Introduction and consent • Performing Schwabe's Test • Interpretation of results	Skill lab/on simulated pt	OSCE
8.	**Physiological basis of sense of smell**	The learners will be able to • Elaborate the physiological basis of sense of smell • Perform examination of olfactory nerve	• Identify the olfactory receptors and explain the transduction mechanisms(cognitive) • Trace the olfactory pathway by means of a flowchart. (cognitive) • Describe the mechanism and importance of "sneezing reflex" • Introduction and consent • Test for different odour perception by simulated patient	LGIS Skill lab/on simulated pt	MCQ OSCE
9.	**Taste perception**	• Elaborate the physiological basis of perception of taste • Examination for perception of taste in a simulated patient	• Correlate the functions of taste receptors and transduction mechanisms • Trace gustatory pathway in form of flowchart. • Perform tests of sense of taste on a subject	Skill lab/on simulated pt.	OSCE

S. No	TOPIC/ THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESMENT TOOLS
1.	**Sensory And Motor Reflexes in Muscles**	The learners will be able to • Emphasize the functional significance of muscle spindle and golgi tendon organs	• Relate the role of muscle spindle in maintenance of posture • Differentiate between dynamic and static response of muscle spindle)	LGIS, SGDs	MCQs, SAQs , structured viva
			• Relate the role of muscle spindle in control of voluntarymuscle activity • Differentiate between the functions of muscle spindle and Golgi tendon organ	LGIS, SGDs	MCQs, SAQs , structured viva
		• Recognize the mechanism of different synaptic reflexes and their significance	• Recognize the mechanism of different synaptic reflexes(cognitive) • Differentiate between flexor and crossed extensor reflex • Relate the concept of reciprocal inhibition in maintenance of posture and locomotive reflexes	LGIS, SGDs	MCQs, SAQs , structured viva

		• Examination of superficial and deep reflexes	• Elicit the deep tendon reflexes with proper protocol • Elicit superficial reflexes with proper protocol	Skill lab on simulated patient	OSCE
2.	**Function OfANS**		• Outline the general organization of autonomic nervoussystem. • Correlate the basic characteristic of ANS with its functions.	SDL	MCQ
			• Differentiate between the excitatory and inhibitory actions of sympathetic and parasympathetic stimulation with reference to their effectson specific organs • Relate the role of adrenal medulla to the functioning of ANS	SGD, Flipped class room	MCQ, structured viva
3.	**BrainStem**	The learners will be able to • Physiological significance of brainstem	• Relate the role of Brain stem in controlling various motorfunctions of the body different clinical situations. • Discuss its role as station for “command signals”	LGIS, SGDs	MCQs, SAQs , Structured viva
4.	**Regulation And FunctionsOf CSF**	The learners will be able to	• Outline the formation and absorption of CSF • Relate the alteration in CSFpressure to the	LGIS, SGDs	MCQs, SAQs , Structured viva

		• Elaborate the regulation of maintenance of CSF pressure and discuss its significance	development of various diseased states		
5.	**Cerebellum**		• Relate the Neurocircuitry of cerebellum to maintenance ofposture and equilibrium	LGIS, SGDs	MCQs, SAQs , Structured viva
			• Enumerate the physiological divisions of cerebellum • Elaborate functions of each relating it with its functional abnormality • Enlist the signs of cerebellardisorder	LGIS, SGD Flipped classroom	MCQs, SAQs , Structured viva MCQs
6.	**Cerebellar Examination**	The learners will be able to • Perform examination for cerebellar function tests with protocols	• Perform the steps of cerebellarexamination on a subject.	Skill lab on simulated Pt.	MCQs, SAQs ,
7.	**Vestibular Apparatus**		• Explain the role of the semicircular canals in detecting head rotation andequilibrium	LGIS, SGDs	MCQs, SAQs , Structured Viva
			• Discuss the role of utricle andsaccule in maintaining equilibrium	LGIS	MCQs, SAQs , Structured Viva
8.	**Auto Regulation Of Cerebral Blood Flow**		• Relate the regulation of cerebral blood flow to the chemical constituents (CO_2,H,O2) • Relate auto regulation of cerebral blood flow to protect brain from changes	LGIS, SGDs	MCQs, SAQs , Structured Viva

			in arterial pressure		
9.	**Motor Cortex**		• Differentiate amongst the functions of primary motor cortex, premotor area andsupplementary motor area with reference to topographical organization	LGIS, SGDs	MCQs, SAQs , OSVE
			• Correlate the transmission of signals from motor cortex to the skeletal muscles withreference to functions of corticospinal tract	LGIS, SGDs	MCQs, SAQs , Structured viva
10.	**Functions Of Basal Ganglia**	The learners will be able to • Elaborate physiological significance of basal ganglia and its involved circuits	• Differentiate between caudate and putamen circuits in executing motor activity • Relate the role of basal ganglia with the development of Parkinsonism	LGIS, SGDs	MCQs, SAQs , Structured viva
11.	**Sleep**	The learners will be able to • Explain the physiological basis and uses of evoked potentials and the electro-encephalogram (EEG)	• Correlate types of sleep with reference to development of sleep disorders • Correlate EEG with different stages of sleep with referenceto insomnia • Explain stages of sleep and changes associated with	LGIS, SGDs	MCQs, SAQs , Structured viva

			aging, drugs, and sleep deprivation Identify the factors that affectsleep		
12.	**Brodman Areas**		• Describe the functional organization of Brodmann areas • Identify the speech disorders and their representation in the brain	LGIS, SGDs	MCQs, SAQs , OSVE
13.	**Memory**		• Explain the basis and mechanism of memory • Relate role of synaptic facilitation and inhibition to development of memory • Compare and contrast short term and long term memory • Differentiate between retrograde and anterograde amnesia	LGIS, SGDs	MCQs, SAQs ,
14.	**Eeg**		• Enlist different EEG waves. • Outline the physiological significance of different EEG waves	LGIS, SGDs	MCQs, SAQs , structured viva
15.	**Limbic System**	The learners will be able to • Elaborate role of limbic system in body functions	• Relate role of reticular excitatory signals in controlling various cerebralactions • Explain the major components of the limbic system • Correlate the basis and	LGIS, SGDs	MCQs, SAQs , structured viva

			mechanism of learning, emotional disorders and sexual orientation • Relate functions of hippocampus, amygdala, limbic cortex to learning with reference to amnesia		
16.	**Hypothalamus**	The learners will be able to • Outline the functions of hypothalamus	• Relate effect of bilateral ablation of amygdala • Enlist vegetative and non-vegetative functions of hypothalamus. • Differentiate between heat stroke and heat exhaustion	LGIS, SGDs LGIS, SGDs Flipped classroom LGIS, SGD	MCQs, SAQs, structured viva

S. No	TOPIC/THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL
1.	**Pituitary Hormones**	The learners will be able to • Relate the role of anterior and posterior pituitary hormones in maintaining body homeostasis	• Differentiate amongst the various types of chemical messenger systems involved in hormone secretion.	LGIS, SGDs	MCQs, SAQs, Structured viva
2.	**Control ofPituitary Secretions**		• Relate the role of the hypothalamic- hypophysial portal system with the controlof pituitary secretions • Enlist the hormones secreted by anterior and posteriorpituitary.		MCQs, SAQs, Structured viva
3.	**Hormone Secretion, Transport and Clearance from Blood**	The learners will be able to • Describe the hormonal secretion, transport and clearance	• Describe the secretion, transport, and clearance of various hormones. • Describe the various methodsof estimating hormone concentration in blood for diagnosis of various clinical disorders.	LGIS, SGDs	MCQs, SAQs, Structured viva

4.	**Growth Hormone I**	The learners will be able to • Correlate the physiological role of growth hormone in various stages of life with reference to various abnormalities	• Correlate the mechanism of action of Growth Hormone with its biochemical role. • Correlate the role of growth hormone releasing hormone (GHRH) with the regulation of GH secretion. • Describe the biochemical role of growth hormone in gigantism, acromegaly, and dwarfism./ Correlate the role of GH with the development of Acromegaly, Gigantism and Dwarfism.	LGIS, SGDs	MCQs, SAQs, Structured viva
5.	**Growth Hormone II**		• Explain the regulation of GH secretion during various physiological states of life.	LGIS, SGDs	MCQs, SAQs, Structured viva
6.	**Thyroid Hormones-I**	The learners will be able to • Relate the role of Thyroid hormone in physiological and pathological conditions	• Describe the role of thyroid hormone on different body functions • Relate the effect of thyroid hormones to activation of target cells with reference to the Transcription of genes, Cellular metabolic activity and Growth.	LGIS, SGDs	MCQs, SAQs, OSVE

7.	**Thyroid Hormones-II**		• Relate the regulation of thyroid hormone secretion in maintenance of various body functions • Enlist the various clinical condition arising due to altered thyroid hormone level / Correlate the structure, mechanism of action, metabolic role, regulations and clinical disorders of thyroid hormone	LGIS, SGDs	MCQs, SAQs, Structured viva
8.	**Interpretation of Thyroid profile**		• Interpret the Thyroid profileof hypothyroid, hyperthyroid and Euthyroid patient.	Skill lab	OSPE
9.	**Calcium & Phosphate Regulation**	The learners will be able to • Relate the role of, parathyroid hormone, calcitonin and vitamin D in maintenance of calcium and phosphate balance in the body.	• Outline the distribution of calcium and phosphate in the body • Relate the regulation of Calcium and Phosphate levelsin ECF and Plasma with themaintenance of normalphysiological process of the body • Relate the altered levels of Calcium and Phosphate withthe development of hypo and hypercalcemia	LGIS, SGDs	MCQs, SAQs , Structured viva

10.	**Calcium & Phosphate Regulation- II**		• Relate the absorption of calcium and phosphate withthe mechanism of bone calcification • Relate the role of osteoblasts and osteoclasts with the process of bone remodeling • Differentiate between the role of Parathyroid hormone and Calcitonin in maintenanceof calcium and Phosphate	LGIS, SGDs	MCQs, SAQs , Structured viva
11.	**Vitamin – D**		• Relate the physiological actions of Vitamin D to the development of Osteomalaciaand Rickets	LGIS, SGDs	MCQs, SAQs, Structured viva

12.	**Mineralocorticoids**	The learners will be able to • Relate the role of aldosterone in maintenance of sodium and water balance with reference to Conns syndrome	• Enlist the hormones secreted by adrenal gland • Describe the mechanism of action of mineralocorticoids • Correlate the role of mineralocorticoids with themaintenance of serum electrolytes levels and ECF volume • Relate the role of aldosterone in the development of secondary HTN • Distinguish the effects of hyper and hyposecretion of Aldosterone	LGIS, SGDs	MCQs, SAQs, Structured viva

13.	**Glucocorticoids I**	The learners will be able to • Relate the actions of Glucocorticoids in physiological and pathological conditions	• Enlist various glucocorticoids in body • Correlate the mechanism of action of glucocorticoids with its functions • Relate the role of ACTH and CRH with the regulation of glucocorticoid secretion • Describe the action of glucocorticoids on carbohydrates , fats and protein metabolism . • Relate the role of cortisol in the development of adrenal diabetes • Relate the anti-inflammatory effects of cortisol with the prevention of allergic conditions and resolution of inflammation	LGIS, SGDs	MCQs, SAQs, Structured viva

14.	**Glucocorticoids II**		• Relate the role of cortisol in acute and chronic stress. • Relate the circadian rhythm of cortisol in maintaining energy level in the body to various body functions / Relate the physiological variation in levels of adrenal cortisol in t h e maintenance of homeostasis • Differentiate between Cushing syndrome and Cushing's disease	LGIS, SGDs	MCQs SAQs Structured viva
15.	**Hormonesof Adrenal Medulla**	The learners will be able to • Relate the Hormones of Adrenal Medulla in physiological and pathological conditions	• Outline the functions of adrenal medullary hormones. • Relate the Pathophysiology of adrenal insufficiency to the development of signs and symptoms of adrenal insufficiency.	LGIS, SGDs	MCQs SAQs

16.	**Control of Metabolic RegulationThrough Insulin-I**	The learners will be able to • Compare and contrast the role of insulin and glucagon in maintain energy homeostasis	• Enlist the endocrine hormones secreted by the pancreatic islet cells • Describe the structure, biosynthesis, and mechanism of action of insulin • Correlate the regulation of insulin secretion with pre and post prandial blood glucose levels. • Relate the biochemical functions of insulin to the metabolic derangements in diabetes type I and II.	LGIS, SGDs	MCQs SAQs
17.	**Control of Metabolic RegulationThrough Insulin-II**		• Describe the effects of insulin on fat and protein metabolism with reference to the development of diabetes	LGIS, SGDs	MCQs, SAQs, Structured viva
18.	**Regulation of blood glucose level through Glucagon**		• Compare and contrast the effects of insulin and glucagon on CHO, protein and fat metabolism • Describe the mechanism of action of glucagon. • Correlate the role of glucoregulatory hormones with maintenance of normal blood glucose levels.	LGIS, SGDs	MCQs, SAQs, Structured viva

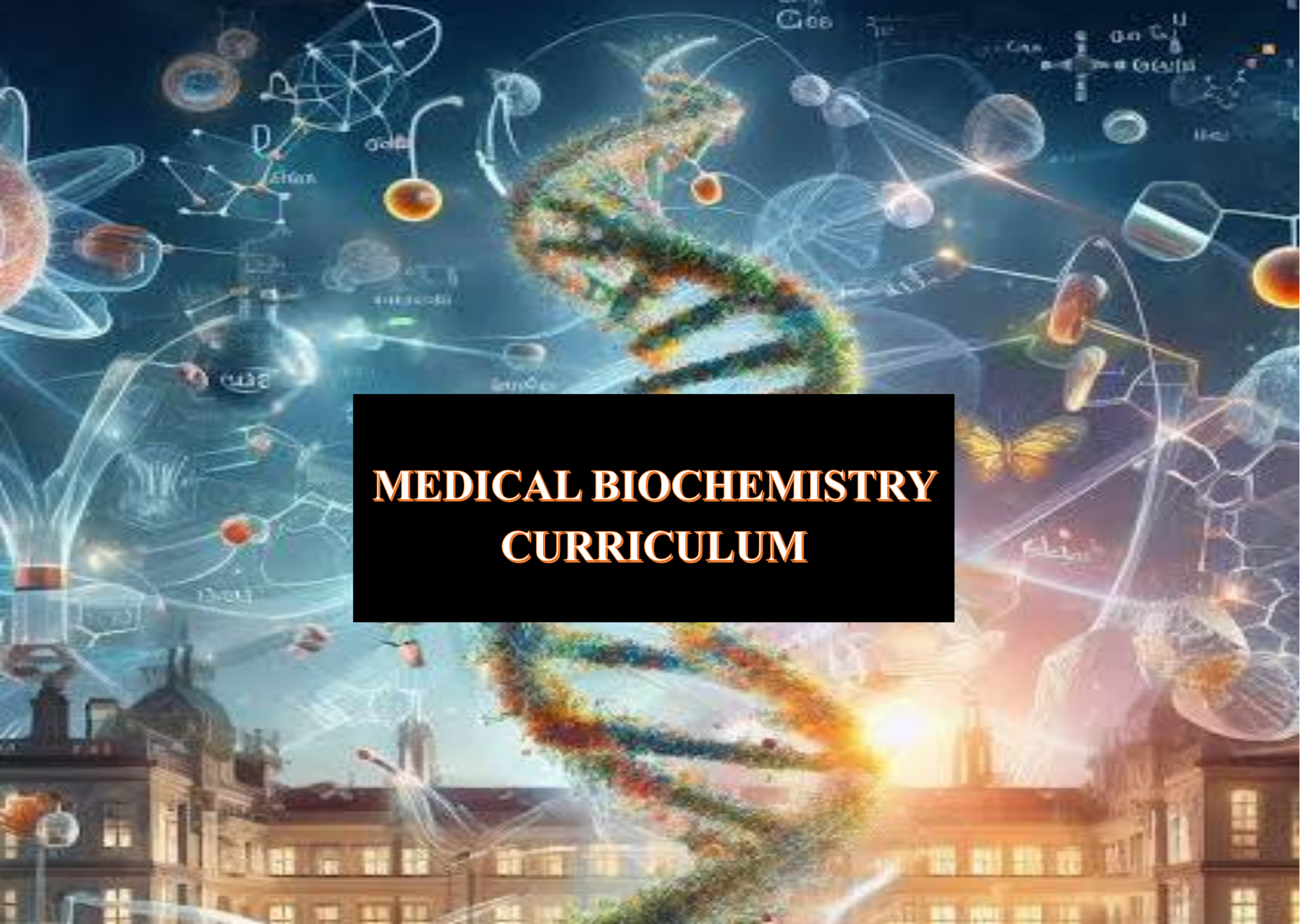
19.	**Male reproductive hormones**	The learners will be able to • Relate the structure of male reproductive organ with their functions	• Enlist the male reproductive hormones. • Relate the effects of testosterone with the development of primary &secondary sexual characteristics from fetal to adult life.	LGIS, SGDs	MCQs, SAQs, Structured viva
20.	**Regulation of Male Reproductive Hormones**		• Relate the regulation of male reproductive hormone through Hypothalamic pituitary gonadal axis with the development of primary and secondary sexual.	LGIS, SGDs	MCQs, SAQs, Structured viva
21.	**Spermatogenesis**	The learners will be able to • Describe the regulation of spermatogenesis	• Correlate the biosynthesis, mechanism of action and metabolic role of hormones affecting spermatogenesis	LGIS, SGDs	MCQs, SAQs, Structured viva
22.	**Semen analysis**		• Recognize different seminal parameters for semen analysis • Interpret the given semen analysis report	Skill lab	OSPE
23.	**OvarianCycle-I**	The learners will be able to	• Differentiate between the follicular& luteal phase of ovarian cycle • Relate the role of various LH, FSH and inhibin in regulation of various phases of ovarian cycle	LGIS, SGDs	MCQs, SAQs, Structured viva

24.	**OvarianCycle-I**	• Correlate the ovarian and endometrial cycle with hypothalamopituitary axis regulation and discuss structural and operative physiology of reproductive system integrating it with applied physiology.	• Relate the role of LH surge to the onset of ovulation, maintenance and involution of corpus luteum during ovarian cycle.	LGIS, SGDs	MCQs, SAQs, OSVE
25.	**EndometrialCycle-I**		• Define endometrial cycle. • Differentiate amongst Proliferative, Secretory and menstrual phase of endometrial cycle	LGIS, SGDs	MCQs, SAQs, OSVE
26.	**Endometrial Cycle-II**		• Describe the interplay between ovarian and Hypothalamic hormones in the regulation of female endometrial cycle with the help of diagram. • Discuss the menstrual history of a female along with its abnormalities (Menorrhagia, Metromenorrhagia, Oligomenorrhea, polymenorrhea, polymenorrhagia, Amenorrhea)	LGIS, SGDs	MCQs, SAQs, Structured viva
27.	**Interpretation of HormonalProfile**	The learners will be able to • Analyse the hormonal profile and interpret the findings	• Interpret the female hormonal profile of a given report on the basis of FSH & LH levels	Skill lab	OSPE

28.	**Functions of Estrogen and Progesterone**	The learners will be able to • Compare and contrast the effect of estrogen and progesterone	• Relate the effects of estrogen with the development of primary & secondary female sexual characteristics from fetal to adult life • Discuss the effects of progesterone in menstrual cycle and pregnancy	LGIS, SGDs	MCQs, SAQs, OSVE
29.	**Functions of the Placenta-I and II**	The learners will be able to • Describe the physiological changes in female in pregnancy and parturition	• Relate the mechanism of transport of nutrients and waste products across placenta with the various stages of fetal development during Pregnancy • Relate the function of placental hormones in the maintenance of • pregnancy.	LGIS, SGDs	MCQs, SAQs, OSVE
30.	**Physiological Changes in Mother During Pregnancy**		• Relate the physiological changes in female during pregnancy, with reference to physical, metabolic, circulatory and respiratory functions during pregnancy.	LGIS, SGDs	MCQs, SAQs, Structured viva

31.	**PregnancyTest**	The learners will be able to • Describe the physiological basis of PregnancyTest	• Perform pregnancy test on a given urine sample. • Calculate the expected date of delivery from given date of last menstrual period. • Calculate the fertile period of menstrual cycles of various duration.	Skill lab	OSPE
32.	**Parturition-I**	The learners will be able to • Describe Parturition process	• Define parturition • Scribe the factors leading to onset of parturition • Differentiate between hormonal and mechanical factors leading to the onset of parturition	LGIS, SGDs	MCQs, SAQs, Structured viva
33.	**Parturition-II**		• Relate the feedback mechanism of oxytocin with various stages of parturition	LGIS, SGDs	MCQs, SAQs, Structured viva
34.	**Lactation**	The learners will be able to • Describe the process of lactation	• Outline the physiological processes involved in lactation. • Differentiate between the mechanism of milk secretion and ejection	LGIS, SGDs	MCQs, SAQs, Structured viva

35.	**Menopause**	The learners will be able to • Relate the hormonal changes in female to physiological effects of menopause	• Define menopause. • Relate the altered ovarian hormone level with the development of menopause • Correlate the changes in female body with the altered level of FSH and LH during menopause • Correlate the physiological and clinical effects of estrogen and other hormone deficiencies in a postmenopausal woman	LGIS, SGDs	MCQs, SAQs, Structured viva
36.	**Fetal Physiology**	The learners will be able to • Describe the physiological basis of fetal growth and neonatal adjustment to extra-uterine life	• Summarize the growth and functional development of the fetus. • Explain the adjustments of the infant to extrauterine life • Describe circulatory readjustments at birth	LGIS SGD	MCQs SAQs Structured viva



MEDICAL BIOCHEMISTRY CURRICULUM

S. No	TOPIC/THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLS
1.	**Cell Chemistry**	The learners will be able to • Describe the structure, function & biochemical composition of cell membrane and sub cellular organelles. • Discuss biochemistry of eukaryotic & prokaryotic cell and related inherited disorders. • Describe signaling pathways and receptors. • Describe structure, functions and marker enzymes of the cell organelles.	• Discuss biochemical composition and role of cell membrane. • Discuss role of phospholipids, cholesterol, proteins, fatty acids and anchoring of proteins in cell membrane. • Describe the structure and functions of different organelles and the cytoskeleton and related inherited disorders. • Compare features of a prokaryotic and a eukaryotic cell. • Discuss cell fractionation techniques (e.g. ultracentrifugation). • List the names of biomarker enzymes of cell organelles. • Enumerate the enzymes present in mitochondrial matrix and peroxisomes. • Compare mitochondrial and nuclear DNA. • Explain ligands and different types of receptors. • Describe cell surface membrane receptors and adenylate cyclase pathway.	LGIS, CBL, SGDs, Flipped classroom	SEQs, SAQs, MCQs, Quiz, Structured Viva

			• Explain Calcium/ phosphatidylinositol pathway. • Discuss Guanylate cyclase pathway. • Describe Kinase / phosphatase pathway. • Discuss cytoplasmic/nuclear receptors.		
2.		The learners will be able to • Demonstrate lab safety protocols. • Demonstrate the principle and working of microscope and centrifuge. • Perform the preparation of different solution and its types. • Perform DNA extraction.	• Demonstrate lab safety protocols and recall the basic equipment. • Demonstrate basic laboratory techniques. • Demonstrate the use of pipetting. • Perform the preparation of different solutions. • Demonstrate the use and working of a centrifuge. • Perform extraction of DNA from onion cells according to the given standard.	Practical	OSPE/ Structured viva
3.	**Carbohydrate Chemistry**	The learners will be able to • Classify carbohydrates. • Discuss chemical and physical properties and biomedical importance of carbohydrates. • Discuss monosaccharides, disaccharides and oligosaccharides.	• Classify carbohydrates. • Discuss structure, properties and functions of monosaccharides. • Differentiate between glycemic index (GI) and glycemic load (GL). • Discuss isomerism in monosaccharides (stereoisomers,	LGIs, CBL, SGDs, Flipped classroom	SEQs, SAQs, MCQs, Quiz, Structured Viva

		• Differentiate between glycemic index (GI) and glycemic load (GL). • Describe isomerism with examples. • Discuss mutarotation. • Discuss polysaccharides. • Differentiate between homopolysaccharides and heteropolysaccharides with examples. • Elaborate the functions of different glycosaminoglycans (GAGs).	enantiomers, epimers, anomers, D & L isomers. • Describe mutarotation. • Discuss structure, properties and biochemical roles of disaccharides. • Discuss structure, properties and biochemical importance of oligosaccharides. • Discuss structure and functions of homopolysaccharides (starch, glycogen, cellulose, dextrose, dextrin, dextran). • Discuss structure and biochemical roles of heteropolysaccharides (glycosaminoglycans, glycoproteins, glycolipids).		
4.		The learners will be able to • Demonstrate the scheme of detection of unknown carbohydrates in the given sample.	• Demonstrate the method of Molisch's Test. • Demonstrate the method of Fehling's Test. • Demonstrate the method of Barfoed's Test. • Demonstrate the method of Benedict's Test. • Demonstrate the method of iodine test. • Demonstrate the method of Seliwanoff Test. • Demonstrate the method of Osazone test.	Practical	OSPE, Structured Viva

			• Identify unknown carbohydrate in the given solution according to the scheme.		
5.	**Protein Chemistry**	The learners will be able to • Describe principles and applications of different protein-separating techniques. • Elaborate biomedical importance of amino acids. • Explain the structure, physical, chemical properties and functions of amino acids with respect to clinical scenario. • Discuss dissociation and titration of amino acids. • Discuss the role of amino acids and proteins in maintenance of pH. • Describe organization of structure of proteins and denaturation of proteins. • Describe fibrous and globular proteins. • Describe protein misfolding and related disorders. • Discuss significance of plasma proteins. • Discuss structure and biochemical significance of immunoglobulins. • Explain nutritional significance of proteins.	• Explain methods of Separation of proteins e.g. salting out, ELISA, Electrophoresis, Chromatography, and Centrifugation. • Classify amino acids based on nutritional requirements, side chain and metabolic fate. • Describe chemical structure and properties of amino acids. • Discuss importance of proteins/ amino acids in maintenance of body pH. • Discuss dissociation, titration and importance of amino acids. • Classify proteins based on functions, physiochemical properties and structure. • Describe peptide bond formation & its characteristics. • Discuss primary, secondary, tertiary and quaternary structures of proteins. • Describe interactions that stabilize structure of proteins. • Explain denaturation of proteins.	LGIS, CBL, SGDs, Flipped membrane	SEQs, SAQs, MCQs, Quiz, Structured Viva

			• Discuss protein folding and role of chaperones in protein folding. • Describe protein misfolding and related diseases (Amyloidosis, Prion disease, Alzheimer disease). • Discuss globular and fibrous proteins. • Discuss biochemical role of collagen and elastin. • Discuss briefly disorders related to structure and metabolism of elastin and collagen. • Enlist different types of immunoglobulins. • Describe the structure of immunoglobulins. • Discuss biochemical roles of immunoglobulins. • Discuss biochemical significance of plasma proteins.		
6.		The learners will be able to • Perform general tests for detection of proteins/amino acids in accordance with established protocols and standards. • Perform paper chromatography.	• Demonstrate the method of Biuret Test. • Demonstrate the method of Xanthoproteic Test. • Demonstrate the presence of Millon Nasse's Test. • Demonstrate the method of Ninhydrin Test. • Demonstrate the method of Lead sulphide test.	Practical	OSPE, Structured Viva

			• Perform the separation of amino acids in a given solution by given protocols of paper chromatography.		
7.	**Lipids and fatty acid chemistry**	The learners will be able to • Discuss classification and biomedical importance of fatty acids. • Classify lipids. • Discuss properties of lipids like saponification and rancidity. • Discuss classification and biomedical importance of fatty acids. • Discuss the sources, properties, and biomedical role of cholesterol and triacylglycerols, ketone bodies, phospholipids, glycolipids and sphingolipids. • Discuss the role of different lipoproteins in the development of atherosclerosis. • Discuss the biochemical role of eicosanoids. • Discuss lipid peroxidation and its significance. • Describe free radical formation with their clinical significance.	• Classify fatty acids. • Discuss biomedical importance of fatty acids. • Correlate the significance of essential fatty acids in relation to health and disease. • Classify lipids. • Discuss properties of lipids like saponification and rancidity. • Discuss the biochemical properties of triacylglycerols. • Classify phospholipids. • Explain the structure, chemistry and functions of glycerophospholipids. • Describe the structure, chemistry and functions of Sphingophospholipids. • Explain the structure, chemistry and functions of glycolipids. • Discuss the structure, chemistry and functions of cholesterol. • Elucidate the biochemical roles of prostaglandins. • Explain the biochemical roles of leukotrienes.	LGIS, CBL, SGDs, Flipped classroom, PBL	SAQs, SEQs, MCQs, Quiz, Structured viva

			• Discuss biochemical roles of thromboxane and prostacyclins. • Discuss chemistry and functions of lipoproteins. • Discuss the role of lipoproteins in the development of atherosclerosis. • Discuss biochemical significance of lipid peroxidation. • Describe free radical formation with their clinical significance.		
8.		The learners will be able to • Perform detection of lipids and fatty acids in given sample.	• Perform detection of lipids and fatty acids in the given sample by ✓ Acrolein test ✓ Solubility test	Practical	OSPE, Structured Viva
9.	**Biochemistry of Enzymes**	The learners will be able to • Classify enzymes. • Discuss mechanism of action of enzymes and enzyme kinetics. • Discuss enzyme inhibition and regulation of enzymatic activity. • Describe isoenzymes, apoenzymes, holoenzyme, metalloenzymes, coenzymes, cofactors.	• Explain nomenclature of enzymes. • Classify enzymes with examples. • Make a diagram to explain structure of enzymes. • Discuss isoenzymes, coenzymes, apoenzymes, holoenzyme, metalloenzymes, and cofactors with suitable examples.	LGIS, CBL, SGDs, Flipped classroom	SAQs, SEQs, MCQs, Quiz, Structured Viva

		• Discuss the applications of enzymes in diagnostics and therapeutics.	• Discuss the mechanism of enzyme action and catalysis and factors affecting enzyme activity. • Discuss regulation of enzyme activity. • Differentiate between competitive and non-competitive enzyme inhibition. • Describe clinical applications (in diagnostics and therapeutics) of enzymes. • Discuss the clinical significance of cardiac enzymes (biomarkers).		
10.		The learners will be able to • Demonstrate the effect of different factors on salivary amylase activity. • Estimate plasma level of Creatine Kinase (CK-MB). • Estimate plasma level of lactate dehydrogenase (LDH).	• Demonstrate the effect of pH and temperature on salivary amylase activity (S & A) • Demonstrate the method of estimating plasma levels of Creatine Kinase (CK-MB). • Demonstrate the method of estimating plasma levels of lactate dehydrogenase (LDH).	Practical	OSPE, structured viva
11.	**Porphyrins and Hemoglobin**	The learners will be able to • Explain synthesis of heme. • Discuss porphyrias. • Compare hepatic and erythropoeitic porphyrias. • Discuss degradation of heme. • Discuss different types of jaundice.	• Discuss basic concepts of structures and types of porphyrins and heme. • Describe the biosynthesis of porphyrins & heme. • Discuss hepatic and erythropoeitic porphyrias. • Explain the process of heme degradation.	LGIS, CBL, SGDs, PBL, Flipped classroom	SEQs, SAQs, MCQs, Quiz, Structured Viva

		• Discuss hemoglobinopathies and alpha and beta thalassemias. • Discuss iron metabolism along with associated disorders.	• Discuss formation of bile pigment and bile salts, transport and excretion. • Explain the causes and types of hyperbilirubinemia. • Construct a table comparing pre- hepatic, hepatic and post-hepatic jaundice. • Discuss the biochemical causes and manifestations of different hemoglobinopathies (Hemoglobin S disease, Hemoglobin C disease, Hemoglobin SC disease, Methemoglobinemia, alpha and beta thalassemias). • Discuss absorption, transport and storage of dietary iron. • Correlate iron metabolism with hemosiderosis and hemochromatosis.		
12.	**LFTs**	The learners will be able to • Perform Liver Function Tests.	• Estimate serum levels of bilirubin according to given standard. • Estimate serum levels of alanine transaminase (ALT). • Estimate serum levels of aspartate transaminase (AST). • Estimate serum levels of alkaline phosphatase (ALP).	Practical	OSPE, Structured Viva
13.	**Vitamins and Minerals**	The learners will be able to	• Classify vitamins.	LGIS, CBL, SGDs, Flipped classroom	SEQs, SAQs, MCQs, Quiz, Structured Viva

		• Discuss sources, biochemical roles, hypervitaminosis and hypovitaminosis of water-soluble vitamins. • Discuss sources, biochemical roles, hypervitaminosis and hypovitaminosis of fat-soluble vitamins. • Discuss sources, regulation and biochemical roles of different minerals. • Discuss toxicity and deficiency states of macro and microminerals.	• Discuss the sources of different water-soluble and fat-soluble vitamins. • Discuss Recommended Daily Allowance (RDA) of water-soluble and fat-soluble vitamins. • Discuss structure of water-soluble and fat-soluble vitamins. • Discuss biosynthesis and storage of vitamins. • Discuss biochemical roles of water soluble and fat-soluble vitamins in detail. • Discuss mechanism of action of different vitamins. • Discuss hypervitaminosis (toxicity) and hypovitaminosis (deficiency disorders) with respect to different vitamins. • Discuss the sources, absorption, regulation and biochemical significance of macrominerals: (sodium, potassium, calcium, chloride, phosphate, sulphur) • Discuss the sources, absorption, regulation and biochemical significance of micro minerals: (iron, zinc, magnesium, selenium, iodine, fluoride, copper,		

			manganese, chromium and cadmium) • Discuss toxicity and deficiency states of macrominerals. • Discuss toxicity and deficiency states of microminerals.		
14.	**Nutrition**	The learners will be able to • Discuss an overview of nutrition. • Discuss basal metabolic rate, respiratory quotient and specific dynamic action. • Explain different components of balanced diet. • Discuss Body Mass Index (BMI). • Discuss metabolic aspects of obesity. • Describe nutritional disorders and nutritional requirements in pregnancy, lactation and newborn. • Discuss protein energy malnutrition.	• Give an overview of nutrition. • Discuss Acceptable Macronutrient Distribution Ranges (AMDR). • Discuss the importance of BMR and RQ with respect to clinical scenario. • Discuss specific dynamic action (SDA). • Enumerate components of balanced diet. • Discuss biochemical importance of carbohydrates and proteins in balanced diet. • Discuss biochemical importance of dietary lipids in balanced diet. • Discuss nutritional requirements in pregnancy, lactation & newborn. • Discuss the role of balanced diet and caloric requirement. • Describe causes and metabolic changes in obesity.	LGIS, CBL, SGDs, Flipped classroom	SEQs, SAQs, MCQs, Quiz, Structured Viva

			• Interpret BMI in relation to obesity and malnutrition. • Discuss causes and biochemical/metabolic changes in Protein Energy Malnutrition (Marasmus and Kwashiorkor). • Compare Marasmus and Kwashiorkor. • Describe nutritional advice to be given for management of a child with protein energy malnutrition (PEM).		
		The learners will be able to • Calculate Body mass index (BMI). • Perform biochemical analysis milk.	• Calculate body mass index (BMI). • Perform milk analysis by separating different components of residues and filtrate.	Practical	OSPE, Structured viva
15.	**Bioenergetics and Biologic oxidation**	The learners will be able to • Discuss the endergonic and exergonic reactions with their clinical significance. • Describe biological oxidation with its clinical disorders. • Explain Respiratory chain, redox potential and oxidation phosphorylation with clinical disorders. • Describe the biochemical process of ATP synthesis.	• Discuss free energy change, entropy and enthalpy during chemical reactions. • Explain Mitchell Hypothesis. • Construct a diagram showing components of electron transport chain. • Discuss flow of electron across electron transport chain (ETC). • Correlate the structure and mechanism of action of ATP synthase.	LGIS, Tutorials, CBL, SGDs, Flipped classroom	SEQs, SAQs, MCQs, Quiz, Structured Viva

		• Discuss the role of uncouplers and inhibitors in oxidative phosphorylation.	• Discuss inhibitors of ETC & uncouplers of oxidative phosphorylation. • Describe substrate shuttles for the transport of electrons across inner mitochondrial membrane.		
16.	**Carbohydrate Metabolism**	The learners will be able to • Describe the digestion and absorption of dietary carbohydrates with their clinical implications. • Discuss glycolysis with biochemical basis of its clinical correlation. • Discuss Tricarboxylic Acid (TCA) cycle with biochemical basis of its clinical correlation. • Discuss gluconeogenesis with biochemical basis of its clinical significance. • Discuss the biochemical basis of HMP shunt with its clinical disorders. • Describe hemolysis in G6PD deficiency with clinical implications. • Describe biomedical importance of uronic acid pathway along with its clinical significance. • Discuss fructose metabolism with biochemical basis of its clinical disorder.	• Discuss digestion and absorption of dietary carbohydrates. • Discuss the process of glycolysis. • Describe the regulation of glycolysis. • Calculate energy yield of glycolysis. • Describe various components of pyruvate dehydrogenase complex. • Explain the reactions of TCA cycle. • Discuss the regulation and energetics of TCA cycle. • Discuss the substrates used for gluconeogenesis. • Describe the reactions of Gluconeogenesis. • Discuss the regulation of Gluconeogenesis. • Describe the irreversible oxidative reactions of Hexose Monophosphate (HMP) shunt.	LGIS, CBL, SGDs, Flipped classroom, PBL	SEQs, SAQs, MCQs, Quiz, Structured Viva

		• Describe the metabolism of galactose and sorbitol in relation to diabetes mellitus. • Correlate ethanol metabolism with alcoholic liver disease. • Discuss glycogen metabolism with clinical significance. • Discuss glycogen storage diseases with their clinical implications.	• Describe the reversible non-oxidative reactions of Hexose Mono Phosphate (HMP) shunt. • Discuss the biochemical uses of NADPH. • Discuss G6PD deficiency and its clinical implications. • Describe the pathways and responsible for metabolism of fructose. • Discuss metabolism of galactose and sorbitol in relation to diabetes mellitus. • Describe disorders associated with fructose and galactose metabolism. • Discuss steps and regulation of glycogenesis and glycogenolysis. • Discuss enzyme deficiencies and biochemical effects of glycogen storage diseases. • Describe the steps and biomedical importance of uronic acid pathway. • Discuss ethanol metabolism with relation to alcoholic liver disease. •		
17.		The learners will be able to	• Perform the estimation of blood glucose level with finger prick test-Glucometer.	Practical	OSPE, structured viva

		• Perform the estimation of blood glucose level with Finger Prick Test-Glucometer. • Perform the estimation of plasma glucose according to established standards.	• Estimate plasma glucose level by enzymatic glucose oxidase method. • Estimate plasma glucose level by enzymatic orthotolidine method.		
18.	**Metabolism of Lipids**	The learners will be able to • Describe digestion and absorption of dietary lipids. • Identify the properties, composition, functions and regulation of bile. • Discuss the Biomedical importance of fatty acid synthesis. • Discuss the synthesis of triacylglycerol with its clinical disorders. • Describe the oxidation of fatty acids along with its types and its clinical significance. • Describe the metabolism of cholesterol and its clinical disorders. • Discuss the metabolism of lipoproteins and its clinical disorders. • Correlate development of coronary heart disease and biochemical basis of atherosclerosis.	• Describe the digestion & absorption of dietary lipids. • Explain the properties, composition, functions and regulation of bile. • Describe reactions involved in de novo synthesis of fatty acids. • Summarize the regulation of de novo synthesis of fatty acids. • Discuss synthesis of triacylglycerols along with disorders. • Describe the mobilization and activation of fatty acids. • Explain carnitine shuttle with the help of a diagram. • Discuss sources and inhibitor of carnitine shuttle. • Enumerate the steps of beta oxidation of fatty acids. • Discuss the regulation and energy yield of of beta oxidation of fatty acids. • Discuss different disorders of fatty acid oxidation.	LGIS, CBL, SGDs, Flipped classroom,	SEQs, SAQs, MCQs, Quiz, Structured Viva

		• Discuss the metabolism of Eicosanoids along with clinical disorders. • Discuss the metabolism of phospholipids and its clinical significance. • Discuss the metabolism of glycolipids and sphingolipids along with its clinical significance. • Discuss the metabolism of ketone bodies and its clinical significance.	• Discuss various fates of acetyl CoA. • Explain other types of fatty acid oxidation. • Enlist ketone bodies. • Elucidate the process of ketogenesis. • Elucidate the process of ketolysis along with energy yield. • Discuss ketosis in relation to health and disease. • Discuss Diabetic ketoacidosis (DKA)-a medical emergency in diabetes mellitus. • Discuss synthesis of phosphatidylcholine & phosphatidylethanolamine. • Discuss synthesis of sphingophospholipids and sphingomyelin. • Discuss degradation of phospholipids. • Discuss metabolism of glycolipids and sphingolipids. • Explain different types of Sphingolipidosis (IGM 1 Gangliosidosis, Tay-sachs disease, Gauchers disease, metachromatic leukodystrophy). • Discuss the biochemical basis of Sphingolipidosis II Sandhoff disease, Fabrys		

			disease, Niemann-Pick disease, Farber disease, Krabbe disease. • Discuss biosynthesis of Eicosanoids: Cyclooxygenase pathway and Monooxygenase pathway. • Explain the structure and chemistry of lipoproteins. • Elucidate the metabolism of chylomicrons. • Describe the metabolism of VLDL, LDL and HDL. • Discuss the significance of lipoproteins in relation to health and disease. • Discuss denovo synthesis of cholesterol. • Discuss the regulation of cholesterol biosynthesis. • Discuss different types of hyperlipidemias and hypercholesterolemia. • Correlate the biochemical basis of atherosclerosis with development of coronary artery disease.		
19.		The learners will be able to • Perform tests included in Lipid profile.	• Estimate plasma level of total cholesterol by enzymatic method. • Estimate plasma level of HDL cholesterol. • Estimate plasma level of LDL cholesterol.	Practical	OSPE, structured viva

			• Estimate plasma level of Triacylglycerols.		
20.	**Metabolism of proteins and amino acids**	The learners will be able to • Describe digestion and absorption of dietary proteins. • Discuss the biochemical importance of Transamination and Deamination with clinical disorder. • Describe the mechanism of transport of ammonia and the formation of urea. • Discuss the effects of ammonia toxicity on brain. • Discuss the metabolism of amino acids and their inherited disorders.	• Discuss digestion & absorption of dietary proteins. • Discuss transport of amino acids into cells. • Explain transamination and deamination reactions. • Discuss nitrogen balance. • Discuss formation of ammonia. • Discuss transport of ammonia to liver. • Discuss the steps of ammonia detoxification- urea cycle • Describe genetic defects of urea cycle. • Discuss genetic and acquired causes of hyperammonemia. • Discuss biochemical aspects of ammonia toxicity and its effects on the brain. • Discuss synthesis and degradation of different amino acids. • Discuss enzyme deficiencies and resultant defects associated with the metabolism of different amino acids (phenylalanine, tyrosine, tryptophan, branched chain amino acids,	LGIS, CBL, SGDs, Flipped classroom, PBL	SEQs, SAQs, MCQs, Quiz, Structured Viva

			methionine, cysteine, cystine).		
21.		The learners will be able to • Perform urinalysis. • Perform renal function tests. • Perform estimation of plasma albumin.	• Perform analysis of urinary constituents by dipstick method. • Prepare a urinalysis report. • Estimate plasma level of urea by urease method (Berthelot Method). • Estimate plasma level of creatinine according to given standards. • Perform estimation of plasma albumin according to standard protocols.	Practical	OSPE, Structured viva
22.	**Metabolism of Nucleotides**	The learners will be able to • Discuss structure and biomedical role of nucleosides and nucleotides. • Describe chemistry of purines and pyrimidine, their types, structure and function. • Discuss derivatives of purines and pyrimidines and their role in health and disease with implementation in research case. • Discuss the digestion and absorption of nucleic acids with its clinical disorders. • Discuss the purine metabolism with biochemical basis of its clinical disorders.	• Discuss structure, types and functions of purines and pyrimidines and their derivatives. • List key points about the structure of nucleosides and nucleotides. • Differentiate between nucleosides and nucleotides. • Enumerate the role of derivatives of nucleosides and nucleotides in health and disease. • Discuss digestion and absorption of nucleic acids along with clinical disorders. • Describe synthesis of purine nucleotides.	LGIS, CBL, SGDs, Flipped classroom	SEQs, SAQs, MCQs, Quiz, Structured Viva

		• Discuss the pyrimidine metabolism with biochemical basis of its clinical disorders.	• Discuss inhibitors of purine synthesis. • Explain feedback inhibition of purine synthesis. • Discuss mechanism of action of mycophenolate with respect to purine synthesis. • Discuss purine salvage pathway. • Discuss Lesch-Nyhan Syndrome. • Describe degradation of purine nucleotides. • Discuss diseases associated with purine degradation. • Describe pyrimidine synthesis. • Discuss disorders associated with pyrimidine synthesis. • Discuss conversion of dTMP from dUMP in relation to mechanism of action of anti-neoplastic drugs. • Explain key features about salvage of pyrimidines and degradation of pyrimidine nucleotides.		
23.		The learners will be able to • Perform plasma uric acid estimation.	Estimate plasma level of uric acid in the given sample.	Practical	OSPE, Structured Viva
24. .	**Biochemical genetics**	The learners will be able to	• Discuss structure, types and functions of RNA and DNA.	LGIS, CBL, SGDs, Flipped classroom	SEQs, SAQs, MCQs, Quiz, Structured Viva

		• Describe the structure, function and different types of DNA & RNA. • Describe the process of replication of DNA, mutation and DNA repair with biochemical basis of its clinical disorder. • Describe the process of transcription, RNA process with biochemical basis of its clinical disorder. • Describe the process of translation and genetic code with biochemical basis of its clinical disorder. • Describe the regulation of Gene expression with biochemical basis of its clinical disorder. • Discuss the mechanism of Genetic Disorders. • Discuss the basic techniques used in molecular genetics. • Describe processes of DNA replication. • Discuss the process of transcription. • Discuss the process of protein translation. • Describe DNA mutations and DNA repair mechanisms	• Discuss the double helical structure of DNA (Watson-Crick Model). • Discuss the role of histones in organization of DNA. • Discuss semiconservative model of DNA Replication. • Discuss various types and functions of DNA polymerases. • Describe separation of DNA strands and formation of replication fork. • Explain phenomenon of DNA supercoiling. • Discuss the role of topoisomerases. • Explain the formation and significance of Okazaki fragments during replication. • Discuss termination of replication. • Describe eukaryotic DNA replication. • Define telomeres. • Discuss telomere shortening. • Discuss the role of telomerases. • Explain organization of DNA into chromosomes. • Describe different mechanisms of DNA repair.		

		• Discuss different molecular techniques e.g. Polymerase chain reaction.	• Discuss disorders related to DNA repair (e.g. xeroderma pigmentosum).
			• Discuss initiation, elongation and termination of transcription in prokaryotes.
			• Discuss initiation, elongation and termination of transcription in eukaryotes.
			  • Discuss post-transcriptional modifications of mRNA.
			  • Discuss the concept of lac operons in detail.
			• Discuss reverse transcription with reference to HIV.
			• Explain types, properties and functions of genetic code.
			• Enlist steps of translation of proteins.
			• Describe all events involved in Translation.
			• Discuss codon recognition by tRNA - Wobble hypothesis.
			• Discuss Inhibitors of protein synthesis at each stage of translation.
			• Describe post-translational processing of newly formed proteins.
			• Discuss regulation of gene expression.
			  • Explain Recombinant DNA technology.		

			• Discuss RFLP and restriction endonucleases. • Describe molecular cloning. • Define vectors. • Describe polymerase chain reaction (PCR). • Discuss the applications of PCR. • Describe southern blotting technique. • Discuss salient features and applications of gene therapy. • Discuss the mechanism of genetic disorders. • Name different types of mutations in DNA. • Discuss clinical manifestations of different DNA mutations. • Discuss different mechanisms for DNA repair.		
25.		The learners will be able to • Demonstrate the working of a Thermal cycler. • Demonstrate the process of gel electrophoresis.	• Show different parts of a Thermal cycler. • Demonstrate setting of no. of cycles and temperature regulation during different stages of polymerase chain reaction. • Follow the protocol of working on the thermal cycler.	Practical	OSPE, structured viva

			• Demonstrate the process of gel electrophoresis.		
26.	**Biochemistry of endocrine system**	The learners will be able to • Correlate the structure, biosynthesis, mechanism of action and metabolic role of different hormones.	• Explain ligands and different types of receptors. • Classify hormones. • Integrate classification and mechanism of action of hormones. • Discuss structure, biosynthesis, mechanism of action and metabolic role of different hormones (pituitary hormones, thyroid hormones, parathyroid hormone, calcitonin, pancreatic hormones, adrenal cortical hormones, adrenal medullary hormones). • Discuss the role of parathyroid hormone and calcitonin in regulation of calcium levels. • Discuss the structure, biosynthesis, mechanism of action of estrogen, testosterone and progesterone. • Discuss the structure, biosynthesis, mechanism of action and metabolic role of oxytocin and prolactin.	LGIS, CBL, SGDs, Flipped classroom, PBL	SEQs, SAQs, MCQs, Quiz, Structured Viva

			• Discuss biochemical roles and effects of different hormones with respect to carbohydrate, protein and lipid metabolism.		
27.		The learners will be able to • Perform estimation of plasma calcium levels. • Perform estimation of serum leptin.	• Perform estimation of plasma calcium according to standard protocols. • Perform estimation of serum leptin according to the given standard protocol.	Practical	OSPE, Structured viva
28.	**Water and electrolyte balance and acid base balance**	The learners will be able to • Elaborate the role of pH and dissociation constant in buffering capacity, Ionization of water, weak acids, bases, and titration curve of weak acids. • Discuss applications of H-H equation. • Discuss different buffers and acid base regulation in human body. • Discuss the sources and absorption of Na+ and K+, their balance and imbalance with clinical disorders. • Describe the types, causes and mechanism of metabolic acidosis and alkalosis with clinical significance. • Describe the types, causes and mechanism of	• Discuss biochemical mechanisms for control of water and electrolyte balance. • Discuss the sources and absorption of Na+ and K+, their balance and imbalance with clinical disorders. • List different buffers in the body. • Describe different buffers along with their qualities and mechanism of action. • Classify buffers with examples. • Describe blood and plasma buffers. • Explain renal buffers. • Discuss the role of kidneys in pH regulation.	LGIS, CBL, SGDs, Flipped classroom	SEQs, SAQs, MCQs, Structured Viva

		respiratory acidosis and alkalosis with clinical significance.	• Describe the role of respiratory system in pH regulation. • Classify Acid-base disturbances. • Describe acid base disturbances/ disorders. • Describe and interpret Arterial Blood Gases (ABG). • Discuss anion gap and base excess with clinical correlation.		
29.		The learners will be able to • Perform pH estimation. • Interpret Arterial Blood Gases (ABGs) report.	• Identify pH of different solutions using electrometric method. • Interpret Arterial Blood Gases (ABGs) report.	Practical	OSPE, Structured Viva
30.	**Neurotransmitters**	The learners will be able to • Discuss the metabolism, biomedical importance and associated diseases of neurotransmitters.	• Discuss the metabolism, biomedical importance and associated disorders of acetylcholine, glutamate, GABA, glycine, serotonin, dopamine.	LGIS, CBL, SGDs, Flipped classroom, PBL	SEQs, SAQs, MCQs, Structured Viva
31.		The learners will be able to • Perform CSF analysis (protein, chloride, glucose).	• Perform CSF analysis (protein, chloride, glucose).	Practical	OSPE, Structured Viva

PHARMACOLOGY CURRICULUM

S. No	TOPIC/THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL
1.	**Introduction, Historical Overview**	The learners will be able to • Describe general features of drugs, define important terms related to pharmacology and recognize the importance of pharmacology and therapeutics in the practice of medicine	• Describe pharmacology and branches of pharmacology. • Discuss therapeutics and explain rational drug therapy. • Summarize role of Muslim scientists in advancement of pharmacology. • Briefly describe modern pharmacology • Discuss and explain pharmacokinetics and pharmacodynamics. • Differentiate chemotherapy, toxicology, clinical pharmacology, pharmacy, pharmacognosy, pharmacogenomics, pharmacoepidemiology, comparative pharmacology, animal pharmacology, pharmacoeconomics & posology. • Describe drug nomenclature/essential drugs/orphan drugs. • Describe general features of drugs. • Discuss standard sources of drug information; and • Differentiate pharmacopoeia and drug formularies.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce

2.	**Drug Transport Across Membrane & Drug Absorption**	The learners will be able to • Interpret the different pharmacokinetic patterns, their clinical significance and factors affecting these parameters.	• Discuss absorption of drugs and describe the processes by which drugs are absorbed across membranes. • Summarize different factors affecting absorption of drugs. • Explain role of ionization in absorption of drugs from different gastrointestinal barriers.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
3.	**Drug Bioavailability**		• Review and calculate bioavailability. • Discuss the factors affecting bioavailability of drugs & its clinical significance; and • Differentiate between bioequivalence, therapeutic equivalence & chemical equivalence.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
4.	**Drug Distribution & Plasma Protein Binding Of Drugs**		• Differentiate distribution & redistribution. • Discuss and explain concept of volume of distribution (Vd). • Discuss the significance of Vd • Discuss the characteristics of plasma protein binding & their clinical significance. • Describe relationship among volume of distribution and plasma protein binding; and • Discuss the drug reservoirs in the body.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
5.	**Biotransformation Of Drugs**		• Discuss biotransformation.	LGIS, CBL, SGD	MCQs SAQs OSPE

			• Explain the role of biotransformation /aims & types; and • Describe reactions and determinants of biotransformation.		Structured Viva/Voce
6.	**Plasma Half-Life Of Drugs**		• Describe and calculate plasma half-life. • Discuss graphical representation of half-life (time concentration curve). • Describe factors affecting half-life; and • Explain the clinical significance of half-life.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
7.	**Excretion Of Drugs: Drug Clearance**		• Review excretion of drug and classify major & minor routes of excretion. • Enlist processes involved in renal excretion. • Discuss the role of enterohepatic circulation in excretion of drug. • Describe and calculate drug clearance. • Discuss factors affecting clearance and outline its significance.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
8.	**Mechanism Of Drug Action**	The learners will be able to • Correlate the concept of molecular mechanistic to the therapeutics.	• Enumerate mechanisms of cellular-drug interaction. • Describe receptors and explain their types & distribution. • Discuss ligands and describe its types. • Describe types of drug-receptor interaction; and • Explain the concept of second messenger.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce

9.	**Factors Modifying Actions & Doses Of Drugs**		• Classify the determinants affecting action of drug. • Discuss factors affecting pharmacokinetics of drugs (age, body size, genetic & environmental factors, diseases & co-morbid states, concomitantly administered drugs); and • Discuss and explain factors responsible for pharmacodynamic variability (tolerance, synergism, antagonism etc.)	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
10.	**Dose Response Curve** **Structure Activity Relationship**		• Review dose response curve. • Discuss different types of dose response curve. • Describe characteristics of different dose response curves; and • Discuss the significance of dose response curve. • Explain concept of drug isomerism; and • Describe the relationship between drug structure and activity	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
11.	**Drug Toxicity**		• Describe drug toxicity. • Discuss types of drug toxicity. • Summarize the reasons that may lead to toxicity of drugs. • Recognize the toxic effects of drugs in the body organ systems. • Discuss teratogenicity, mutagenicity with examples; and • Describe pharmacovigilance.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce

12.	**Pharmacogenetics**	The learners will be able to • Identify the genetic principles in drug disposition	• Discuss pharmacogenetics and understand the concept of pharmacogenomics. • Explain common examples of pharmacogenetics.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
13.	**Sources Of Drugs**	The learners will be able to • Identify various sources from which drugs can be obtained	• Classify animal, plant & mineral sources of drugs • Explain recombinant DNA technology & its clinical applications	Practical	MCQs OSPE
14.	**Active Principles Of Drugs**	The learners will be able to • Co relate that different intrinsic chemical substance in drugs are responsible for pharmacological activity	• Discuss what an active principle is • Identify characteristics of different active principles	Practical	MCQs OSPE
15.	**Weights & Measures**	The learners will be able to • Identify the SI system of weights & measures	Describe various weights & measures	Practical	MCQs OSPE
16.	**Dosage Forms**	The learners will be able to • Identify various dosage forms for the same/different drugs	• Classify solid, liquid and inhalational dosage forms • Corelate which dosage form to be used in different conditions	Practical	MCQs OSPE
17.	**Routes Of Administration**	The learners will be able to • Identify/justify various modes of administering drugs to the body	• List various routes of drug administration • Explain advantages and disadvantages of all the different routes	Practical	MCQs OSPE
18.	**Biostatistics**	The learners will be able to • Discuss various statistical analysis techniques	• Calculate measures of central tendency • Calculate variance, standard deviation • Construct frequency tables • Apply different statistical tests of significance	Practical	OSPE

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19.	**Effect Of Drugs On Rabbit Ileum**	The learners will be able to • Interpret how drugs can act as agonists/antagonists to alter the motility and secretions of gastrointestinal tract	• Demonstrate & observe the effects of adrenaline, acetylcholine and histamine on receptors in the ileum • Demonstrate & observe the ceiling effect of agonists • Plot dose response curve & log dose response curve of agonist and antagonist	Practical	OSPE
20.	**A N S: Introduction**	The learners will be able to • Correlate the physiology of autonomic receptors with the therapeutic application	• Describe characteristics of parasympathetic & sympathetic nervous system with their neurotransmitters. • Discuss important autonomic receptors with their location.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
21.	**Directly Acting Cholinergic Drugs**		• Classify cholinergic drugs. • Describe cholinergic receptors. • Explain the mechanism of action, pharmacological effects, therapeutic uses & adverse effects of cholinergic drugs	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
22.	**Indirectly Acting Cholinergic Drugs (Anti-Cholinesterase)**		• Enumerate anti-cholinesterase. • Discuss reversible & irreversible anticholinesterases. • Outline the treatment of myasthenia gravis. • Recognize the clinical feature of Organophosphate Poisoning • Enlist the oximes & evaluate their role in organophosphate poisoning. • Design the management plan for organophosphate poisoning. • Explain acute & chronic nicotinic toxicity &their management.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce

23.	**Cholinergic Blockers**		• Classify cholinergic Receptors blockers (chemical & therapeutic). • Discuss in detail pharmacokinetics, mechanism of action, pharmacological action, therapeutic uses & adverse effects of cholinergic receptors blockers. • Compare & contrast hyoscine & atropine.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
24.	**Catecholamines**		• Classify adrenergic/ Sympathomimetic drugs • Describe catecholamines & characteristics of catecholamines. • Enumerate catecholamines • Discuss chemistry, metabolism, mechanism of action, pharmacological actions, therapeutic uses & adverse effects of epinephrine (adrenaline). • Differentiate Isoprenaline, dopamine & dobutamine in relation to their route of administration, organ system effects, therapeutic uses & adverse effects.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
25.	**Non-Catecholamines**		• Discuss structure activity relationship. • Enlist non-catecholamine. • Differentiate between catecholamines & non catecholamines. • Explain pharmacokinetics, mechanism of action organ system	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce

			effects, therapeutic uses & adverse effects of non- catecholamines.		
26.	**Adrenergic Blockers: Alpha- Receptor Blockers**		• Classify alpha receptors blockers. • Discuss different alpha blockers with their clinical uses. • Explain important untoward effects & give in detail the conditions in which alpha blockers should not be used. • Give the management of pheochromocytoma. • Explain "Epinephrine reversal".	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
27.	**Adrenergic Blockers: Beta Receptor Blockers**		• Classify beta receptors blockers according to receptor selectivity, intrinsic sympathomimetic & membrane stabilizing activity. • Discuss different beta receptors blockers with their clinical uses. • Describe adverse effects & contraindications of beta blockers.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
28.	**Skeletal Muscle Relaxants**		• Classify skeletal muscle relaxants. • Describe in detail non-depolarizing neuromuscular blockers. • Discuss depolarizing neuromuscular blockers (succinylcholine). • Enlist centrally acting skeletal muscle relaxants. • Describe individual drug briefly. • Identify the management of malignant hyperthermia.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
29.	**Drug Treatment Of Glaucoma**		• Describe glaucoma. • Classify drugs used in glaucoma.	CBL, SGD	MCQs SAQs OSPE

			• Discuss different drugs how they lower intraocular pressure in glaucoma. • Differentiate the drug treatment of open angle & angle closure glaucoma.		Structured Viva/Voce
30.	**Effect Of Drugs On Rabbit Eye**	The learners will be able to • Discuss how locally applied drugs can affect function of the different parts of eye	• Explain light and corneal reflex • Enumerate miotics and mydriatics • Explain action of parasympathomimetic & parasympatholytic drugs on eye • Demonstrate & observe action of adrenaline, pilocarpine, tropicamide & proparacaine on eye	Practical	OSPE
31.	**P-Drug & Prescription Writing**	The learners will be able to • Discuss the concept of Priority-Drug (p-drug) and why it is important	• Rationalize the use of a certain drug for a specific disease • Outline & write the parts of a proper prescription • Discuss general Principles and Guideline for Prescription Writing & Drugs Rational Use • Identify elements of the prescription • Identify prescribing Errors, Omission of Information • Recognize poor Prescription Writing, inappropriate drug Prescriptions • Discuss E-Prescribing, drug compliance • Discern legal factors involved in drug prescription • Classify Controlled Substances (Risk Evaluation and Mitigation Strategy)	Practical	OSPE

			• Appreciate the labeled & Off-Label uses of drugs, • Recognize socioeconomic Factors (cost of prescriptions, Generic Prescribing, other cost factors).		
32.	**P-Drug & Prescription Writing – Anaphylactic Shock**	The learners will be able to • Rationalize how to prescribe a specific drug for anaphylactic shock	• Identify the drug, dosage form & exact dosage for a patient of anaphylactic shock	Practical	OSPE
33.	**Hematinics**	The learners will be able to • Justify the management plan of anemia, coagulation disorders and dyslipidemias by correlating it to the patho-physiological basis of disease	• Recall the physiology of absorption & role of iron, vitamin B12 & folic acid in hematopoiesis. • Describe anemia & enlist common nutritional causes of anemia. • Enlist various oral & parenteral preparations of iron, vitamin B12 & folic acid; and • Identify the therapeutic role of iron, Vitamin B12 & folic acid in different types of anemia.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
34.	**Anticoagulants**		• Outline the mechanism of hemostasis &coagulation pathways &trace the role of coagulating factors &platelets in it • Classify anticoagulant drugs • Describe the mechanism of action of heparin • Tabulate the difference between un-fractionated heparin &low molecular weight heparin • Summarize the indications, precautions & potential adverse effects of heparin	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce

			• Discuss management of heparin induced thrombocytopenia • Enumerate direct thrombin inhibitors • Describe the mechanism of action of warfarin • Outline the major drug interactions of warfarin • Summarize the concept of INR (International Normalized Ratio) • Enlist the clinical uses of warfarin • Identify the adverse effects of warfarin &suggest treatment of warfarin toxicity • Compare newer oral anticoagulants to warfarin.		
35.	**Thrombolytic Agents**		• Enumerate thrombolytic drugs • Describe the mechanism of action, indications & adverse effects of thrombolytic (fibrinolytic) agents • Name anti-fibrinolytic agents/agents used for neutralizing action of thrombolytic drugs • Trace the possible interaction of fibrinolytic agents with anticoagulant(heparin) &antiplatelet drugs(aspirin)	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
36.	**Anti-Platelet Drugs**		• Revise the role of platelets in the coagulation • Classify anti-platelet drugs. • Discuss the mechanism of action of various groups of antiplatelet drugs	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce

			• Describe the clinical uses &adverse effects of different anti-platelet drugs.		
37.	**Antihyperlipidemic Drugs**		• Classify anti hyperlipidemic drugs. • Discuss mechanism of action, pharmacological effects, therapeutic uses & adverse effects of different anti-hyperlipidemic drugs. • Enlist & discuss the combinations therapies used in different conditions of hyperlipidemias.	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce
38.	**P-Drug & Prescription Writing - Anemia**	The learners will be able to • Rationalize how to prescribe a drug to an anemic patient	• Identify the drug, dosage form and exact dosage for a patient of anemia in a proper prescription	Practical	OSPE
39.	**IV Infusions**	The learners will be able to • Determine the rate of IV infusions.	• Calculate rate of IV infusions	Practical	OSPE
40.	**Antihypertensive Drugs**	The learners will be able to • Relate the pathophysiology of heart and vessels to its treatment modalities	• Classify antihypertensive drugs in relation to the etiology of hypertension • Explain mechanism of action, pharmacological effects, indications, adverse effects & contraindications various classes of antihypertensive drugs. • Classify direct vasodilators; • Explain mechanism of action vasodilators with their therapeutic uses & adverse effects; • Discuss the rationale of polypharmacy in hypertensive patient; and	LGIS, CBL, SGD	MCQs SAQs OSPE Structured Viva/Voce

			• Develop a management plan of hypertensive emergencies. • Revise the role of methyldopa & clonidine in hypertension; and • Discuss stepped care of hypertension and rationalize the use of various combinations in management of hypertension.		
41.	**Antianginal Drugs**		• Summarize angina pectoris & types of angina pectoris and classify drugs used in angina pectoris. • Describe in detail role of nitrates in a patient of angina. • Explain adverse effects of nitrates & nitrites including tolerance & dependence. • Express the function of beta blockers in angina & why beta blockers are not indicated in prinzmetal angina. • Outline the mechanism of action of calcium channel blockers in angina pectoris & give their therapeutic uses & adverse effects; and • Discuss newer anti-angina agents.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
42.	**Drugs Used In Congestive Cardiac Failure**		• Revise the physiology of contraction of heart. • Classify the drugs used in chronic heart failure. • Classify the drugs used in acute heart failure. • Discuss electrical & mechanical mechanism of action of cardiac	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			glycosides with their indications & adverse effects. • Explain the role of other cardio tonic drugs. • Rationalize the use of drugs without positive ionotropic effect (Angiotensin converting enzyme inhibitors, Angiotensin Receptor Blockers, Beta blockers, vasodilators & diuretics) in acute & chronic heart failure. • Discuss the role of beta blockers in chronic heart failure.		
43.	**Anti-Arrhythmic Drugs**		• Recall physiology of action potential in heart and explain types & causes of arrhythmias. • Classify anti arrhythmic drugs. • Discuss mechanism of action of various class I anti-arrhythmic drugs with their indications & adverse effects; and contraindications.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
44.	**Effect Of Drugs On Frog Heart**	The learners will be able to • Explain the effects of drugs on a live physiological system (heart)	Demonstrate and observe the effect of adrenaline and acetylcholine on the heart	Practical	OSPE
45.	**P-Drug & Prescription Writing - Angina**	The learners will be able to • Rationalize how to prescribe a specific drug for stable angina pectoris	Identify the drug, dosage forma & exact dosage for a patient of angina pectoris	Practical	OSPE

46.	**P-Drug & Prescription Writing – Congestive Cardiac Failure**	The learners will be able to • Rationalize how to prescribe a specific drug for congestive cardiac failure	Identify the drug, dosage forma & exact dosage for a patient of congestive cardiac failure	Practical	OSPE
47.	**P-Drug & Prescription Writing - Hypertension**	The learners will be able to • Rationalize how to prescribe a specific drug for hypertension	Identify the drug, dosage form & exact dosage for a patient of hypertension	Practical	OSPE
48.	**Diuretics**	The learners will be able to • Justify the use of diuretics in treatment of cardiovascular diseases and other edematous and non-edematous conditions	• Recall the physiology of nephron. • Classify diuretics. • Describe in detail mechanism of action of diuretics at different levels of a nephron. • Explain therapeutic uses & adverse effects of different diuretics. • Give the rationale of combination of K^+ sparing diuretics with loop & thiazide diuretics.	LGIS	MCQs SAQs OSPE Viva/Voce
49.	**Urinary Antiseptics**	The learners will be able to • Justify the use of drugs for prevention and treatment of infections of the urinary tract	• Recall anatomy of urinary tract • Classify urinary antiseptics • Describe their role in prevention and treatment of uncomplicated Urinary tract infection	LGIS	MCQs SAQs OSPE Structured Viva/Voce
50.	**P-Drug & Prescription Writing – Uncomplicated Uti**	• Rationalize how to prescribe a drug for urinary tract infection	Identify the drug and dosage form to be advised to a patient with uncomplicated urinary tract infection	Practical	OSPE
51.	**Expectorants & Antitussives**	The learners will be able to • Justify the use of expectorants and antitussives in different respiratory conditions	• Summarize importance of cough & classify it. • Outline the important components of cough reflex. • Describe the term antitussives, mucolytic & expectorants.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			• Classify drugs used as antitussives, expectorants & mucolytic agents. • Describe the mechanism of action of respective drug groups. • Identify different respiratory conditions requiring the use of antitussives, mucolytic & expectorants		
52.	**Drugs Used In Treatment Of Bronchial Asthma**	The learners will be able to • Develop and justify the management plan of obstructive pulmonary disorders (Asthma, chronic obstructive pulmonary disease).	• Recall the distribution of autonomic receptors in lungs &their role in control of bronchial smooth muscle tone. • Describe asthma & identify its types & pathological basis. • Classify drugs used in bronchial asthma into bronchodilators & anti-inflammatory drugs. • Discuss the mechanism of action of different groups/drugs used in bronchial asthma. • Describe the adverse effects &special considerations associated with these drugs.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
53.	**Drugs Used In Acute Severe Asthma**	The learners will be able to • Rationalize the role of various antiasthma drugs in acute severe asthma	• Discuss the pharmacological management of acute severe asthma (status asthmaticus).	LGIS	MCQs SAQs OSPE Structured Viva/Voce
54.	**Antihistamines**	The learners will be able to • Justify the clinical use of antihistamines in different conditions	• Recall the site of action, physiologic & pathophysiologic role of histamine. • Identify conditions causing release of histamine.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			• Classify antihistamine drugs (H_1 antagonists). • Differentiate the two generations of antihistamines with examples. • Describe the mechanism of action & pharmacological effects of antihistamines. • Identify the various therapeutic uses of antihistamine therapy. • Discuss the adverse effects of both generations of antihistamines.		
55.	**Autacoids**	The learners will be able to • Appraise the pharmacological effects of autacoids	• Recall the physiological role of autacoids • Different types of autacoids and their pharmacological applications	LGIS	MCQs SAQs OSPE Viva/Voce
56.	**P-Drug & Prescription Writing – Asthma**	The learners will be able to • Rationalize how to prescribe a drug for asthma	• Identify the drug, dosage form and exact dosage be advised to a patient with asthma	Practical	OSPE
57.	**P-Drug & Prescription Writing – Allergic Rhinitis**	The learners will be able to • Rationalize how to prescribe a drug for allergic rhinitis	• Identify the drug, dosage form & exact dosage to be advised to a patient with allergic rhinitis	Practical	OSPE
58.	**Introduction To Central Nervous System Pharmacology**	The learners will be able to • Discuss the role of neurotransmitter and ion channels in diseases of the central nervous system	• Briefly describe neurotransmitters in central nervous system. • Identify types of ion channels in central nervous system	LGIS	MCQs SAQs OSPE Structured Viva/Voce
59.	**Sedative Hypnotics**	The learners will be able to • Appraise the pharmacological effects of sedative /hypnotics	• Differentiate between sedation anxiety & hypnosis. • Classify sedative/anxiolytics & hypnotics.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			• Discuss the mechanism of action of Benzodiazepines (BDZ) & barbiturates & differentiate between their mechanisms of action. • Describe the therapeutic uses of BDZ & barbiturates. • Enlist the side effects of BDZ & barbiturates • Identify the reason for better safety profile of BDZ over barbiturates.		
60.	**Alcohols**	The learners will be able to • Correlate the effects of substances of abuse (alcohol, opioids, heroin) on body to its plan for aversion therapy	• Enlist different types of alcohols. • Discuss pharmacokinetics, pharmacodynamics & uses of ethanol. • Design a management plan for toxicity & addiction of alcohols, including drugs used for it. • Describe alcohol aversion therapy	LGIS	MCQs SAQs OSPE Structured Viva/Voce

61.	**Drugs Of Abuse**		• Discuss the following terms
			  • Dependence
			  • Tolerance
			  • Addiction
			  • Withdrawal
			• Enumerate drugs of abuse and classify according to their molecular targets.
				LGIS	MCQs
					SAQs
					OSPE
					Structured Viva/Voce

62.	**Drugs Used In Parkinsonism**	The learners will be able to • Justify the use of antiparkinsonian drugs correlating it to the underlying pathophysiology of the disease	• Recall physiology of cholinergic & dopaminergic balance in Central nervous system. • Give classification of drugs used in Parkinsonism. • Discuss in detail role of levodopa in Parkinsonism. • Give the rationale of combining carbidopa with levodopa. • Express the role of other group of drugs in parkinsonism.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
63.	**Anti-Epileptic Drugs**	The learners will be able to • Analyze the effects of anti-epileptic drugs in relation to neuro-excitatory illnesses	• Describe seizure & epilepsy. • Categorize types of epilepsy. • Write therapeutic classification of anti-epileptic drugs. • Describe the mechanism of action of major anti-epileptic drugs with their clinical indications, adverse effects & contraindications. • Outline the management of status epilepticus. • Other clinical uses of anti-epileptic drugs.	• LGIS	MCQs SAQs OSPE Structured Viva/Voce
64.	**Anti- Depressants Drugs**	The learners will be able to • Correlate the patho-physiology of psychiatric	• Describe depression & outline its types. • Identify main neurotransmitters in the pathology of depression. • Classify anti-depressant drugs.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

		illnesses to their management	• Describe the mechanism of action of various classes of anti – depressant drugs • Enlist the therapeutic uses & adverse effect of anti-depressant drugs. • Indicate the important drug interactions of antidepressants & precautionary measures.		
65.	**Anti-Psychotic Drugs**		• Outline different theories of psychosis. • Classify antipsychotic drugs. • Discuss different anti-psychotic agents with their MOA, therapeutic uses & adverse effects. • Differentiate between typical & atypical antipsychotic agents.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
66.	**Lithium And Other Mood Stabilizing Drugs**		• Enlist drugs used in bipolar effective disorder. • Describe lithium in detail.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
67.	**Local Anesthetics (LA)**	The learners will be able to • Differentiate between different pharmacological agents (LA, general eanesthetics, opioids, NSAIDs) used in the pain management	• Recall Physiology of pain. • Classify LA according to chemistry &Therapeutic uses. • Discuss in detail mechanism of action, pharmacokinetics, clinical uses, adverse effects and factors affecting LA action. • Write the advantages of addition of Vasoconstrictor with LA. • Explain Differential Sensitivity of nerve fibers to Local anesthetics	LGIS	MCQs SAQs OSPE Structured Viva/Voce
68.	**General Anesthetics**		• Classify general anesthetics.	LGIS	MCQs SAQs

			• Summarize general principles of surgical anesthesia. • Outline pre-anesthetic medications. • Describe stages of general anesthesia. • Discuss mechanism of action of inhalational anesthetic, pharmacokinetic characters affecting induction & recovery. • Describe acute & chronic toxicity of inhalational general anesthetics • Explain briefly Mechanism of action, their specific uses & untoward effects of I/V anesthetics. • Compare the advantages & disadvantages of individual I/V agent.		OSPE Structured Viva/Voce
69.	**Opioids**		• Recall physiology of pain • Outline afferent & efferent pain pathways • Enlist opioid receptors, give their distribution & effects mediated. • Classify opioid analgesics • Describe the mechanism of analgesic action of opioids & differentiate it from NSAIDs. • Describe the therapeutic uses, adverse effects & contraindication of opioids.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			• Describe briefly endogenous opiopeptides		
70.	**Non-Steroidal Anti-Inflammatory Drugs (Nsaids)**		• Describe pain perception • Recognize the role of cyclooxygenase (COX) & prostaglandins in the pathology of pain, inflammation & fever • Identify the role of prostaglandins in the homeostatic regulation of: a) Gastric function b) Renal function c) Regulation of vasomotor tone & platelet functions • Delineate the term NSAIDs. • Classify NSAIDs. • Describe the general mechanism of action of NSAIDs & differentiating points of selective & non-selective COX2 Inhibitors. • Discuss the pharmacokinetics, therapeutic uses & adverse effects of aspirin & paracetamol • Differentiate aspirin & paracetamol • Describe paracetamol toxicity & design its management plan. • Identify indications for preferring cyclo oxygenase 2 (COX-2) inhibitors over COX-1	LGIS	MCQs SAQs OSPE Structured Viva/Voce

71.	**Drug Treatment Of Rheumatoid Arthritis**	The learners will be able to • Correlate the pathophysiology of rheumatoid arthritis with different treatment modalities for the disease	• Classify DMARDs • Describe and summarize how destruction of joints can be prevented by use of methotrexate and other conventional synthetic DMARDs • Discuss the development/advent of biological DMARDs and how they have revolutionized the treatment of rheumatoid arthritis	LGIS	MCQs SAQs OSPE Structured Viva/Voce
72.	**Drugs Used In Gout**	The learners will be able to • Rationally prescribe drugs for acute and chronic gout	• Summarize the pathophysiology of gout • Classify drugs used for gout • Discuss how treatment of acute and chronic gout differs	LGIS	MCQs SAQs OSPE Structured Viva/Voce
73.	**Drugs Used In Migraine**	The learners will be able to • Formulate the management plan of migraine in accordance with the underlying disease mechanism	• Discuss migraine • Enumerate drugs used in the prophylaxis & treatment of migraine • Describe the mechanism of action of various drugs used in migraine • Enlist contraindications of drugs used in migraine.	CBL	MCQs SAQs OSPE Viva/Voce
74.	**P-Drug & Prescription Writing - Insomnia**	The learners will be able to • Rationalize how to prescribe a drug for insomnia	• Identify the drug and dosage form to be advised to a patient with insomnia	Practical	OSPE
75.	**P-Drug & Prescription Writing - Migraine**	The learners will be able to • Rationalize how to prescribe a drug for migraine	• Identify the drug and dosage form to be advised to a patient with migraine	Practical	OSPE

76.	**P-Drug & Prescription Writing - Epilepsy**	The learners will be able to • Rationalize how to prescribe a drug for epilepsy	• Identify the drug and dosage form to be advised to a patient with epilepsy	Practical	OSPE
77.	**P-Drug & Prescription Writing - Parkinson's Disease**	The learners will be able to • Rationalize how to prescribe a drug for Parkinson's disease	• Identify the drug and dosage form to be advised to a patient with Parkinson's disease	Practical	OSPE
78.	**Effect Of CNS Stimulants And Depressants In Frog**	The learners will be able to • Observe how various drugs can act on receptors in the central nervous system	• Demonstrate and observe the effects of caffeine, strychnine and diazepam on central nervous system of the frog	Practical	OSPE
79.	**Insulins & Antidiabetic Drugs**	The learners will be able to • Correlate types of diabetes mellitus to their different treatment modalities	• Overview of Diabetes Mellitus, Types of Diabetes & Signs & symptoms of Diabetes. • Recall release & structure of insulin. • Classify insulin depending upon its onset & duration of action. • Describe in detail structure of insulin receptors, pharmacokinetics, and mechanism of action, indications & adverse effects. • Give the management of hypoglycemia. • Outline methods of delivery of insulin. • Explain briefly diabetic ketoacidosis pathophysiology & management. • Give classification of non-insulin (oral / newer) anti diabetic drugs. • Express in detail pharmacokinetics, mechanism of action, uses	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			&adverse effects of different oral anti diabetic agents. • Enlist different combinations of anti-diabetic drugs used in type II diabetes.		
80.	**Thyroid & Antithyroid Drugs**	The learners will be able to • Correlate the pathophysiological basis thyroid disorders with their therapeutics.	• Revise briefly Thyroid hormones. • Classify anti thyroid drugs. • Discuss mechanism of action of different anti-thyroid drugs with their indications &adverse effects. • Discuss the management of hyperthyroid crisis & Grave's disease. • Outline the management of myxedema. • Describe briefly thyroxin with its indications & adverse effects.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
81.	**Adrenal Hormones**	The learners will be able to • Correlate pathophysiology of adrenal gland disorders with therapeutic options	• Recall briefly synthesis, release, feedback control of corticosteroids by hypothalamic pituitary axis. • Classify corticosteroids. • Discuss in detail pharmacokinetics, pharmacological effects, therapeutic uses & adverse effects of glucocorticoids. • Enlist contraindications of corticosteroids. • Describe mineralocorticoids in detail.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
82.	**Sex Hormones Estrogen And Progestins**	The learners will be able to	• Revise the Physiology of female sex hormones. • Explain in detail the pharmacological effects of estrogen &progesterone & their uses,	LGIS	MCQs SAQs OSPE Structured Viva/Voce

		• Justify the clinical use of sex hormones in relation to reproductive physiology	adverse effects & contraindications.		
83.	**Drugs Used In The Treatment Of Infertility**	The learners will be able to • Correlate the physiology of ovulation with basic pharmacology of drugs used for infertility	• Identify the incidence & causes of infertility. • Give classification of drugs used in infertility. • Describe the ovulation inducing agents. • Discuss the hormonal replacement therapy.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
84.	**Hormonal Contraceptives**	The learners will be able to • Rationalize the use of hormonal contraceptives in different female reproductive disorders	• Classify hormonal contraceptives. • Enlist monophasic, biphasic & triphasic contraceptive pills in contraception. • Describe mechanism of action, pharmacological actions, adverse effects, benefits &contraindications of contraceptive pills.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
85.	**Anabolic Steroids**	The learners will be able to • Discuss clinical pharmacology of androgens in relation to underlying endocrine disorder	• Enlist androgens & anti androgens. • Discuss their clinical uses and adverse effects.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
86.	**Drugs Used In The Treatment Of Osteoporosis**	The learners will be able to • Correlate the patho-physiological basis of osteoporosis to its pharmacological management.	• Describe osteoporosis & types of osteoporosis with brief introduction to bone formation/remodeling & pathophysiology of post-menopausal osteoporosis.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			• Discuss Pharmacological modalities to treat osteoporosis according to severity.		
87.	**Drugs Acting On The Uterus**	The learners will be able to • Discuss how various drugs can affect the activity of the uterus	• Classify uterine stimulants • Co relate how drugs can stimulate the contractions of the uterus to aid in facilitation of labor • Classify tocolytics • Describe how some drugs can be used to control premature onset of labor	LGIS	MCQs SAQs OSPE Structured Viva/Voce
88.	**Calculate Different Concentrations Of Drugs Or Solutions.**	The learners will be able to • Discuss various terms (percentage, mole, milli-osmole etc) used in calculating the dose of a drug and how to calculate dosage	Discuss how to calculate different types of solutions including: i. Stock Solution & its dilution ii. Percentage solutions iii. Fractional Solutions iv. Molar Solutions v. Equivalent Solutions vi. vi. Osmolar Solutions	Practical	OSPE
89.	**Immunomodulators**	The learners will be able to • Appraise that agent that alter the balance of immune system can be used for management of certain disease	• Classify immunomodulant drugs and their applications • Classify, uses and adverse effects of monoclonal antibodies	LGIS	MCQs SAQs OSPE Structured Viva/Voce
90.	**Introduction To Chemotherapy And Principles Of Chemotherapy**	The learners will be able to • Rationally prescribe antimicrobials in infectious diseases	• Describe the terms antimicrobial, antibiotic & outline the difference between the two. • Discuss bacteriostatic & bactericidal antimicrobials. • Identify the difference between concentration & time dependent killing.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			• Discuss the post antibiotic effect. • Describe the differences among narrow, extended & broad-spectrum antibiotics. • Explain empirical therapy in detail. • Enlist ten principles of chemotherapy. • Classify antimicrobials according to their mechanism of action. • Classify antimicrobials according to their mechanism of action.		
91.	**Mechanism Of Resistance**	The learners will be able to • Review the role of resistance in management of microbial diseases	• Discuss innate, acquired resistance, due to genetic alteration & altered expression protein &their mechanism. • Enlist the mechanisms by which microorganism can acquire resistance with examples.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
92.	**Penicillins**	The learners will be able to • Justify the treatment modalities for various microbes (bacteria, viruses, helminths, parasites) according to mode of action, resistance patterns and regional current practices	• Give brief introduction of history & chemistry of penicillins. • Classify penicillins. • Discuss mechanism of action of penicillins. • Describe mechanism of resistance. • Describe pharmacokinetics, antimicrobial spectrum, therapeutic uses & adverse effects of various groups of pencillins.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
93.	**Cephalosporins**		• Discuss structure of cephalosporin as compared to penicillins • Classify cephalosporin. • Describe pharmacokinetics mechanism of action, antimicrobial	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			spectrum, therapeutic uses & adverse effects of cephalosporin.		
94.	**Other Cell Wall Inhibitors**		• Enlist other cell wall inhibitors. • Describe mechanism of action, pharmacokinetics, clinical uses & adverse effects of vancomycin & linezolid.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
95.	**Tetracyclines**		• Classify tetracyclines. • Outline the spectrum of activity, mechanism of resistance & pharmacokinetics of tetracyclines. • Explain mechanism of action, therapeutic uses, adverse effects, drug interaction & contraindications of tetracyclines.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
96.	**Macrolides**		• Describe the spectrum of activity, mechanism of resistance & mechanism of action of macrolides. • Compare newer macrolide agents in respect to their pharmacokinetics, clinical uses & adverse effects to erythromycin.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
97.	**Chloramphenicol**		• Explain mechanism of action of chloramphenicol. • Describe antimicrobial spectrum, mechanism of resistance, clinical uses & adverse effects	LGIS	MCQs SAQs OSPE Structured Viva/Voce
98.	**Aminoglycosides**		• Classify aminoglycosides. • Enlist characteristics of aminoglycosides. • Outline spectrum & mechanism of resistance. • Discuss pharmacokinetics of aminoglycosides.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			• Describe mechanism of action, clinical uses & adverse effects of aminoglycosides.		
99.	**Sulfonamides, Trimethoprim**		• Outline briefly historic review of sulphonamides. • Summarize the chemistry of sulphonamides. • Give therapeutic classification of sulphonamides. • Express in detail mechanism of action of sulphonamides, pharmacokinetics, antimicrobial spectrum, clinical indications & adverse effects. • Discuss cotrimoxazole (trimethoprim/sulphamethoxazole), pharmacokinetics, antimicrobial spectrum, therapeutic uses& adverse effects.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
100.	**Quinolones**		• Classify quinolones. • Enlist characteristics of fluoroquinolones & their differences from simple quinolones. • Explain pharmacokinetics, spectrum of activity, mechanism of action & mechanism of resistance. • Describe clinical indications, adverse effects & contraindications of fluoroquinolones.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
101.	**Clindamycin And Other Protein Synthesis Inhibitors**		• Enlist protein synthesis inhibitors. • Describe mechanism of action, pharmacokinetics, clinical uses & adverse effects of clindamycin.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

102.	**Anti-Tuberculous Drugs**		• Discuss pathogenesis of tuberculosis • Enumerate first line anti-TB drugs • Describe pharmacokinetics, mechanism of action, therapeutic uses, adverse effects and drug interactions of first line drugs • Enlist second line anti-TB drugs • Describe adverse effects of second line drugs	LGIS	MCQs SAQs OSPE Structured Viva/Voce
103.	**Antileprosy Drugs**		• Enlist drugs used in various types of leprosy. • Outline pharmacological management of leprosy.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
104.	**Anti-Fungal Drugs**		• Classify anti- fungal drugs. • Describe pharmacokinetics, spectrum, mechanism of action, therapeutic uses & adverse effects of amphotericin B • Write down the spectrum, mechanism of action, indications & adverse effects of azoles. • Discuss in detail miscellaneous anti-fungal drugs with their mechanism of action, therapeutic uses & adverse effects.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
105.	**Anti-Malarial Drugs**		• Revise species, life cycle of malarial parasite • Give therapeutic classification & Chemical classification of anti-malarial drugs. • Describe mechanism of action, pharmacokinetics, indications and	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			adverse effects of different anti-malarial agents. • List the drugs used in chloroquine resistant malaria recommended by WHO. • Summarize chemoprophylaxis of malaria.		
106.	**Anti-Amoebics**		• Recall amoebiasis, life cycle of *Entamoeaba histolytica* & pathogenesis. • Classify anti-amoebic drugs. • Explain mechanism of action, pharmacokinetics, spectrum, dose, adverse effects & contraindication of metronidazole. • Briefly explain other anti- amoebic agents.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
107.	**Anti-Helminths**		• Recall classification of helminths. • Classify anthelmintics. • Explain in detail mechanism of action, pharmacokinetics, clinical indications & adverse effects of different anthelmintic.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
108.	**Anti-Viral Drugs**		• Classify the anti-viral drugs according to viral cycle. • Describe basic pharmacology of anti-viral drugs used in common viral infections including herpes simplex, herpes zoster, CMV and influenza. • Discuss drugs used in hepatitis B and C.	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			• Describe Highly active antiretroviral therapy (HAART) and antiretroviral drugs.		
109.	**Cancer Chemotherapy**	The learners will be able to • Appraise the principles of cancer chemotherapy in relation to its current therapeutic modalities	• Classify anticancer agents on the basis of cell cycle specific & non-cell cycle specific. • Enlist antimetabolites. Describe their mechanism of action, pharmacokinetics therapeutic uses, adverse effects & development of resistance. • Discuss hormones/ antagonist, cyclophosphamide, vinca alkaloids &anthracyclines in detail • Outline briefly other anti- cancer drugs. • Describe the general adverse effects produce by anti-cancer agents.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
110.	**P-Drug & Prescription Writing – Scabies**	The learners will be able to • Rationalize how to prescribe a drug for scabies	• Identify the drug and dosage form to be advised to a patient with scabies	Practical	OSPE
111.	**P-Drug & Prescription Writing – Follicular Tonsillitis**	The learners will be able to • Rationalize how to prescribe a drug for follicular tonsillitis	• Identify the drug and dosage form to be advised to a patient with follicular tonsillitis	Practical	OSPE
112.	**P-Drug & Prescription Writing – Ascariasis**	The learners will be able to • Rationalize how to prescribe a drug for ascariasis	• Identify the drug, dosage form and exact dosage to be advised to a patient with ascariasis	Practical	OSPE
113.	**P-Drug & Prescription Writing – Vaginal Candidiasis**	The learners will be able to • Rationalize how to prescribe a drug for vaginal candidiasis	• Identify the drug, dosage form and exact dosage form to be advised to a patient with vaginal candidiasis	Practical	OSPE

114.	**P-Drug & Prescription Writing – Malaria**	The learners will be able to • Rationalize how to prescribe a drug for malaria	• Identify the drug and dosage form to be advised to a patient with malaria	Practical	OSPE
115.	**P-Drug & Prescription Writing – Ankylostomiasis**	The learners will be able to • Rationalize how to prescribe a drug for ankylostomiasis	• Identify the drug and dosage form to be advised to a patient with ankylostomiasis	Practical	OSPE
116.	**P-Drug & Prescription Writing – Typhoid Fever**	The learners will be able to • Rationalize how to prescribe a specific drug for typhoid fever	• Identify the drug, dosage form & exact dosage for a patient with typhoid fever	Practical	OSPE
117.	**Emetics & Antiemetics Prokinetics**	The learners will be able to • Develop and justify the management plan of common disorders of gastrointestinal tract (peptic ulcer, vomiting, constipation, gastropathies, diarrhea, inflammatory bowel disease).	• Describe in detail nausea & emesis including mechanism. • Summarize stimuli, pathways & key events in nausea & vomiting. • Appreciate the role of Chemoreceptor trigger zone, NTS & vomiting center in vomiting. • Classify anti-emetic drugs. • Describe mechanism of action of various groups of anti-emetic drugs. • Identify appropriate antiemetic drugs useful in different patient situations (chemotherapy induced nausea vomiting, post-operative nausea vomiting, motion sickness, hyperemesis gravidarum).	LGIS	MCQs SAQs OSPE Structured Viva/Voce
118.	**Antidiarrheals**		• Recall the physiology of gastrointestinal motility.	LGIS	MCQs SAQs

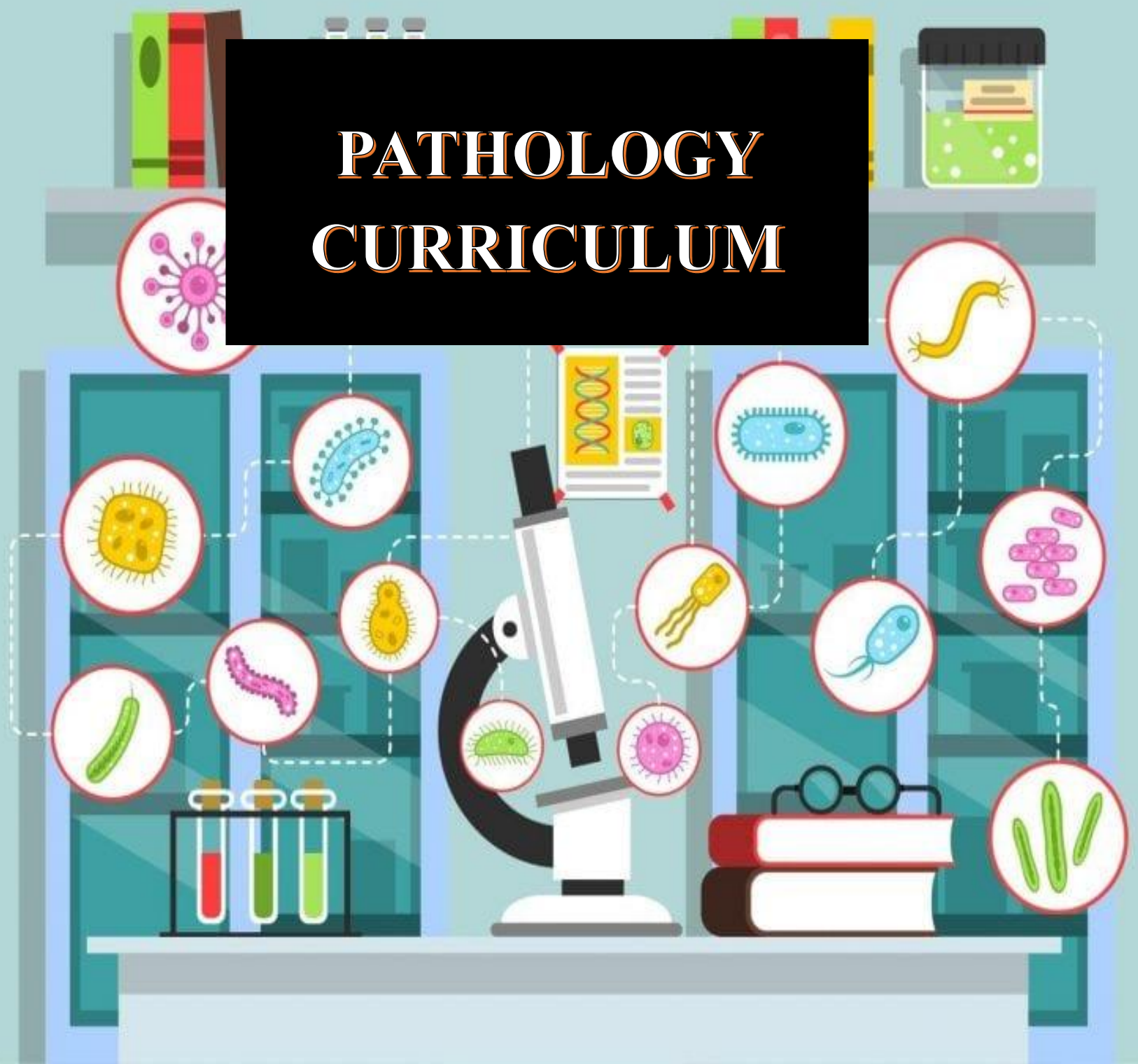
			• Summarize & categorize diarrhea on basis of cause & onset of symptoms. • Classify anti-diarrheal drugs. • Describe the mechanism of various drug groups used for diarrhea. • Outline approaches to treat diarrhea. • Recognize the role & effectiveness of drugs in the treatment of various types of diarrhea.		OSPE Structured Viva/Voce
119.	**Purgatives/Laxatives**		• Recall the physiology of gastrointestinal motility. • Outline constipation/ purgative/laxatives. • Identify the underlying pathophysiological mechanism of constipation. • Classify purgative/laxatives. • Describe site, onset & mechanism of action of various groups of purgatives. • Tabulate the clinical application of purgatives/laxatives.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
120.	**Drugs Used In Peptic Ulcer**		• Review the physiology of gastric acid secretion & natural protective mechanisms against it. • Identify location &role of different receptors on various gastric cells. • Summarize & enlist peptic ulcer diseases (PUD).	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			• State etiological factors of Peptic ulcer disease (*H. Pylori*, stress & drug induced). • Outline non-pharmacological &pharmacological treatment options for Peptic ulcer disease. • Classify drugs used for peptic ulcer disease • Describe mechanism of action of various drug groups used for peptic ulcer disease. • Describe the therapeutic indications of drugs used for peptic ulcer disease. • Summarize triple & quadruple drug regimens of *H. Pylori* induced ulcers.		
121.	**Drug Treatment Of Inflammatory Bowel Disease**		• Discuss the pathophysiology of inflammatory bowel disease • Classify the drugs used to treat inflammatory bowel disease (IBD) • Appraise the role of immunomodulatory drugs in IBD	LGIS	MCQs SAQs OSPE Structured Viva/Voce
122.	**P-Drug & Prescription Writing - Acid Peptic Disease**	The learners will be able to • Rationalize how to prescribe a drug for acid peptic disease	• Identify the drug and dosage form to be advised to a patient with peptic ulcer disease	Practical	OSPE
123.	**P-Drug & Prescription Writing- Acute Diarrhea**	The learners will be able to • Rationalize how to prescribe a drug to a patient with acute diarrhea	• Identify the drug, dosage form and exact dosage for a patient of acute diarrhea in a proper prescription	Practical	OSPE
124.	**P-Drug & Prescription Writing- Amoebic Dysentery**	The learners will be able to	• Identify the drug, dosage form and exact dosage for a patient of	Practical	OSPE

		• Rationalize how to prescribe a drug to a patient of amoebic dysentery	amoebic dysentery in a proper prescription		
125.	**P-Drug & Prescription Writing – Bacillary Dysentery**	The learners will be able to • Rationalize how to prescribe a drug to a patient of bacillary dysentery	• Identify the drug, dosage form and exact dosage for a patient of bacillary dysentery in a proper prescription	Practical	OSPE
126.	**Oral Rehydration Therapy**	The learners will be able to • Identify the need for and importance of rehydration therapy in conditions of fluid loss	• Identify the composition of ORS • Understand how to make and administer ORS • Identify conditions where ORS must be used	Practical	OSPE
127.	**Pharmacy**	The learners will be able to • Recognize proper dispensing of selected pharmaceutical preparations	• Identify common apparatus used in pharmacy • Make calculations for preparation of i. Sulphur ointment ii. Carminative mixture iii. $KMnO_4$ lotion	Practical	OSPE
128.	**Locally Acting Drugs**	The learners will be able to • Identify drugs used topically	Discuss basic pharmacology of demulcents, emollients, irritants, counter irritants, astringents, antiseptics and disinfectants.	LGIS	MCQs
129.	**Chelating Agents**	The learners will be able to • Outline the essential pharmacological principles of toxicology.	• Enlist heavy metals & heavy metal poisoning. • Identify the antidotes of different heavy metals & describe their Mechanism of action.	LGIS	MCQs SAQs OSPE Structured Viva/Voce
130.	**Drug – Drug Interactions**		• Review drug interactions • Enumerate types of drug interactions with examples	LGIS	MCQs SAQs OSPE Structured Viva/Voce

			(Pharmacokinetic &pharmacodynamics) • Identify the consequences of drug interactions • Outline the importance of drug interactions		
131.	**Adverse Drug Reactions**		• Describe adverse drug reactions (ADRs) • Classify adverse drug reactions • Explain mechanisms of adverse drug reactions • Describe hypersensitivity reactions to drugs with examples • Discuss idiosyncrasy, hypersusceptibility, hyposusceptibility and cross allergy • Outline stages of drug evaluation to avoid ADRs • Review pharmacovigilance and pharmacoepidemiology	LGIS	MCQs SAQs OSPE Structured Viva/Voce
132.	**Pharmacokinetic Calculations I – Dose Calculation In Renal Failure, Children Etc.**	The learners will be able to • Justify the adjustment of doses for different conditions – children, old age, renal failure etc.	• Calculate dose in according to age, surface area & renal function	Practical	OSPE
133.	**Pharmacokinetic Calculations II**	The learners will be able to • Estimate basic pharmacokinetic calculations	• Estimate the loading dose, maintenance dose, half-life and volume of distribution of drugs	Practical	OSPE

PATHOLOGY CURRICULUM



GENERAL PATHO & GEN MICROBIOLOGY

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLS
1.	**Immunity & its Cells**	The learners will be able to • Correlate the function of immune cells with mechanisms of immune regulation.	• Classify immunity • Enumerate cells of immune system • Describe functions of cells of immune system • Differentiate between class MCH-I & MCH-II	LGIS SGD	MCQs SAQs

2	**Classification of microorganisms**	The learners will be able to • Correlate the variation in morphological features & culture requirements of various micro-organisms	• Differentiate between prokaryotes and eukaryotes • Classify the microorganisms i. E bacteria, viruses, parasites, fungi & with various examples • Differentiate between the gram positive and negative bacteria • Classify the special groups of microorganisms i.e rickettsia, chlamydia, mycoplasma & mycobacteria • Differentiate between the dna & rna viruses • Differentiate between the ecto and endo parasites	SGD	MCQs
3.	**Types of Microscope**	The learners will be able to • Correlate various types of microscopes with their uses	• Describe various types of microscopes and their uses	SGD Skill	MCQs OSPE

4.	**Lab Introduction to Microscope and Gram Staining SKILL**	The learners will be able to • Safely handle a light microscope and focus a slide on different magnifications. • Interpret the morphology of bacteria on Gram staining.	• Label the parts of microscope on a diagram • Demonstrate the correct method of focusing a slide on microscope • Demonstrate the use of course and fine focusing apparatus • Describe the principle of gram staining • Enlist the reagents required in gram staining and their functions • Demonstrate the procedure of gram staining	Skill	OSPE

5.	**Normal Flora & Pathogenicity of Microorganisms**	The learners will be able to • Describe the normal flora and the pathogenicity of microorganisms	• Define normal flora • Enlist sites and importance of normal flora. • Describe functions of normal flora. • Define the differences between pathogenicity and virulence • Enlist the stages of infection • Describe the pathogenicity and virulence of microorganisms and the difference between them	SGD Students Presentations	MCQs
6.	**Classification of microorganisms, Normal Flora & Pathogenicity of Microorganisms**	The learners will be able to • Correlate microbial pathogenicity with the sites of normal flora	• Classify the microorganisms i. E bacteria, viruses, parasites, fungi & with various examples • Differentiate between the gram positive and negative bacteria • Define normal flora • Enlist sites and importance of normal flora • Describe the pathogenicity and virulence of microorganisms and the difference between them	SGD	MCQs

7.	**Immunodeficiency (HIV)**	The learners will be able to • Correlate the etio-pathogenesis with clinical presentation and complications of HIV	• Define immunodeficiency state • Classify immunodeficiency states • Enumerate the routes of transmission for HIV • Describe the pathogenesis of HIV infection and AIDS • Enumerate aids defining infections and neoplasms	LGIS	MCQs SAQs

8. 9.	**Reversible Cell Injury**	The learners will be able to • Correlate the etio-pathogenesis with morphology and mechanisms involved in reversible cell injury	• Classify cell injury • Describe the morphological changes of reversible and irreversible cell injury • Describe the pathogenesis of reversible and irreversible cell injury • Describe the role of reactive oxygen species (ROS) in cell injury • Differentiate between reversible and irreversible cell	LGIS	MCQs SAQs

10.	**Irreversible Cell Injury**	The learners will be able to • Correlate the etio-pathogenesis with morphology and mechanisms involved in irreversible cell injury	• Describe the pathogenesis of irreversible cell injury • Describe the morphological changes of irreversible cell injury • Describe the role of reactive oxygen species (ros) in cell injury • Differentiate between reversible and irreversible cell	LGIS	MCQs SAQs
	Apoptosis & Necrosis Cellular Accumulations	The learners will be able to • Correlate the etio-pathogenesis with morphology and mechanisms involved in apoptosis • Correlate the pathogenesis with morphology of necrosis • Correlate the cellular changes in various	• Define necrosis • Describe morphology of necrosis • Enumerate patterns of necrosis with examples • Define apoptosis • Describe pathogenesis of apoptosis • Describe morphology of apoptosis	LGIS	MCQs SAQs

11.		accumulations with their pathogenesis	• Enlist different types of intracellular accumulations • Describe the mechanisms involved in different types of intracellular accumulations • Define pathological calcification and its types • Differentiate between dystrophic and metastatic calcification • Enlist different types of amyloid proteins • Describe the pathogenesis of amyloid accumulation • Describe the pathogenesis of amyloid accumulation		MCQs SAQs

12.	**Cellular adaptation SGDS**	The learners will be able to • Correlate the etio-pathogenesis with morphology of cellular adaptations	• Define cellular adaptations • Enumerate types of cellular adaptations • Define each type of cellular adaptation with examples and describe their morphology • Differentiate between different types of cellular adaptations and illustrate with examples	SGD	MCQs

13.	**Necrosis and cellular adaptations SKILL**	The learners will be able to • Identify the morphology of different patterns of necrosis and cellular adaptations	• Illustrate the microscopic features of caseous necrosis with the help of diagram • Illustrate the microscopic features of coagulative necrosis with the help of diagram • Illustrate the microscopic features of fat necrosis with the help of diagram • Illustrate the microscopic features of metaplasia with the help of diagram • Illustrate the microscopic features of hyperplasia with the help of diagram • Illustrate the microscopic features of hypertrophy with the help of diagram	Skill	OSPE

14.	**Hypersensitivity** Reactions **I & IV**	The learners will be able to • Correlate the pathogenesis of different hypersensitivity reactions with the immune mechanisms involved and examples	• Define type I hypersensitivity reaction • Describe pathogenesis of type I hypersensitivity reaction • Enlist examples of type 1 hypersensitivity reaction • Define type IV hypersensitivity reaction • Describe the pathogenesis of type IV hypersensitivity reaction • Describe its morphological features • Enumerate examples of type IV hypersensitivity reaction	LGIS	MCQs SAQs

15.	**Hypersensitivity Reactions II & III**	The learners will be able to • Correlate the pathogenesis of different hypersensitivity reactions with the immune mechanisms involved and examples	• Classify hypersensitivity reactions • Define type ii hypersensitivity reaction • Describe pathogenesis of type ii hypersensitivity • Differentiate between subtypes of hypersensitivity reaction ii • Describe the pathogenesis of type iii hypersensitivity reaction • Describe the clinical manifestations of hypersensitivity reaction type iii with examples • Describe the morphological features of hypersensitivity reaction type iii	LGIS	MCQs SAQs
16.	**Transplant rejection**	The learners will be able to • Correlate the various mechanisms involved in transplant rejection with their clinical presentation.	• Enlist types of grafts • Enlist types of rejections • Correlate the immune mechanisms involved in different types of rejections with their pathogenesis	LGIS	MCQs

			• Describe the changes occurring in different types of rejections		
17.	**AI disorders – SLE**	The learners will be able to • Correlate the pathogenesis of autoimmune disorders with the immune mechanisms involved and examples	• Define autoimmune diseases • Describe pathogenesis of autoimmune diseases • Enlist types of autoimmune disorders • Describe revised diagnostic criteria for classification of sle • Describe etiology of sle • Describe morphology and lab diagnosis of sle	LGIS	MCQs

18.	**Sterilization & Disinfection**	The learners will be able to • Differentiate the various options available to achieve high level of sterilization & disinfection	• Define sterilization • Define disinfection • Classify items to be sterilized • Classify items to be disinfected • Describe different methods of sterilization • Describe methods of disinfection	LGIS	MCQs SAQs

19.	**Neoplasia –I (classification & characteristics)**	The learners will be able to • Describe the taxonomy grading staging and morphological characteristics of neoplasia	• Define neoplasia, benign and malignant neoplasms. • Describe the nomenclature of neoplasia • Differentiate between characteristics of benign and malignant neoplasms • Describe the growth characteristics and replicative potential of cancer cells • Describe the sustained angiogenesis in cancer • Describe the invasive and metastatic mechanism of cancer cells	Skill	OSPE

			• Enlist the staging and grading categories of neoplasia		
20.	**Neoplasia – II (Carcinogenesis}**	The learners will be able to • Correlate the etiopathogenesis of neoplasia with different carcinogenic agents	• Define carcinogenesis • Enumerate types of carcinogenic agents • Explain mechanism of chemical carcinogens • Describe radiation carcinogens • Describe viral & microbial carcinogens	LGIS	MCQs SAQs
21.	**Neoplasia – III Lab diagnosis and presentation**	The learners will be able to • Describe the clinical presentation and laboratory diagnosis of neoplasia	• Enlist the effects of neoplasia on patient and correlate them with underlying mechanism • Describe the laboratory techniques of tumor diagnosis • Describe the significance tumor markers • Define paraneoplastic syndromes with examples	LGIS	MCQs SAQs

22.	**Neoplasia** **SKILL**	The learners will be able to • Interpret the morphology of benign and malignant neoplasms	• Identify the morphological features of benign neoplasms • Identify the morphological features of malignant neoplasms. • Illustrate the microscopic features of benign neoplasms with the help of diagram • Illustrate the microscopic features of benign neoplasms with the help of diagram	Skill	OSPE

23.	**Oncogenic viruses (EBV, HPV, CMV, HBV, HCV,)**	The learners will be able to • Correlate the pathogenicity and diagnostic options of oncogenic viruses	• Define oncogenic viruses • Enlist important oncogenic viruses • Describe basic characteristics of oncogenic viruses • Describe pathogenesis & lab investigation of ebv,hpv, cmv, hbv and hcv	LGIS	MCQs SAQs

24.	**Acute Inflammation**	The learners will be able to • Correlate the pathogenesis with factors controlling inflammation and its complications	• Define inflammation, acute, chronic and granulomatous inflammation • Enlist the stimuli for inflammation • Enlist the morphological and functional changes in inflammation • Enlist the components of vascular and cellular events in inflammation and explain their mechanisms and regulation • Differentiate the role of mediators in different steps of inflammation • Enlist the outcomes of inflammation • Enlists the laboratory tests for diagnosing inflammation	LGIS	MCQs SAQs

25.	**Regeneration & Repair**	The learners will be able to • Correlate the pathogenesis and factors affecting wound healing.	• Classify and describe the tissues with different proliferative capacities • Describe role of cell proliferation, growth factors and extracellular matrix in regeneration and repair • Describe the process of scar formation • Describe the factors that influence tissue repair • Enlist types of wounds • Describe the mechanisms involved in each type of wound healing • Tabulate differences between healing with primary intention and healing with second intention	LGIS	MCQs
26.	**Chronic Inflammation**	The learners will be able to • Correlate the pathogenesis with factors controlling inflammation and ts complications	• Define chronic and granulomatous inflammation • Enlist the morphological and functional changes in chronic inflammation • Differentiate the role of mediators in different steps of inflammation	LGIS	MCQs SAQs

27.	**Inflammation** **SGD**	The learners will be able to • Correlate the pathogenesis with factors controlling inflammation and its complications	• Define acute inflammation • Enlist the morphological and functional changes in acute inflammation • Define chronic and granulomatous inflammation • Enlist the morphological and functional changes in chronic inflammation	SGD	
28.	**Inflammation (acute and chronic)** **SKILL**	The learners will be able to • Identify the morphological changes in different types of inflammation	• Illustrate the morphological features of acute inflammation • Illustrate the morphological features of Chronic inflammation • Illustrate the morphological features of granulomatous inflammation	Skill	OSPE

29.	**Oedema/ Infarction**	The learners will be able to • Correlate the pathogenesis of oedema with the clinical presentation • Differentiate between different types of infarctions	• Define edema • Enlist causes of edema • Describe the pathogenesis of edema • Describe morphology of edema • Describe clinical features of edema • Differentiate between transudate and exudate	LGIS	MCQs SAQs
30.	**Thrombosis & Embolism**	The learners will be able to • Correlate the pathogenesis of thromboembolism with its different types	• Describe the pathogenesis of thrombosis • Tabulate the difference between arterial & venous thrombi • Tabulate the difference between antemortem & postmortem clot • Enumerate the fate of thrombus • Enlist the types of embolism and describe each	LGIS	MCQs SAQs

31.	**Shock**	The learners will be able to • Correlate the pathogenesis of shock with its different stages and types	• Define shock • Enlist & define various types of shock • Describe stages of shock • Describe the pathogenesis of shock	LGIS	MCQs
32.	**Microbial Genetics**	The learners will be able to • Correlate the genetic basis of pathogenicity of microbes with their virulence	• Enumerate bacterial components for genetic transformation • Describe bacterial components for genetic transformation • Describe various types of mutations related to bacterial genetics • Describe viral growth & replication. And demonstrate with the help of diagram • Describe different methods of fungal growth & replication	LGIS	MCQs SAQs

33.	**Antimicrobials and Vaccines**	The learners will be able to • Describe the mode of actions of anti-microbials and vaccines.	• Differentiate between anti microbials and vaccines • Classify anti microbials with examples (anti-bacterial, anti-viral, antianti-fungal, anti-helminths) • Define drug resistance • Describe the methods for drug resistance • Describe the mode of action of anti-microbials • Describe the ways to reduce drug resistance	LGIS	MCQs SAQs

34.	**Culture Medias & Culturing Techniques**	The learners will be able to • Identify different types of culture media for culture sensitivity.	• Explain use of culture media • Enumerate types of culture media • Describe preparation of culture media • Describe streaking methods • Identify and differentiate between various types of culture media • Describe the principle and uses of Anaerobic jar • Differentiate between principles and uses of Anaerobic Jar, Autoclave, Hot air oven and Incubator	Skill	OSPE

35.	**Basis of Genetic diseases**	The learners will be able to • Correlate the mechanisms involved in genetic abnormalities with their classification.	• Define genetic diseases • Classify genetic diseases • Define mutation • Classify mutations • Describe polymorphism, epigenetic changes & alterations in non-coding rnas	LGIS	MCQs SAQs
36.	**Mendelian disorders**	The learners will be able to • Differentiate between Autosomal recessive, Dominant and X linked	• Define Mendelian disorders • Enlist transmission patterns of single-gene disorders • Describe disorders of autosomal dominant & recessive inheritance • Describe disorders X-linked disorders • Describe diseases caused by mutations in genes encoding structural proteins, receptor proteins, enzyme proteins, & proteins that regulate cell growth	LGIS	MCQs SAQs

37.	**Mycology – I cutaneous & subcutaneous**	The learners will be able to • Correlate the various characteristics of cutaneous & subcutaneous fungi with their pathogenicity and diagnostic options	• Classify fungi • Enlist cutaneous mycoses and diseases caused by them • Describe the tests for diagnosing cutaneous mycoses.	LGIS	MCQs SAQs
38.	**Mycology – II systemic**	The learners will be able to • Correlate the various characteristics of systemic fungi with their pathogenicity and diagnostic options	• Enlist microbes of systemic fungal infections • Correlate the morphology with pathogenesis of infection caused by pneumocystis pneumonia, cryptococcus species, aspergillus species and candida albicans • Describe lab diagnosis of infection caused by pneumocystis pneumonia, cryptococcus species, aspergillus species and candida albicans	LGIS	MCQs SAQs

39.	**Mycology** **SGD**	The learners will be able to • Classify fungi and correlate the morphology with pathogenesis of infection caused by fungi	• Classify fungi • Enlist cutaneous mycoses and diseases caused by them • Enlist microbes of systemic fungal infections • Correlate the morphology with pathogenesis of infection caused by pneumocystis pneumonia, cryptococcus species, aspergillus species and candida albicans	SGD	-

S. No	TOPICS	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1	**RHD-I (Gram + Streptococci)**	The learners will be able to • Correlate etiopathogenesis of Streptococci with clinical manifestations	• Differentiate between Gram positive, and catalase negative cocci. • Describe the suppurative & non suppurative man infestations seen in post Streptococcal sequelae • Describe the virulent factors and pathogenesis of Streptococci • Define and classify various types of hemolysis seen on blood agar plate. • Describe the procedure and significance of ASO titer for diagnosing a case of group A Streptococcus pyogenes infection	LGIS	MCQs SAQs

2	**RHD-II (Pathogenesis & Morphology}**	The learners will be able to • Correlate pathogenesis with morphological findings of Rheumatic heart disease	• Define rheumatic fever and rheumatic heart disease • Describe the immunological basis of damage to heart in rheumatic fever • Describe the morphological lesions in acute rheumatic fever • Describe the morphological lesions in chronic rheumatic heart disease • Describe the clinical features and diagnosis by Jones criteria	LGIS	MCQs SAQs
3.	**Endocarditis**	The learners will be able to • Co relate pathogenesis with morphological findings of infective endocarditis	• Describe the pathogenesis and risk factors of infective endocarditis • Describe the clinical and morphological manifestations of infective endocarditis • Describe the dukes' criteria • Innumerate the complications of infective endocarditis • Differentiate between the vegetations in different endocarditis		
4.	**ASO Titer/ Anaerobic Jar**	The learners will be able to • Correlate the lab result of ASO titer with clinical manifesta	• Perform and interpret the finding of ASO Titer • Describe the principles and interpretation of anaerobic jar	Skill	OSPE

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Microbes of Upper Resp. Tract Infections**	The learners will be able to • Describe the classification, microbial etiology, pathogenesis and diagnostic options for URTI	• Correlate the boundaries for upper and lower RT infections with the diseases of specific regions • Enlist the common pathogens of URTI • Describe the etiology and pathogenesis for rhinitis, pharyngitis, tonsillitis, epiglottis, otitis media and sinusitis. • Describe the etiology, pathogenesis and diagnostic options for Corona virus, Influenza A, B & C viruses, Resp. syncytial virus, Corynebacterium diphtheria, Bordetella pertussis	LGIS	MCQs SAQs
2	**Corona Viral Infection (COVI)**	The learners will be able to • Describe the etiopathogenesis, clinical manifestations and lab diagnostic options for Corona viral infection	• Describe the etiopathogenesis of Corona viral infection • Describe the clinical manifestations and complications of COVID especially fungal infections • Describe the lab diagnostic options for Corona viral infection	LGIS	MCQs SAQs

3.	**Microbes of Typical Pneumonia**	The learners will be able to • Correlate the clinical manifestation with the diagnostic options for various microbes causing Typical Pneumonia	• Define &classify pneumonias • Correlate the microbial etiopathogenesis with clinical presentations of typical and atypical pneumonia • Differentiate between lactose fermenting and non-lactose fermenting bacteria • Describe the morphology and etiopathogenesis of Streptococcus pneumoniae, Klebsiella pneumoniae, Haemophilusinfluenzae and Moraxella catarrhalis • Differentiate between the diagnostic criteria for Streptococcus pneumonia, Klebsiella pneumonia, Haemophilusinfluenzae and Moraxella catarrhalis	LGIS	MCQs SAQs
4.	**Microbes of Atypical Pneumonia**	The learners will be able to • Correlate the pathogenesis with clinical features of Mycoplasma pneumoniae, Chlamydia pneumoniae, Legionella pneumophila infection, swine flu and avian flu	• Enlist causative organisms of atypical pneumonia • Correlate the pathogenesis with clinical features of Mycoplasma pneumoniae, Chlamydia pneumoniae, & Legionella pneumophila infection • Describe the diagnostic criteria for Mycoplasma pneumoniae, Chlamydia pneumoniae, & Legionella pneumophila infection • Enlist the viruses responsible for causing pneumonia • Describe route of transmission, pathogenesis and clinical features of swine flu & avian flu	LGIS	MCQs SAQs

5.	**Typical & Atypical Mycobacteria**	The learners will be able to • Describe the classification, pathogenesis and diagnostic options for Typical &Atypical Mycobacteria	• Classify Mycobacteria & differentiate between the typical and atypical Mycobacteria • Enlist the group characteristics of Mycobacteria • Describe the etiopathogenesis of Mycobacterium tuberculosis infection • Describe the laboratory diagnostic options for confirming Mycobacterial infection • Describe the etiopathogenesis of Mycobacterium leprae infection • Differentiate between the etiopathogenesis of atypical mycobacterial infections.	LGIS	MCQs SAQs

6.	**ZN staining**		• Describe the principle of ZN staining • Describe the function of each reagent used in ZN staining	Skill	OSPE

S. NO	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	Urinary tract infection	The learners will be able to • Correlate the pathogenesis of UTI with clinical features and lab findings	• Species • Describe the morphology, pathogenesis and diagnostic criteria for Enterococci species • Describe the morphology, pathogenesis and diagnostic criteria for Enterococci species • Describe the morphology, pathogenesis and diagnostic criteria for Enterococci species • Describe the morphology, pathogenesis and diagnostic criteria for Enterococci spec • Differentiate between UTI & sterile pyuria etiology with predisposing factors of UTI • Correlate the microbial etiology with predisposing factors of UTI • Correlate the microbial etiology with predisposing factors of UTI • Correlate the microbiologic etiology with predisposing factors of UTI	LGIS	MCQs SAQs

			• Correlate the pathogenesis of UTI withit's clinical features • Correlate the pathogenesis of UTI with clinical feature • Describe the morphology, pathogenesis and diagnostic criteria for Proteus species • Describe the morphology, pathogenesis and diagnostic criteria for Enterococci species • Describe the morphology, pathogenesis and diagnostic criteria for Enterococci E • Describe the morphology, pathogenesis and diagnostic criteria for Enterococci species, Enterobacter species, Proteus species and Pseudomonas species		
2.	**Pyelonephritis/ Interstitial nephritis**		• Define pyelonephritis and enumerate its types. • Enlist the predisposing factors of pyelonephritis • Describe the pathogenesis of pyelonephritis • Describe the morphology and complications of acute pyelonephritis • Describe the morphology and forms of chronic pyelonephritis • Describe the pathogenesis and morphology of drug induced interstitial nephritis	LGIS	MCQs SAQs

3.	**Interpretation of Urine Routine examination (Skill)**		• Describe the clinical significance of urine R/E • Describe the sample collection for urine R/E • Perform physical examination of a urine sample • Perform chemical &microscopic examination of a urine sample • Interpret a urine R/E report	Skill	OSPE

S. NO	TOPICS	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Haemorrhagic fever viruses**	The learners will be able to • Differentiate between +ive and -ive, ss and ds viruses. Correlate the etiopathogenesis with morphology and clinical features of Dengue	• Differentiate between +ve & –ve sense viruses • Differentiate between ss & ds viruses • Describe the steps of viral replicating • Enlist the transmission routes for various haemorrhagic fever viruses • Describe the pathogenesis & diagnosis of dengue fever (DF)	LGIS	MCQs SAQs

2.	**Haemoparasites**	The learners will be able to • Correlate the characteristics of blood & tissue protozoal parasites with their pathogenicity and life cycles	• Correlate the life cycles of Plasmodium species with their clinical presentations • Describe the lab diagnosis of malaria • Correlate the life cycle of Trypanosoma species with their clinical presentations • Describe the lab diagnosis of trypanosomiasis • Correlate the life cycle of toxoplasma species with their clinical presentations • Describe the lab diagnosis of toxoplasmosis • Correlate the life cycles of Leishmania species with their clinical presentations • Describe the lab diagnosis of different types of Leishmaniais	LGIS	MCQs SAQs

3.	**Malaria**	The learners will be able to • Diagnose of Malaria • Identify Plasmodium species and interpret ICT for diagnosis of malaria	• Identify different Plasmodium species under microscope • Identify different stages in the life cycles of Plasmodium species • Illustrate the morphological differences between the species of Plasmodium with the help of diagram • Describe the principle of immunochromatographic technique for diagnosis of malaria • Interpret ICT results for diagnosis of malaria	Skill	OSPE

S. NO	TOPICS	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Campylobacteraceae**	The learners will be able to • Correlate the characteristics of members of Campylobacteraceae with their pathogenicity and laboratory identification	• Enlist the members of family Campylobacteraceae • Describe the morphology, pathogenesis, and lab diagnostic options of H.pylori • Enlist the complications for H.pylori infection • Enlist the serotypes of Campylobacter species • Describe the morphology, pathogenesis, and lab diagnostic options of Campylobacter species	LGIS	MCQs SAQs

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Food Poisoning**	The learners will be able to • Correlate the characteristics of organisms responsible for food poisoning with their pathogenicity and laboratory identification	• Differentiate between diarrhea & dysentery • Describe the morphology, pathogenesis and lab diagnostic protocols for clostridium perfringens and c. Difficile infection • Describe the morphology, pathogenesis and lab diagnostic protocols for bacillus cereus infection • Describe the morphology, pathogenesis and lab diagnostic protocols for infection by cryptosporidium species • Describe the morphology, pathogenesis and lab diagnostic protocols for rota viral infection	LGIS	MCQS SAQS
2.	**Microbes of Enteric fever& Cholera**	The learners will be able to • Correlate the characteristics of organisms responsible for Enteric fever & Cholera with their pathogenicity and laboratory identification	• Classify Salmonella species • Describe the morphology, pathogenesis and lab diagnostic options for Salmonellosis • Enlist the complications of Salmonella infection • Classify family Vibrionaceae • Describe the morphology, pathogenesis and lab diagnostic options for Vibrio cholera infection	LGIS	MCQS SAQS

3.	**Parasitology – I Protozoa**	The learners will be able to • Correlate the characteristics of Intestinal Protozoa with their pathogenicity and life cycle	• Classify parasites (protozoa & helminths) • Differentiate between clinical symptoms of giardiasis, entamoeba histolytica and cryptosporiadiasis. • Describe source of infection giardiasis, amoebiasis and cryptosporidiosis • Describe the pathogenesis of amoebiasis, giardiasis and cryptosporiadiasis. • Enlist different types of cryptosporidia • Describe stool examination findings for diagnosis of giardiasis, amoebiasis and cryptosporidiosis • Differentiate between amoebic and bacillary dysentery	LGIS	MCQs

4.	**Parasitology – II** **Nematodes**	The learners will be able to • Correlate the characteristics of Nematodes with their pathogenicity and life cycle	• Enlist the common parasites of class nematodes • Describe life cycle and pathogenesis of filariasis, ascaris lumbricoides, ancylostoma duodenale and enterobius vermicularis • Describe stool examination and laboratory findings for diagnosis of filariasis, ascaris lumbricoides, ancylostoma duodenale and enterobius vermicularis • Tabulate the diseases caused by different nematodes	LGIS	MCQs SAQs
5.	**Parasitology – III** **Trematodes**	The learners will be able to • Correlate the characteristics of Trematodes with their pathogenicity and life cycles	• Enlist the common trematodes (Schistosoma species, Clonorchis sinensis, Paragonimum westermani, Fasciola) • Enlist the common characteristics of trematodes. • Describe the life cycles of Schistosoma and Clonorchis sinensis • Describe the laboratory diagnosis of Schistosomiasis and Clonorchiasis	LGIS	MCQs SAQs

6.	**Parasitology – IV** **Cestodes**	The learners will be able to • Correlate the characteristics of Cestodes with their pathogenicity and life cycle	• Enlist the common parasites of cestode class. (tenia spp., diphylobothrium latum and echinococcus granulosus) • Enlist the common characteristics of cestodes. • Describe the life cycle of cestodes • Tabulate different diseases caused by various cestodes • Describe stool examination findings for diagnosis of diseases caused by cestodes	LGIS SGD	MCQs SAQs -
7.	**Parasitology** **SGD**	The learners will be able to • Correlate the characteristics of Protozoa, Nematodes, Trematodes and Cestodes with their pathogenicity and life cycle	• Classify parasites (protozoa & helminths) differentiate between clinical symptoms of Giardiasis, Entamoeba histolytica and Cryptosporiadiasis. • Describe stool examination and laboratory findings for diagnosis of filariasis , Ascaris lumbricoides, Ancylostoma duodenale and Enterobius vermicularis • Tabulate sites of involvement and the diseases caused by various trematodes • Enlist the common parasites of cestode class.(tenia spp., Diphylobothrium latum and Echinococcus granulosus) • Describe stool examination findings for diagnosis of diseases caused by cestodes	LGIS SGD	

8.	**Stool RE** **SKILL**	The learners will be able to • Identify common parasitic ova and cysts in stool routine examination	• Interpret a report of stool R/E • Examine a wet mount • Examine an iodine mount • Identify common intestinal parasites • Identify ova/cysts of common intestinal parasites • Describe pathogenesis, morphology & clinical course of Hepatitis A viral infection • Interpret serological markers of Hepatitis A viral infection	Skill LGIS	MCQS SAQS OSPE
9.	**Viral hepatitis I & II**	The learners will be able to • Correlate the etiopathogenesis of viral hepatitis with its morphological changes	• Describe pathogenesis, morphology & clinical course of Hepatitis B virfection • Interpret serological markers of Hepatitis B viral infection • Describe pathogenesis, morphology & clinical course of Hepatitis C viral infection • Interpret serological markers of Hepatitis C viral infection • Describe Pathology of Hepatitis D virus infection • Differentiate among acute, chronic and fulminant viral hepatitis	Skill	OSPE

10.	**ICT for H.pylori & Viral hepatitis & Typhoid fever**	The learners will be able to • Correlate the ICT results with clinical manifestations	• Perform and interpret ICT for H.pylori, viral hepatitis and enteric fever	Skill	OSPE
11.	**Widal test interpret**		• Perform and interpret widal test	Skill	OSPE

S. NO	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Skin diseases caused by microbes I**	The learners will be able to • Correlate etiopathogenesis & cl. Manifestations of Measels (Rubeola) , German Measels (Rubella), Chicken pox (Varicella/ Herpes zooster), Small pox (Variola), Herpes, Papilloma & EBV infection	• Enlist the microbes for various skin infections • Differentiate between the etiopathogenesis & cl. Manifestations of Measels (Rubeola) , German Measels (Rubella), Chicken pox (Varicella/ Herpes zooster), Small pox (Variola), Herpes, Papilloma & EBV infection • Differentiate between the lab diagnosis of Measles, German Measels, Small pox & EBV infection • Enlist the complications of Measels, German Measels, Herpes , papilloma & EBV infection	LGIS	MCQS SAQS

2.	**Skin diseases caused by microbes II**	LGIS	• Classify the members of family Rickettsiacea • Differntiate between the clinical manifestations of different Rickettsial species • Describe the lab diagnosis of Rickettsial diseases • Differentiate between the etiopathogenesis Borrelia burgdorferi (Lyme disease or Erythema chronicum margins), Bacillus anthrax • Describe the lab diagnosis of Borrelia burgdorferi & Bacillus species, infection	LGIS	MCQS SAQS

3	Leprosy **(LGIS)**	The learners will be able to Correlate etiopathogenesis with lab diagnosis of leprosy	• Define leprosy • Enlist types of leprosy • Enlist etiology of leprosy • Describe pathogenesis of leprosy • Describe morphology of leprosy • Enlist lab diagnosis of leprosy	LGIS	MCQS SAQS

4	**Staphylococcus species**	The learners will be able to Correlate the etiopathogenesis of various spp. Of Staphylococci	• Classify Staphylococci • Describe the pathogenesis of Staphylococcal infection based upon various characteristics of virulent factors • Differentiate between the lab diagnosis of Staphylococci. • Describe the significance of MRSA & VRSA	LGIS	MCQS SAQS

S. NO	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1	**Meningeal infection (Neisseria, TBM)**	The learners will be able to • Correlate microbial ethology with clinical manifestations and lab diagnosis of meningitis	• Enlist the sites & routes for nervous system infections • Enlist the microbes responsible for meningitis in various ages and etiologies • Describe the pathogenicity, diagnosis & complications of neisseria meningitides • Describe the pathogenicity, diagnosis & complications of chronic tuberculous meningitides • Differentiate between the morphology of pyogenic and tuberculous meningitis	LGIS	MCQS SAQS
2.	**CSF R/E**	The learners will be able to • Interpret CSFR R/E	• Enlist the tests performed in CSF R/E • Interpret the results of CSF R/E • Tabulate the CSF3 findings in various types of meningitis	LGIS	MCQS SAQS

3.	**CSF R/E & Culture**		• Enlist the steps for performing CSF R/E and culture • Interpret a report of CSF R/E • Identify different culture media used for CSF culture	Skill	OSPE

S. NO	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Microbes of neural infections (Picorna viruses, Entro viruses, Polio, Tetanus and Botulism)**	The learners will be able to • Correlate microbial ethology with clinical manifestations for the microbes of neural infections	• Describe etiopathogenesis and clinical features of Poliomyelitis • Investigate a case of Poliomyelitis • Describe etiopathogenesis, clinical features and diagnostic options for Tetanus • Enlist the preventive options for tetanus • Describe etiopathogenesis, clinical features and diagnostic options for Botulism	LGIS	MCQS SAQS

S. No	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Encephalitis (Rabies, Meningoencephalitis**	The learners will be able to • Correlate between the etiopathogenesis, and lab diagnosis of encephalitis and meningoencephalitis	• Describe the etiopathogenesis for encephalitis • Describe the modes of transmission and clinical features for various types of viral meningoencephalitis • Describe the morphological changes seen in viral meningoencephalitis • Describe the etiopathogenesis, clinical features and morphology of encephalitis of cerebral amebiasis	LGIS	MCQS SAQS

S. NO	TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	TEACHING STRATEGIES	ASSESSMENT TOOLS
1.	**Infections of reproductive tract**	The learners will be able to • Correlate etiopathogenesis with complications of Infections of reproductive tract	• Classify reproductive tract infection • Describe the morphology, pathogenesis, clinical features, complications and diagnostic options for chlamydia trachomatis • Describe the morphology, pathogenesis, clinical features complications and diagnostic options for trichomonas vaginalis • Describe the morphology, pathogenesis, clinical features complications and diagnostic options for treponemapallidum infection • Describe the morphology, pathogenesis, clinical features complications and diagnostic options for haemophillusducreyiinfection	LGIS	MCQS SAQS

FORENSIC MEDICINE & TOXICOLOGY

S. No	TOPIC/ THEME	LEARNING OUTCOMES	LEARNING OBJECTIVES/ CONTENT	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL
1.	**Introduction To Legal Medicine**	The learners will be able to • Apply the medical knowledge for the purpose of law	• Describe: a) the law and its types b) the powers and jurisdiction of courts • Discuss procedures for inquest • Define the important legal terms • Apply Qisas & Diyat act • Assess the role of a medical doctor in the medico-legal system. & To give medical evidence in courts. • Plan dying deceleration & dying deposition • Act according to framework of privileges and obligations of RMP • Demonstrate doctor-patient relationship in the context of maintaining highest ethical standards in medical profession • Maintain highest ethical principles in medical examination and when obtaining consent. • Discuss the laws related to organ transplantation • Analyze the structure, authority & mandate of PMDC	LGIS SGD Microlearning	MCQs SAQs/SEQs Structured viva OSPE/OSCE

			• To interpret Xray & identify & label it according to Qisas & Diyat		
2.	**Traumatology/Mechanical Injuries**	The learners will be able to • Evaluate the mechanism, types, postmortem findings & medico legal importance of injuries • Discuss the domestic abuse faced by children & women	• Differentiate between mechanical injuries: • Explain the mechanisms of wound production, • Classify injuries and significance of their medico-legal aspects. • , Identify firearm ammunition, understand ballistics and their medico-legal aspects. • Examine an injured person, certify nature, manner of injury, causative agent, and dating of wound • Differentiate between ante-mortem and post-mortem wound • Diagnose whether death is suicidal, homicidal or accidental • Differentiate between self-inflicted, defense wound or wounds produced by criminal intent • Identify injuries of head (scalp, skull, brain), face, chest, abdomen, extremities, vertebral column and its contents, • Describe transportation injuries sustained by	LGIS SGD Flip Classroom	MCQs SAQs/SEQs Structured viva OSPE/OSCE

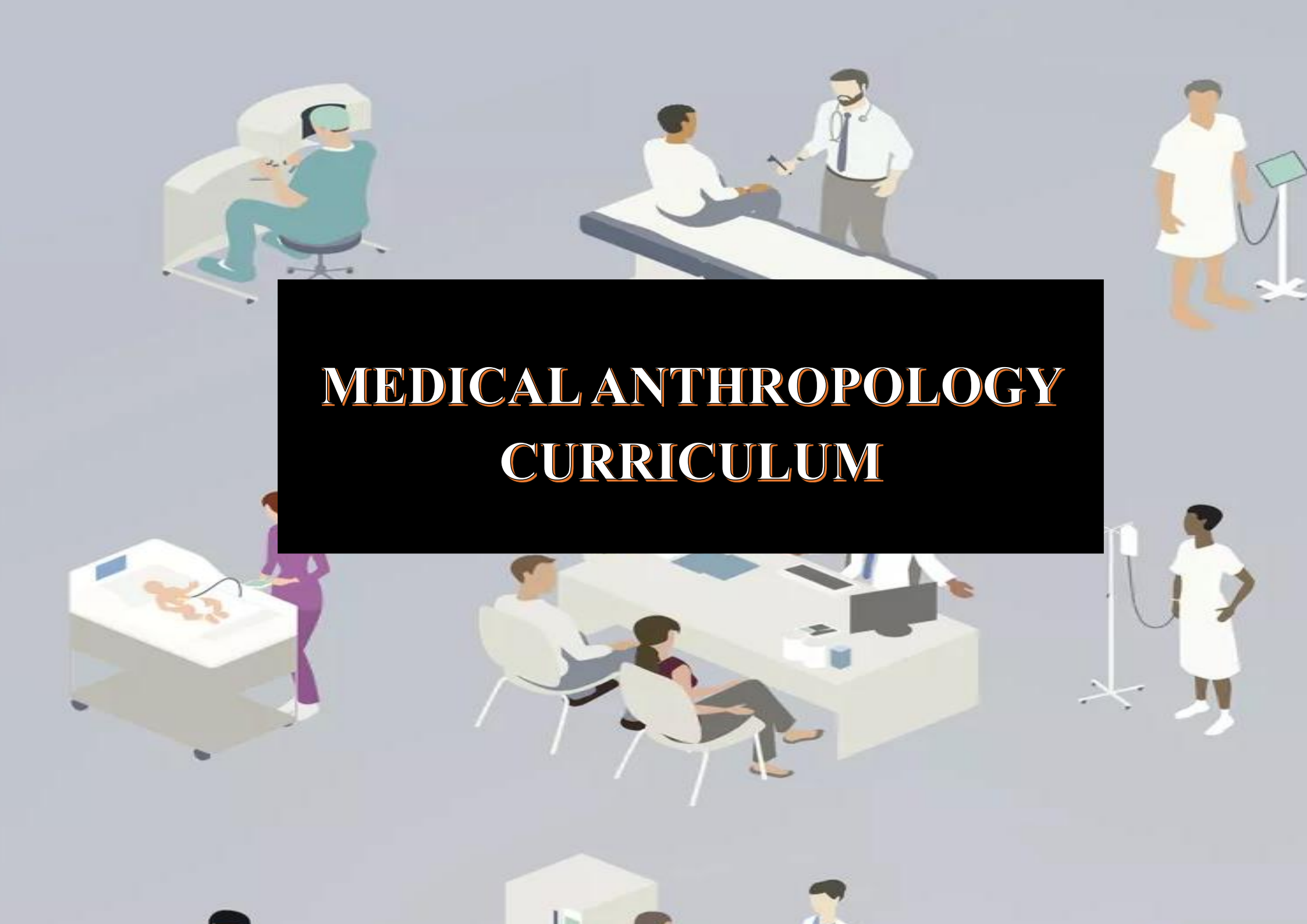
			pedestrian,driver,occupants of vehicle & motorcyclist • Evaluate medico-legal aspects of injuries due to starvation, heat, cold, lightening & electricity • Identify degrees of burns & label according to rule of 9 • Discuss anatomical, physiological, biochemical and pathological signs of asphyxial deaths, their autopsy findings & medico legal aspects. • Discuss types of drowning, its patho-physiology, autopsy findings & medico legal importance • Critically analyze the laws related to presumption of survivor ship • Assess the pattern, reasons, examination of victim & medico legal significance of domestic abuse against women & children		
3.	**Autopsy & Exhumation**	The learners will be able to • Evaluate the types, requirements, procedure & documentation of autopsy • Analyze the protocol, legal requirements, steps & documentation of exhumation	• Describe types, objectives, requirements, techniques and procedure for postmortem. • Describe autopsy protocol. • Analyze collection, preservation, labeling & dispatch of viscera to FSL • Describe postmortem artifacts • Knows laws related to exhumation • Describe steps of exhumation	LGIS SGD Audiovisuals DHQ visits	MCQs SAQs/SEQs Structured viva OSPE/OSCE

			• Describe precautions during & after exhumation • Observe autopsy & medico legal procedures in DHQ hospital • Issue medico legal report, autopsy report, & death certificate		
4.	**Thanatology**	The learners will be able to • Evaluate the mechanism of death • Discuss the postmortem phenomenon • Analyze death certificate	• Discuss scientific concepts regarding death & medico-legal aspects of brain death, and mechanisms of death. • Describe cause, mode & manner of death • Describe physiological & biochemical changes occurring in various body tissues and organs after death. • Issue a certification of death according to W.H.O guidelines.	LGIS SGD Flip class room	MCQs SAQs/SEQs Structured viva OSPE/OSCE
5.	**Personal identity**	The learners will be able to • Discuss medico legal importance of parameters of identification	• Understand parameters of personal identity, • Apply methods of identification in living, dead, decomposed, mutilated and burnt bodies, and skeletal and fragmentary remains using special techniques (Dentistry, Radiology, etc.) • To understand various intersex states • To estimate age & gender using teeth & bones.	LGIS SGD Models Bones X rays Slides Performance/ practical/ skill	MCQs SAQs/SEQs Structured viva OSPE/OSCE Practical performance

			• To perform physical examination of bones for diagnosis & identification • To identify bone & describe its morphology • To evaluate fingerprints & understand its significance • To perform detection of blood and interpret its medico legal importance • To be able to assess the blood group & its medico legal importance • To identify & differentiate between the hair of different species and know the medico legal importance • To identify & differentiate between the blood cells of different species and know the medico legal importance		
6.	**Forensic sexology**	The learners will be able to • Evaluate virginity, pregnancy & delivery in living & dead • Discuss natural & unnatural sexual offenses • Discuss the medico legal examination of rape victim & accuser • Explain sexual perversions • Discuss Zina & Hudood ordinance • Define & classify abortions, examination of aborted	• Define virginity, pregnancy and delivery, their examination & medico-legal aspects • Perform medico legal examination of victim and assailant, & collection of specific specimens and reporting of victim & accuser of sexual offenses. • Define sexual offenses and relevant sections of law (Zina and Hudood Ordinance)	LGIS	MCQs SAQs/SEQs Structured viva

		material & understand laws related to abortion • Identify crime against new born/ infants	• Differentiate between natural and unnatural sexual offenses. • Define & explain common sexual perversions • Describe medico-legal aspects applicable to abortion, its types & causes • Examining mother and aborted material, sending aborted material in proper preservative for examination • To differentiate between natural & induced abortion • Discuss laws related to abortions • Define infanticide, its reasons, postmortem examination & medico legal importance		
7.	**Forensic Psychiatry**	The learners will be able to • Analyse mental illness, its various types & laws related to it • Discuss the law related to admission in a mental facility • Discuss laws related to insanity & its medico legal importance	• Diagnose mental illness. • Distinguish between true and feigned insanity. • Explain various mental disorders • Explain the law related to admission in a mental facility • Explain the criminal responsibility & laws related to it	LGIS SGD Flip classroom	MCQs SEQs/SAQs OSPE/OSCE Structured viva
8.	**Toxicology**	The learners will be able to • Discuss the general principles of Toxicology • Define & classify poisons & antidotes • Explain gastric lavage • Enlist poisons groups, their mechanism of action, fatal	• Define toxicology & toxins, • Differentiate between drug & poison • Classify poisons with examples • Define & classify antidotes with examples • Describe the duties of a medical officer in case of poisoning	SGD Models Specimen Audiovisuals	MCQs SEQs/SAQs OSPE/OSCE Structured viva

		dose, fatal period, sign & symptoms, examination, treatment & medico legal importance • Identify poisons/drugs of abuse prevailing in our society along with medico-legal aspects: e.g., Alcohol • Apply autopsy techniques with collection, preservation and dispatch of biological material to analytical laboratory.	• Explain routes of administration & fate of poisons in human body • Perform gastric lavage • Analyze & explain the following poisons according to their mechanism of action, fatal dose, fatal period, sign & symptoms, examination, treatment & medico legal importance ➢ Corrosives ➢ Irritants ➢ Cardiac ➢ Asphyxiants ➢ Neurotics ➢ Miscellaneous • Discuss drug dependence & abuse		



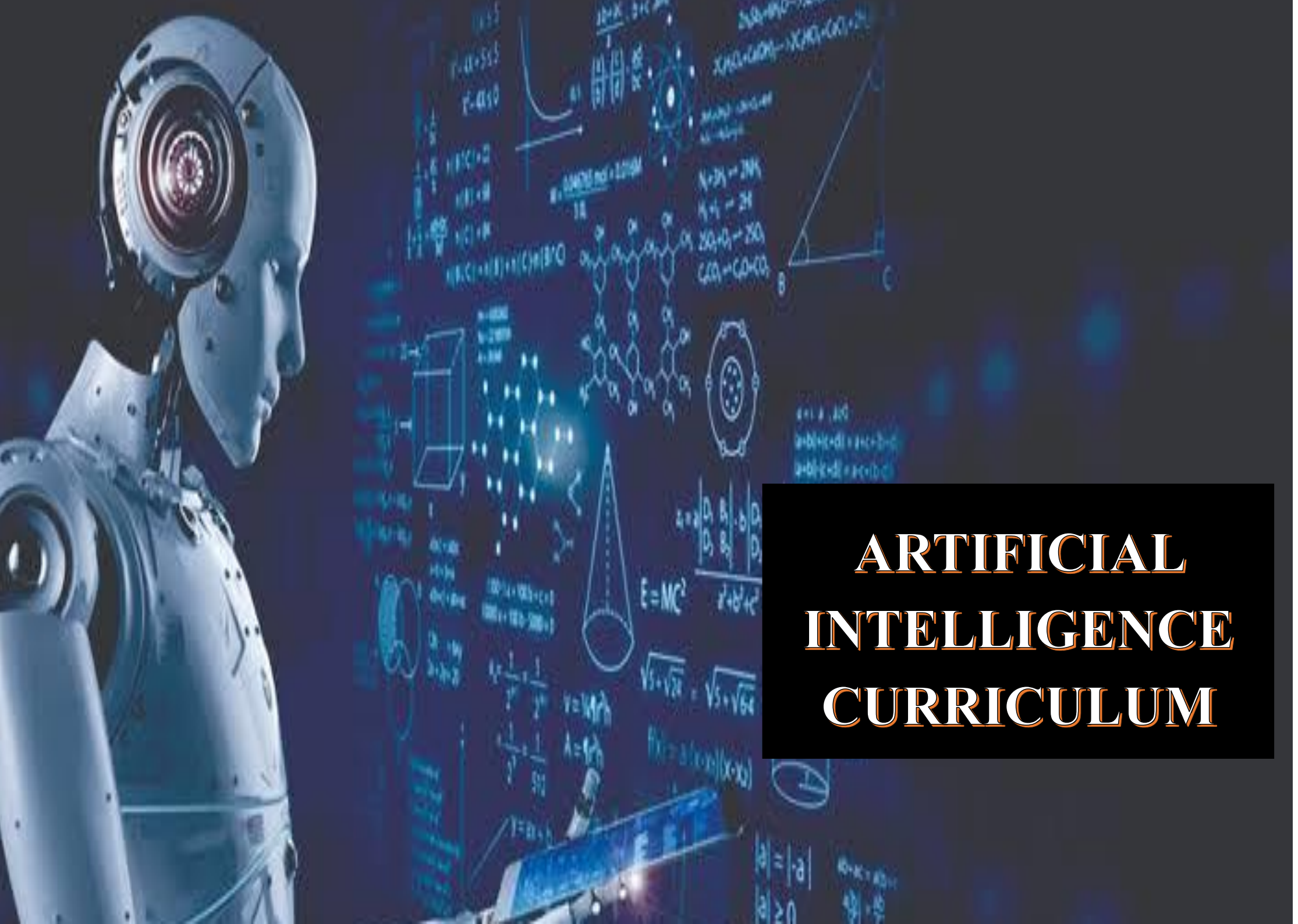
MEDICAL ANTHROPOLOGY CURRICULUM

S. No	TOPIC/THEME	LEARNING OUTCOME	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLS
1	**Introduction To Medical Anthropology**	The learners will be able to • Understand the role of medical anthropologists to investigate and respond to the study of pain, illness, suffering, and healing in global contexts	• To compare the health and disease situation with an ecological and bio-cultural approach	Lectures, Case studies, Presentations	**FA**: MCQs, SAQs, and OSCE **IA:** quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
2	**History Of Health in Human Life**	The learners will be able to • Synthesize the differences and similarities between alternative and complementary medicine, ethnomedicine, and biomedicine	• Discuss the differences and similarities between alternative and complementary medicine, ethno-medicine, • Discuss biomedicine • Discuss the significance of applied and policy making.	Lectures, Case studies, Presentations	
3	**History Of Health in Human Life**	The learners will be able to • Discuss the scope and concerns of Medical Anthropology	• Discuss the syntonic ways of medical anthropology	Lectures, Case studies, Presentations	

4	**Theoretical Orientations In** **i. Medical Anthropology** **ii. Medical Ecology** **Bio Cultural Approach**	The learners will be able to • Explain the difference between illness and disease from cultural point of view	• 1. Able to recognize the difference between illness and disease	Lectures, Case studies, Presentations	
5	**Theoretical Orientations In** **i. Medical Anthropology** **ii. Applied Medical Anthropology**	The learners will be able to • Explain health issues and solutions to improve health	• Discuss solutions to improve health issues	Lectures, Case studies, Presentations	
6	**Concepts Of Medical Anthropology and Cross Cultural Adaptations**	The learners will be able to • Elaborate adaptations and new health issues	• Discuss emerging health issues	Lectures, Case studies, Presentations	

7	**Mono Cultural (Ethnographic) Research and Cross-Cultural Research**	The learners will be able to • Apply research to analyse health structure of communities	• Compare how gender, ethnicity, class, and sexual orientation inform health and disease outcomes	Lectures, Case studies, Presentations	
9	**Culture: Human Development and Clinical Assessment**	The learners will be able to • Apply research to analyse the health structure of communities	• Conduct to analyse the health structure of community's research	Lectures, Case studies, Presentations	
10	**Cultural Variations in Understanding Of Health Care**	The learners will be able to • Understand native's knowledge of health and disease	• Analyse the links between biology and culture	Presentations	
11	**Cultural Competence in Health Care**	The learners will be able to • Understand native's knowledge of health and disease	• Discuss native's knowledge of health and disease	Lectures, Case studies, Presentations	
12	**Concepts Of Medical Anthropology Popular, Folk, And Professional Health Care Sectors**	The learners will be able to • Compare the concepts Of Medical Anthropology in Popular, Folk, And Professional Health Care Sectors	• Differentiate between the concepts Of Medical Anthropology in Popular, Folk, And Professional Health Care Sectors	Lectures, Case studies, Presentations	

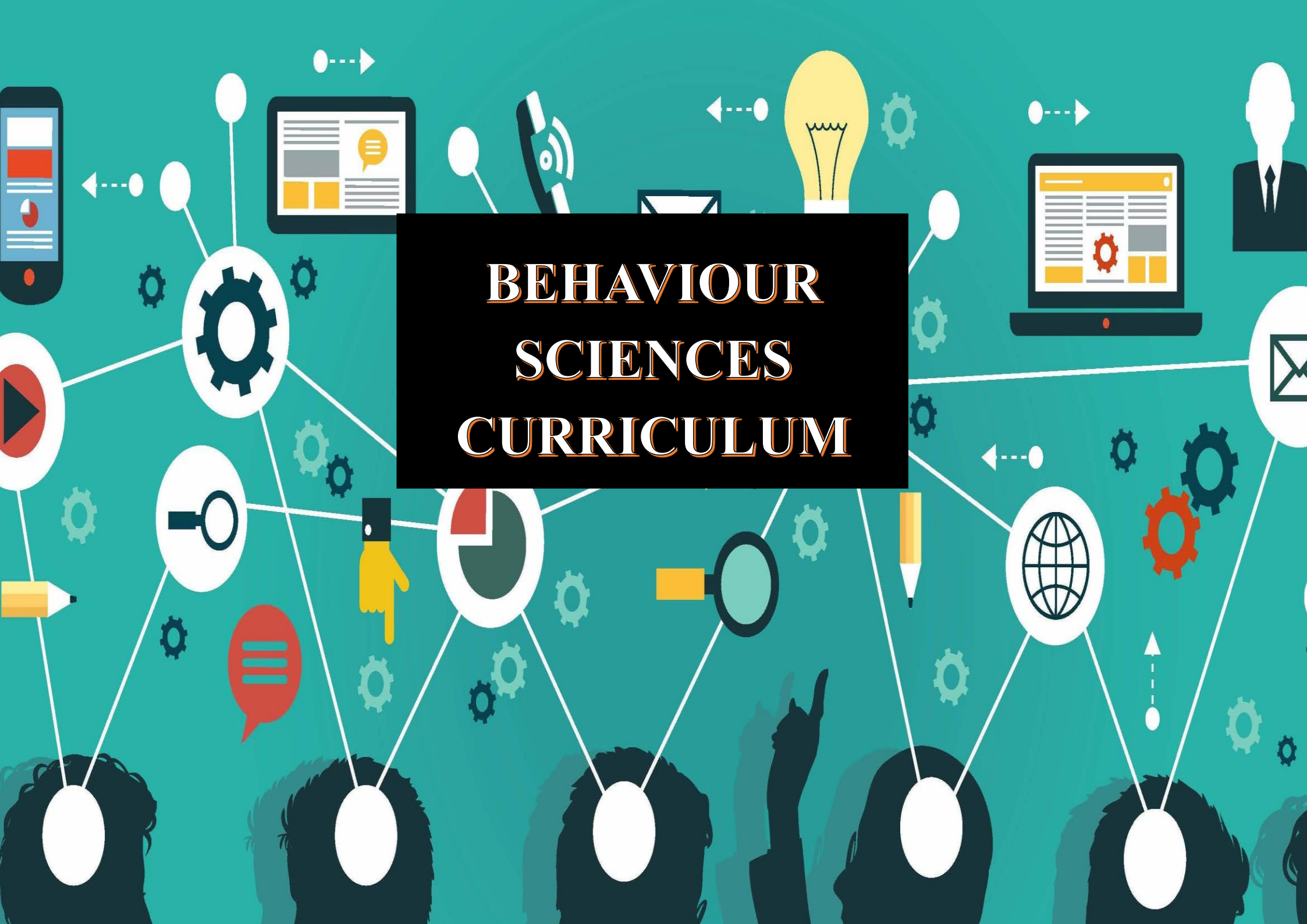
14	**Culture And Personality**	The learners will be able to • Analyse culture and personality	• Distinguish between various cultures and personality	Lectures, Case studies, Presentations	
15	**Medical Ecology and Disease**	The learners will be able to • Describe and analyse the transition to global health	• Able to describe and analyse the transition to global health.	Lectures, Case studies, Presentations	
16	**Healthcare System of World Presentations**	The learners will be able to • Analyse the transition to global health	• Describe and analyse the transition to global health.	Lectures, Case studies, Presentations	


ARTIFICIAL
INTELLIGENCE
CURRICULUM

S. No	THEME/TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLs
1.	**Overview of artificial intelligence and machine learning concepts**	The learners will be able to • Describe historical perspective and current applications in healthcare	• Discuss the perspective and current applications in healthcare	LGIS	Formative MCQs
2.	**Data Science**	The learners will be able to • Apply health data sources, standards and Interoperability standards	• Discuss the Health data sources, standards, interoperability standards	LGIS	Formative MCQs
3.	**Fundamentals of AI**	The learners will be able to • Apply basic principles of machine learning algorithms • Apply data preprocessing and feature engineering • Apply Model training, evaluation, and validation	• Discuss the basic principles of machine learning algorithms • Data preprocessing and feature engineering • Model training, evaluation, and validation	LGIS	Formative MCQs

4.	**AI Tools and Technologies:**	The learners will be able to • Understand an introduction to popular AI tools and platforms used in healthcare • Experience Hands-on experience with AI software for medical image analysis, diagnostic decision support, and predictive modelling	• Discuss the popular AI tools and platforms used in healthcare	LGIS LAB	Formative MCQs
5.	**Ethical and Legal Considerations**	The learners will be able to • Analyse the ethical implications of AI in healthcare decision-making • Apply regulatory frameworks and guidelines for AI usage in medical practice • Apply patient privacy, data security, and transparency in AI algorithms	• Discuss the ethical implications of AI in healthcare decision-making. • Regulatory frameworks and guidelines for AI usage in medical practice • Patient privacy, data security, and transparency in AI algorithms	LGIS	Formative MCQs
6.	**AI Applications in Medical Imaging:**	The learners will be able to • Navigate through application of AI	• Discuss the use of AI for image interpretation, segmentation, and feature extraction • Case studies and practical sessions on AI-driven radiology, • pathology, and dermatology imaging	LGIS	Formative MCQs

7.	**Clinical Decision Support Systems**	The learners will be able to • Analyse systems (CDSS) • Integrate AI algorithms into electronic health records (EHR) for personalized patient care • Evaluate CDSS performance and impact on clinical outcomes	• Discuss AI-based clinical decision support systems (CDSS) • Integration of AI algorithms into electronic health records (EHR) for personalized patient care • Evaluation of CDSS performance and impact on clinical outcomes	LGIS LAB	Formative MCQs
8.	**Future Trends and Emerging Technologies** **Radiology** **Pathology** **Surgery** **Medicine** **ENT** **Eye** **Community Medicine**	The learners will be able to • Explore cutting-edge AI applications such as predictive analytics, genomics, and precision medicine	• Discuss cutting-edge AI applications such as predictive analytics, genomics, and precision medicine • Discussion on the role of AI in healthcare innovation, research, and clinical trials	LGIS	Formative MCQs


BEHAVIOUR
SCIENCES
CURRICULUM

Sr.No	TOPIC/ THEMES	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLS
1.	**Introduction to Behavioural Sciences and Its Importance in Health**	The learners will be able to • Comprehend significance of Behavioural Sciences in Medical practice	• Significance of behavioural Sciences in clinical practice	Seminar with Psychologist, anthropologist and Sociologist	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
2.		The learners will be able to • Demonstrate understanding of holistic and biomedicine model in clinical practice along with understanding of culture and medical practice	• Differentiate: • Holistic Vs. Traditional Allopathic Medicine • Culture & Medical Practice	Lectures/ Presentations	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

3.		The learners will be able to • Comprehend understanding of psychology, sociology and anthropology as well as biological determinants of health and disease in clinical practice, along with public health approach of primary and secondary prevention of disease/disorder and promotion of health.	• Discuss Health Care Models and their Clinical Applications • Bio-Psycho- Social Model of health and disease • The Integrated Model of Health Care: Correlation of Body, Brain, Mind, Spirit and Behavioural Sciences • The Public Health Care Model	Lectures/Presen stations Small group discussions (SGD)/seminars	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
4.	**Understanding Behaviour**	The learners will be able to • Analyse human behaviour and other factors affecting health and disease by enhancing doctor's own learning and clinical skill.	• Understand human behaviour through Principles of Psychology • Sensation and sense organs • Perception • Attention and concentration • Memory • Thinking • Communication	Lectures/Presentations Interactive Video Vignettes Large group Interactive session (LGIS)	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

5.	**Individual Differences**	The learners will be able to • Understand and assess types of human personality and phases of personality development along with intelligence.	• Understand individual human differences • Intelligence • Personality Development	Lectures/Presentations Interactive Video Vignettes Large group Interactive session (LGIS)	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
6.		The learners will be able to • Understand the complex interplay of Brain and Behaviour.	• Describe Neurobiological and Psychological Basis of Behaviour • Emotions • Motivation/need/d rive • learning	Lectures/ Presentations Interactive Video Vignettes Group Project	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
7.	**Medical Ethics and Mental Health Acts**	The learners will be able to • Integrate the principles of medical ethics in professional life	• Medical Ethics and Professionalism	Lectures/ Presentations Small Group Discussion	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

8.		The learners will be able to • Integrate significance of medical ethics in medical practice	• Describe and Demonstrate relevance of Ethics in the Life of a Doctor • Scope and Meaning of Medical Ethics • Guiding Principles of Medical Ethics • Common Ethical Issues in Medical Practice • Common Ethical Dilemmas in a Health • Professional's Life • Doctor-Patient Relationship	Lectures/Presen tations Declamation Contests, Dramas, Documentaries,	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies,
9.				Short Films and Videos (e.g. on common ethical dilemmas) Role-playing with peers Case-Based Learning (CBL)	reflective writing and student portfolios
10.		The learners will be able to • Familiarize doctors with alternative medicine and ethical concerns of its practices in medical setup.	• Discuss the significance of knowing psychosocial aspects of alternative medicine in clinical practice.	Lectures/ Presentations Large group Interactive session (LGIS)	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
11.		The learners will be able to • Comprehend Mental Health Acts	• History of Mental Health Acts in Pakistan • Recent Psychiatric health laws in Pakistan	Lectures Presentations Group discussions Case Based Learning	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

12.	**Doctor Patient Relationship**	The learners will be able to • Analyse critical situations/ challenges in clinical practice to solve clinical problems	• Discuss Rights and Responsibilities of Patients and Doctors • Rights of the Patient • Responsibilities of the Patients • Rights of the Doctor • Responsibilities of the Doctor	Lectures/Presentations Case-Based Learning (CBL) Large group Interactive session (LGIS) Storytelling by students	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
13.		The learners will be able to • Critique the ethical boundaries of conduct in doctor patient relationship	• Understand Psychological Reactions in Doctor-Patient Relationship • Social bonding	Lectures/Presentations Case-Based Learning (CBL)	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group
14.			• Dependence • Transference • Counter- transference • Resistance • Unwell Physician • / Burn-out	Large group Interactive session (LGIS) Storytelling by students Role-playing with peers	projects, case studies, reflective writing and student portfolios
15.		The learners will be able to • Demonstrate professional excellence of a doctor to maintain healthy doctor-patient relationship	• Understand Professionalism in Health Care • Knowledge • Skills • Attitudes	Lectures/Presentations Large group Interactive session (LGIS)	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

16.	**Non-Pharmacological Interventions: Communication Skills, Counselling, Crisis Intervention, Conflict Resolution, Informational Care and Breaking Bad News**	The learners will be able to • Demonstrate effective communication skills in clinical practice, assimilate and handle patient information in different clinical scenarios. • Handle uncertain situations in clinical practice.	• Demonstrate Non-Pharmacological Interventions (NPIs) in Clinical Practice • Communication Skills • Counselling • Informational Care (IC) • Handling Difficult Patients and their Families • Breaking Bad News • Crisis • Intervention and Disaster Management • Conflict Resolution • Empathy	Lecture /Presentation Role-playing with peers Storytelling by students Problem Based Learning (PBL) Case-Based Learning (CBL), Interactive Video Vignettes	EA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
17.		The learners will be able to • Cope with critical psychosocial issues in exceptional hospital settings	• Discuss Psychosocial Issues in Special Hospital Settings • Coronary Care Unit • Intensive Care Unit • The Emergency Department	Lectures/Presentations Large group Interactive session (LGIS) Role-playing with peers Case Studies Seminars	EA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

18.			• Psychosocial Aspects of Organ Transplantation • The Dialysis Unit • Reproductive Health • Pediatrics Ward • Oncology • Operating Theater		
19.		The learners will be able to • Critically analyze the patient to provide the best care possible and help the individual obtain optimal health.	• Demonstrate knowledge, and necessary skills for Psychosocial Assessment	Lectures/Presentations Large group Interactive	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
20.	**Life Events: Psychotrauma, Psychological Reactions, Stress and Stressors, Stress Management**	The learners will be able to • Identify sources of stress and its management towards patients, self and other staff members	• Define and discuss Stress and its Management • Job-related Stress & Burnout • Response to stress • Stress Management	Lectures/Presentations Case-Based Learning (CBL), Case studies Individual assignment	EA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

21.		The learners will be able to • Equip medical students with knowledge and skills to respond to psycho-traumatic cases in hospital settings.	• Understanding Psychotrauma	Lectures/Presentations Case studies Reflective writing	EA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
22.		The learners will be able to • Prepare doctors to deal with challenges of terminal and bereavement care in clinical practice within their boundaries.	• Discourse of the Psychosocial. • Aspects of Death and Dying	Lectures/Presentations Storytelling by patients (i.e., patient's narrative) Case-Based Learning (CBL), Case studies	EA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
23.		The learners will be able to • Understand the impact of terrorism on mental health and its management for mental well being	• Explain Psychosocial Aspects of Terrorism	Lectures/Presentations Case-Based Learning (CBL) Case studies	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

24.		The learners will be able to • Identify the correlation of aging with life span, psychological factors and sociological factors.	• Discuss Psychosocial. Aspects of Aging	Lectures/Presentations Storytelling by patients (i.e., patient's narrative) Case-Based Learning (CBL), Case studies	EA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
25.	**Psychological Aspects of Health and Disease**	The learners will be able to • Illustrate human thought, behaviour and interactions by health and disease situations influenced by psychological factors.	• Discuss role of Psychology in Medical Practice • Role of psychological factors in the aetiology of health problems • Role of psychological factors in the precipitation (triggering) of illnesses • Role of psychological factors in the management of illnesses • Role of psychological and social factors in diseases causing disability. handicap and stigma • Role of psychological factors in patients' reactions to illness • Medically Unexplained Physical Symptoms (MUPS)	Lectures/Presentations Large group Interactive session (LGIS) Reflective Writing Interactive Video Vignettes	

26.		The learners will be able to • Recognize the factors contributing towards a state of psychological and social well-being of human in clinical practice.	• Discuss and Demonstrate Psychosocial Aspects of Health and Disease • Health and Normality • Defence Mechanisms • Psychosocial Assessment in Health Care • Clinical Situations Demanding a Comprehensive Psychosocial Assessment • Psychological reactions to Illness and Hospitalization	Lectures/Presentations Large group Interactive session (LGIS) Role-playing with peers	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
27.	**Pain, Sleep, Consciousness and Sexuality**	The learners will be able to • Understand the complex interplay of Brain and Behaviour	• Describe Neurobiological Basis of Behaviour • Arousal • Sleep • Consciousness	Lectures/ Presentations Interactive Video Vignettes Group Project	
28.		The learners will be able to • Integrate knowledge and skills of coping and treatment of pain in various situations.	• Discuss Psychosocial aspects of Pain	Lectures/ Presentations Individual Assignments / Group Projects	

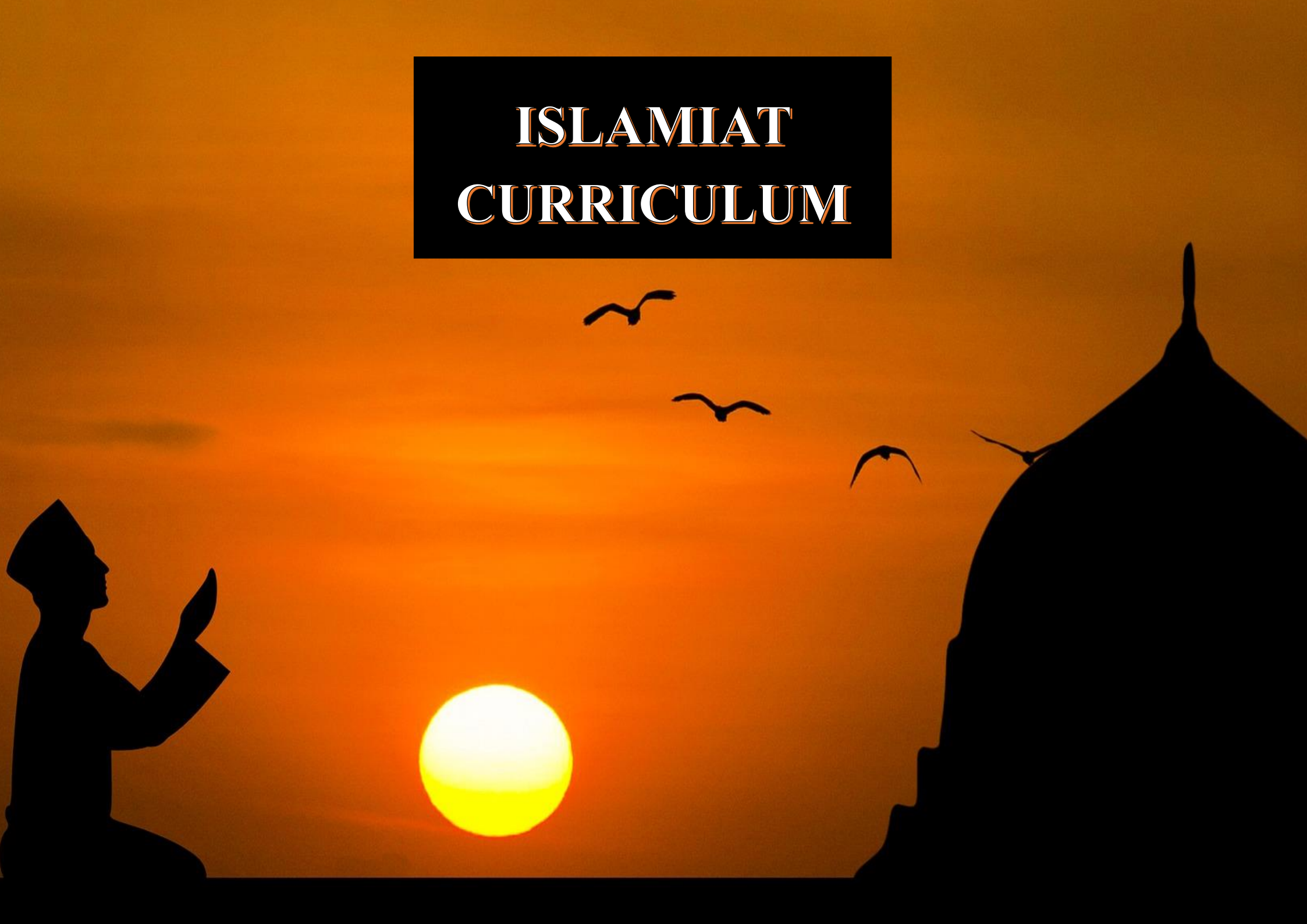
29.		The learners will be able to • Identify the bio- psycho-social factors contributing to sexual health and impact physical and mental health of human being.	• Discuss Psychosocial Aspects of Gender and Sexuality • Sexual Identity • Gender Identity • Sexual Behaviour • Gender differences in Sexual Behaviour • Masturbation • Sexual orientation • Psychiatric morbidity • Sexual Disorders • Sexual Dysfunction • Disorders of Sexual Preference/ Paraphilia • Gender Dysphoria (DSM V) or gender identity disorder (ICD 10) • Management of Gender and Sexuality Issues	Lectures/ Presentations Storytelling by patients (i.e., patient's narrative) Case-Based Learning (CBL), Case studies Reflective Writing Group project	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

30.	**Culture and Medical Practice**	The learners will be able to • Understand the cultural and social aspects of medical practice by getting holistic view of health	• Explain following cultural and social aspects in medical practice: • Sociology and Health • Social Groups • Social Class • Child Rearing Practices • Roles, Social Support, religion, Stigma, Sick role, Death and Dying • Impact of social factors on Treatment Adherence • Anthropology and Health • Understanding culture in health • Influence of culture on health care • Culturally sensitive clinical assessment	Lectures/Presentations Case-Based Learning (CBL) Case studies	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

31.	**Common Psychiatric Disorders in General Health Settings**	The learners will be able to • Understand c o mmon Psychiatric Disorders in General Health Settings	• Mixed Anxiety and Depression • Panic Disorder • Unexplained Somatic Complaints: Persistent Complainers • Dissociative and Possession States • Drug Abuse, Alcohol & Tobacco use • Suicide and Deliberate Self Harm (DSH) • Delirium	Lectures/Presentations Case studies	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
32.	**Interviewing/ Psychological History Taking**	The learners will be able to • Interview and perform Psychosocial Assessment	• Techniques for interviewing in clinical setting • History taking • Developmental History	Lectures/Presentations Demonstrations of these techniques by	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
33.			• Educational history • Job stressors • Social history • Marital history • Drug addiction history • Legal history • Medical/surgical history • Assessment of health services & other psychosocial stressors • Assessment of patient perception of disease according to Health Belief	Role playing in peer groups	

			Model		
34.	**Child rearing practices**	The learners will be able to • Understand child rearing practices • Describe various effects of child rearing practices on individual. • Analyze the relationship between child rearing practices and development of illnesses	• Define child rearing practices • Its effects on individual • Impact of various child rearing practices on emotional social and cognitive development of individual • Common illnesses associated with certain child rearing practices e.g. anxiety depression	Lectures/Presentations Interactive Video Vignettes Group Project	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios
35.	**Emotions**	The learners will be able to • Understand emotions • Understand motivation	• Define emotions • Various types of emotions • Significance of emotions in human behavior • Define Emotional quotient and explain its components • Defining emotional literacy and its importance in managing emotions • Techniques to improve emotional literacy • Impacts of emotional literacy on interpersonal relationships	Lectures/Presentations Large group Interactive session (LGIS) Reflective Writing Interactive Video Vignettes	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios

36.	**Learning**	The learners will be able to • Understand learning, assess types of learning, theories of learning, different methods and styles of learning, identify and differentiate different type of learners	• Define learning • Modern methods and style of learning • Types of learners • Cognitive theory of learning • Strategies to improve learning skills	Lectures/Presentations Interactive Video Vignettes Large group Interactive session (LGIS)	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios


ISLAMIAT
CURRICULUM

S. No	TOPIC	TOPIC OBJECTIVES
1.	**Islamic Perspective on The Practice Of Medical Profession**	The learners will be able to Envision the concept of treatment in Islam. Recognize the roles, responsibilities and characteristics of a Muslim doctor. i. Concept of treatment in Islam ii. Medical Ethics Vs Islamic medical ethics iii. Doctor Vs Muslim doctor iv. Roles of a Muslim doctor v. Historic perspective of health care and the contribution of Muslim physicians vi. Hamdard-e Khalaiq, Marja –e Khalaiq -Leadership role of doctors in the society
2.	**The View of The Muslim Doctor Regarding Human Life And Other Forms Of Life**	The learners will be able to Broaden their perspective of human life and its interaction with other living forms created by Allah سبحانہ وتعالیٰ based on the teachings of Quran and Hadith. i. Preservation of human life (1. the right of foetus to live, 2. The suckling right to life, 3. Preference of life maintenance to all other legislative considerations). ii. The reward for saving human life – Ayah 5:25 iii. Preservation of the life to non-Muslim – The principle of “Hifz U Nafs” iv. Preservation of the constituents of human life v. Preservation of human dignity. vi. Life related legislative controls. vii. Human related factors of equality and preference viii. Maintenance of non-human life and relationship with other living forms and the environment
3.	**How To Make My Profession Ibadah – The Perspective of The Muslim Doctors**	The learners will be able to Identify the strategy to make routine professional practice Ibadah and apply it in their own life. i. What is Ibadah? ii. How can our daily routine practice of our profession be made Ibadah? iii. What would be the implications of this paradigm shift for us as an individual, our patients, the community and the profession?
4.	**A Prologue on Essential Communication Skills**	The learners will be able to Gain insight into the physical, moral, spiritual and emotional aspects of communication. Define effective communication, draw a checklist for effective communication and identify barriers for communicating effectively.

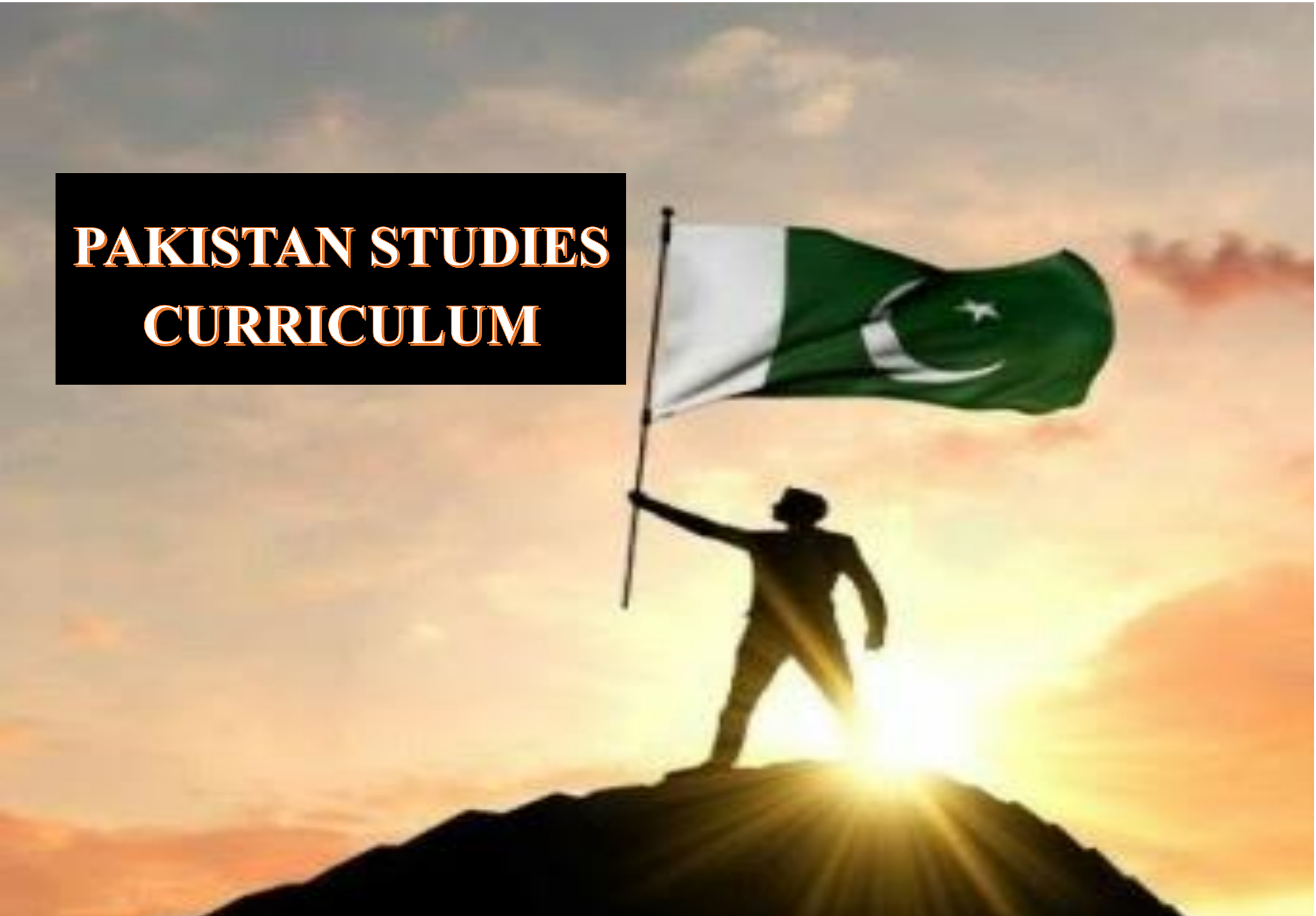
		i. The anatomy of communication skills- the need, the spirit, the physical aspects, emotional perspective and outcome ii. Communication skills a gift from iii. Allah سبحانهوتعالى- Surah Ar Rahman [55:2-3] 'He has created iv. man: He has taught him speech (the art of communication). v. Essence of communication sharing ideas and emotions vi. Principle of all communication33:70 vii. "O you believer! Remain conscious of Allah, and (always) say words that are true to the mark.
5.	**Etiquettes Of Visiting the Patient**	The learners will be able to i. Feeling other's pain and giving solace to one another in tribulations has a great role in the establishment and maintenance of Islamic brotherhood. ii. Disease is an effective mean to realize the value of health in addition to it being a test. iii. Visiting patients helps in giving consolation to the patient as well as directs the healthy to be grateful over his health. Therefore, there is a need to make the patient understand that disease is the mean of blessings by ALLAH Ta'ala which is also expatiation of sins, upgradation and nearness to ALLAH Ta'ala.
6.	**Dealing With Human Tissues, Cadavers and Animals In Medical Practice Medical Risks And Islamic Concepts.**	The learners will be able to i. Respect of the human body, organs and tissues (Including teeth) during treatment, surgical operations, research and health professions education. ii. Use of animals in biomedical research and study of medical and other sciences in the ethical and Islamic perspective.
7.	**Ethical Issues in Organ Transplantation**	The learners will be able to i. Organ-transplant related ethical issues with reference to the Islamic perspective and ethical challenges ii. Permissibility of organ transplant and donation iii. The evidence from Sunnah about tooth transplant iv. Imam Abu Hanifah views on cadaver transplant v. Issues in re productive organs transplant and Islamic concepts vi. Organ- trafficking & commercial use of human remains and embryonic tissue vii. Cosmetic Surgery and use of same patients' tissues
8.	**Research Its Importance and Need**	The learners will be able to Apply knowledge and research as basis of economy. The importance of "research" in the Quranic perspective and Sunnah. Research an obligation of Muslim doctors. The role of Muslim Scholars and researchers i. More than 500 verses of Quran on research and total of around 150 on Islamic jurisprudence (Fiqh) a. سورةالبقره2:164 . b. سورةالعمران-191 3:190 .

		c. سورةفصلت41:53 . d. سورةالروم30:22 . ii. The breakthrough for research through the concept of "توحيد ". iii. The role of experience and logic in research ix. Research and "eeman-bilghaeb
9.	**Ethics Of Bio-Medical Research**	The learners will be able to i. Describe the importance of research as an obligation for a Muslim. ii. Identify the paradigms of ethics for biomedical research iii. Describe the principles of research ethics iv. List the characteristics of quality research and the role of IRB for ensuring quality and safety for research. v. Recognize the perilous outcomes of research where ethics are compromised
10	**Confidentiality**	The learners will be able to comprehend i. Meaning of confidentiality ii. Trust relationship between doctor and patient iii. Types of secrets; ordinary and extraordinary iv. What is the ruling of Islam on the one who discloses secrets? The three signs of hypocrite [Hadith Sahib Bukhari] v. Virtues of keeping secrets: Reference from Hadith; ال ايمان لمن ال امانه vi. المجالس باالمنة. vii. Narrated Uqbah ibn Amir: "The Prophet صلى الله عليه وسلمsaid: He who sees something which should be kept hidden and conceals it will be one who has brought to life a girl buried alive." (Abu Daud) viii. What are the situations where divulging secrets is allowed according to Islamic teachings
11.	**Euthanasia And Other End of Life Care Issues**	The learners will be able to describe i. End-of-life care issues in the modern practice of medicine like advance directives, euthanasia, role of the dying person and the family in decision making regarding end-of-life care ii. Disclosure of terminality of disease to the patient, issues related to confidentiality and consent for palliative treatment for the dying person iii. How to deal with these situations in the most appropriate manner in light of the teaching of Islam.
12.	**Islamic Concepts of Response To Pandemics (Covid-19) For Protection Of Public**	The learners will be able to analyse i. Sanctity of human life. ii. Forbidding communal prayers and Islamic congregations in Pandemics. Examples from Ahadith and practical demonstrations of the prophet and the right Caliphs. iii. Not going to or leaving the pandemic area. iv. The misconception of "Allah's will" (Tawakkal) in such situations. Quranic Ayah 17:32 and others on concept of prevention. The principle of "Sadd i Dharai" (سد ذرائع)

13.	**Death & dying**	The learners will be able to understand i. The Qura'nic concept of Life and Death (خلقالموتوالحياةليبلوكمايكماحسنعمال) ii. Man, a combination of body and soul- the body dies the soul remains. iii. Death – Inevitable and Time is fixed – Reference from Quran Physical and Spiritual death iv. Protocol for the Muslim at the time of death -Responsibilities of doctors and persons present at the time of dying (Death) v. Preparedness for death. Is death the end of life? vi. Who is called dead? Islamic concepts – reference from Quran and Hadith vii. End of life care for a Muslim patient.
14.	**Islam And Tolerance**	The learners will be able to describe i. The importance of tolerance in Quran and Sunnah ii. Examples from the life of Prophet and Sahabah iii. Attitude of a true Muslim in felonious situations as per guidance of Quran and Sunnah iv. Three Quranic principles v. ن ِماىَ ِصف مب علَ نَ حن اَ ۃِ یَٔ ح ِسن ال ِسی ِھناَ تِ ی ِال عب ھَمتٰیال ّٰتی ِ ِ ِی ِکمٰن ِ ب عٔوذ اَ ل رب ہ 96 vi. ِذٰینَ ر و ض ِعبَا دال رح تمنِال یا ٰلَ واِذَا ِخ م ا vii. ونَقَال تج ِھل ما ِ viii. و ِ م ِیٔ ۃِ ِسی ِسی ؤاج و ثٰ مٔنعَفَا فَ ھا ل ث ي. ix. الی ِحبُّال اِنَّ ِھ الل ِمٰی ن x. Hadith: stepping back even if one is right, to avoid a clash and furious situation
15.	**Family Planning and Contraception (FPC)**	The learners will be able to describe i. Definitions & basic concepts; family planning, contraception (FPC), Concept of Hafz-un Nafs and Hafz un Nasl and FPC [مقاصد] ریعہ ii. Ethical issues in family planning and permanent tubal ligation iii. Prohibitions/ permission iv. Conditions of permissibility v. Consent of both the partners when indicated under Islamic Teachings vi. Which method to be preferred vii. Abuse of procedures and its impact on society (Examples from Western Universities and societies) viii. The inverse population pyramid and its socio-economic effects. ix. The graying nations and the growing nations x. For how long- social and medical implication of FPC xi. References / guidance from Quran and Hadith

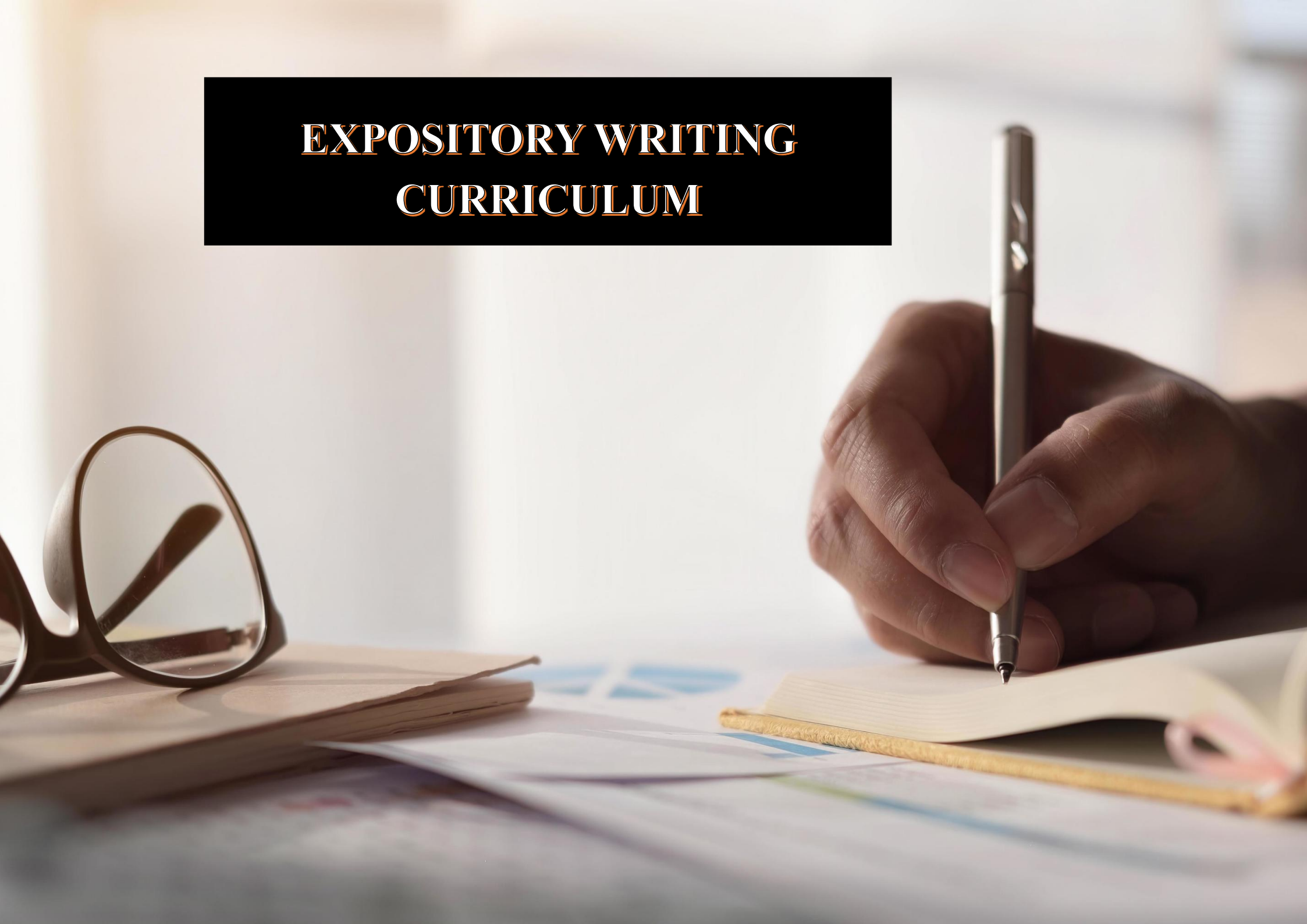
16.	**Gender Interaction in Personal And Professional Communication**	The learners will be able to describe i. The concept of cross-gender interaction (CGI) in Islam ii. The etiquettes of cross gender interaction in personal and professional communication. During education, telephonic communication, cyber/social media interaction, student teacher CGI iii. Etiquettes of CGI considering the Qura'n and Sunnah iv. References from Quran Al Tauba- 9:71, Al Noor- 24:30-31, Al Ahzab- 33:32, Al Qasas-28:25 v. References from Hadith vi. Reference: PMC Booklet on Cross- Gender Interaction
17.	**Halal And Haram**	The learners will be able to describe i. Definition of Halal and Haram. ii. The concept of Makrooh (distasteful) and Mabah (allowable). Application of this in professional life specially Doctor-Pharma relations, Use of medication and gender interaction iii. The concept of mitigation to use even Haram for saving human life and sever hardship. The three level of hardship and its relation to use of forbidden items/ actions iv. The basic principles governing Halal and Haram v. The principle of necessity and mitigation vi. Hadith of defining Halal and Haram and leaving the doubtful.

PAKISTAN STUDIES CURRICULUM



1.	**Structure Of Health Service Delivery System in Pakistan**	- The learners will be able to describe i. Health houses (LHWs) ii. Basic health unit – its composition and function iii. Rural health centre – composition and function iv. Tehsils headquarter hospitals – composition and function v. District headquarters hospital – composition and function vi. Tertiary care hospitals – composition and functions vii. Medical teaching institutions viii. District health information systems ix. Millennium development goals – goals and achievements x. National surgical obstetric and anaesthetic plan – vision 2025 xi. Sustainable development goals - universal health coverage xii. Innovations in improving health care delivery – private public partnership xiii. Prevention of diseases - strategies – medical, surgical, trauma, obstetric xiv. Awareness campaigns xv. Role of WHO, NGOs

EXPOSITORY WRITING CURRICULUM



S. NO	THEME/TOPIC	LEARNING OUTCOMES	LEARNING OBJECTIVES	INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOLS
1.	**Introduction to Expository Writing**:	The learners will be able to describe • Understand the essentials of the writingprocess integrating pre-Writing, drafting,editing and proof reading to producewell-structured essays. • Demonstrate masteryof diverse expository types to address different purposes and audiences. • Uphold ethical practicesto maintain originality in expository writing	• Understanding expository writing (definition, types, purpose, and applications) • Characteristics of effective expositorywriting (clarity, coherence, and organization) • Introduction to paragraph writing.	Lecture/ Presentation / Large group Interactive session (LGIS)/SGD	**EA**: SEQs **IA:** presentations, assignments, group projects, case studies, reflective writing, report writing and research-oriented writing
2.	**The Writing Process**		• Pre-writing techniques (brainstorming, free-writing, mind-mapping, listing, questioning, and outlining etc.) • Drafting (three stage process of draftingtechniques) • Revising and editing (ensuring correct grammar, clarity coherence,conciseness etc.) • Proof reading (fine-tuning of the draft)		

			• Peer review and feedback (providing and receiving critique)		
3.	**Essay Organization and Structure**		• Introduction and hook (engagingreaders and introducing the topic) • Thesis statement (crafting a clear and focused central idea) • Body Paragraphs (topic sentences,supporting evidence and transitional devices) • Conclusion (types of concluding paragraphs and leaving an impact) • Ensuring cohesion and coherence (creating seamless connections between paragraphs)		
4.	**Different Types of Expository Writing**		• Description • Illustration • Classification • Cause and effect (exploring causalrelationships and outcomes) • Process analysis (explaining step-by-step procedures)		

			• Comparative analysis (analyzing similarities and differences)		
5.	**Writing for Specific Purposes andAudiences**		• Diverse types of purposes (to inform, to analyze, to persuade, to entertain etc.) • Writing for academic audiences (formality, objectivity, and academic conventions) • Writing for public audiences (engaging, informative and persuasive language) • Different tones and styles for specific purposes and audiences		
6.	**Ethical Considerations**		• Ensuring original writing (finding credible sources, evaluatinginformation etc.) • Proper citation and referencing (APA,MLA, or other citation styles) • Integrating quotes and evidences (quoting, paraphrasing, andsummarizing) • Avoiding plagiarism (ethical considerations and best practices)		
7.	**Practical Applications and CapstoneProject**		• As part of the overall learning requirements, students will be required to build a writing		

			portfolio having a variety of expository texts and present the same at the end of the course highlighting proficiency in expository writing		