STUDY GUIDE 2025

2nd Year MBBS

Table of Contents

Introduction to Study Guide

This study guide is designed for you through a collaborative effort of institutional faculty members and students' representatives to provide you, the medical students of CMH Lahore Medical College a resource material for sharing important aspects of the curriculum, as proposed by Pakistan Medical & Dental Council and National University of Medical Sciences. The study guide aims to promote self-regulated and lifelong learning by empowering you to have complete information about your educational journey and its significance.

The overarching curricular aspects such as undergraduate competencies, exit outcomes, subject specific learning outcomes, assessment methods, curricular framework, academic calendar, online learning, relevant policies, and names of curriculum coordinators are all included in this guidebook. Horizontal integration across the pre-clinical years has been implemented for better conceptual understanding while vertical integration has been incorporated by early clinical exposure through addition of lectures and integrated seminars.

CMH Lahore Medical College aims to improve health indicators of the community and society at large by training students and doctors in preventive healthcare services, and health education by community outreach programs. The MBBS curriculum at CMH Lahore Medical College also offers learning of medical education, leadership and management via dedicated teaching hours in the academic calendar.

Since curriculum is a living and a dynamic document therefore, the aim is to improve it on yearly basis, using the faculty & your feedback after every block examination by program evaluation unit (L- QEC).

School of Health Professions Education

CMH LMC & IOD

Vision of National University of Medical Sciences

To be the best medical university by conducting world-class bio-medical research and creative research activities that develop knowledge and contribute to improve the health care system and social advancement for the people of Pakistan and benefit humanity as a whole with a standard of excellence.

Mission of National University of Medical Sciences

Our mission is to emphasize rigorous research fundamentals while stimulating innovation and providing talented students and faculty with the high standard research facilities in the colleges/institutions of NUMS, necessary to achieve excellence in bio-medical research to contribute toward best care for our individuals and communities, embraces the challenges of health disparities and improve health care system up to international standards.

Vision of CMH Lahore Medical College and Institute of Dentistry

To be a leading institute in medical education that provides an inclusive and conducive environment to foster excellence in teaching, learning, acquisition of clinical skills, research, and innovation to improve future health indicators within our region and beyond.

Mission of CMH Lahore Medical College and Institute of Dentistry

To improve healthcare by:

1. Providing quality medical education that prepares healthcare professionals according to internationally accepted benchmarks for empathy, social accountability, lifelong learning, critical thinking, and sound clinical acumen.
2. Ensuring a conducive and equitable learning environment in research and continuous professional development for students and faculty respectively, enabling their success in national and international licensure examinations and opportunities.
3. Fostering evidence-based and patient-centered care to efficiently address global healthcare challenges, focusing on prevention and community health improvement.

Rationale of Curriculum

This curriculum of CMH Lahore Medical & Dental College is designed in accordance with the level-7 of Harden's integration ladder to enable undergraduate medical students to understand correlation between basic and clinical sciences. It is focused to prepare future doctors to treat local patients efficiently and safely employing best evidence clinical practice. There are many embedded opportunities for students to learn teamwork, professionalism, and ethical code of conduct to prepare them for their future role as a professional in a healthcare team. There are numerous opportunities at CMH Lahore Medical & Dental College for students to learn and practice teamwork, leadership, professionalism, and ethic by participating in integrated seminars, CPCs, clinical rotations and co-curricular activities. To provide medical students with requisite exposure to evidence-based practices and health education, a structured research module has been incorporated alongside various co-curricular activities. These include initiatives such as Research Day and electives in preventive health education, in order to give students an opportunity for comprehensive academic and professional development. Such additions to the curriculum aim to support their holistic growth and foster a well-rounded educational experience.

Five-year Scheme of Studies:

<table>
<tr><th>Year</th><th>Subjects</th><th>Teaching Method</th><th>Additional Subjects</th><th>Additional Components</th></tr>
<tr><td rowspan="8">1st Year</td><td>Anatomy (including Histology, Embryology & General Anatomy)</td><td>Interactive Lectures. SGDs, Tutorials, DH & Practical</td><td>Islamiyat</td><td rowspan="8">. Student led Integrated Seminar
. Skill Lab
. Clinical Orientation</td></tr>
<tr><td>Physiology</td><td rowspan="2">Interactive Lectures. SGDs, Tutorials, & Practical</td><td>Quran Kareem</td></tr>
<tr><td>Biochemistry</td><td>Introduction to Computer</td></tr>
<tr><td>Surgery & Allied</td><td rowspan="4">Interactive Lectures</td><td rowspan="2">Expository English</td></tr>
<tr><td>Medicine & Allied</td></tr>
<tr><td rowspan="2">Behavioral Sciences</td><td>Basics of Radiology</td></tr>
<tr><td>Research Methodology & EBM</td></tr>
<tr><td rowspan="5">2nd Year</td><td>Anatomy (including Histology & Embryology)</td><td>Interactive Lectures. SGDs, Tutorials, DH & Practical</td><td>Pakistan Studies</td><td rowspan="5">. Student led Integrated Seminar
. Skill Lab
. Clinical Orientation</td></tr>
<tr><td>Physiology</td><td rowspan="2">Interactive Lectures. SGDs, Tutorials, & Practical</td><td rowspan="2">Quran Kareem</td></tr>
<tr><td>Biochemistry</td></tr>
<tr><td>Surgery & Allied</td><td>Interactive Lectures</td><td>Basics of</td></tr>
</table>

Year	Subjects	Teaching Method	Additional Subjects	Additional Components
	Medicine & Allied		Radiology	
	Behavioral Sciences			
3rd Year	Pharmacology & Therapeutics	Interactive Lectures. SGDs, Tutorials, & Practical's	Research Methodology & EBM	Integrated Sessions
	General Pathology			
	Forensic Medicine			
	Behavioral Sciences (includes communication skills, leadership, management, professionalism)	Interactive Lectures. SGDs, & Tutorials.		
	Community Medicine			
	Surgery & Allied	Interactive Lecture, Case Based Learning & Clinical Rotation		
	Medicine & Allied			
	Gynae & Obs			
	Pediatric Medicine & Neonatology	Clinical Rotation		
4th Year	Special Pathology	Interactive Lectures, SGDs, & Tutorials.	Research Methodology & EBM	Seminar/CPC Visit to PKLI ---
	Community Medicine	Interactive Lectures, Clerkship & Community Visits		
	ENT	Interactive Lecture, Case Based learning & Clinical Rotation All clinical rotations will include patient safety.		
	Eye			
	Surgery & Allied			
	Medicine & Allied			
	Gynae & Obs			
	Pediatric Medicine & Neonatology			
Final Year	Surgery & Allied	Interactive Lecture, Case Based Learning & Clinical Rotation		. Seminar/CPC . Team Based Learning (TBL)
	Medicine & Allied			
	Gynae & Obs			

Year	Subjects	Teaching Method	Additional Subjects	Additional Components
	Pediatric Medicine & Neonatology			

Curriculum Perspective

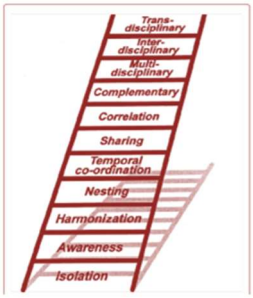


Figure 1: Harden's ladder

At CMH Lahore Medical and Dental College, the Curriculum has been developed along with specifications of Harden's 7th level of integration. These curricular flavors provide opportunities to students to have structured learning and practice session along with information orientated feedback, small group learning, critical thinking, decision making and problem-solving opportunities.

Introduction to Curricular Framework

The implemented curriculum is at the 7th level in the integration ladder where basic sciences' facts are correlated with clinical sciences through student led integrated seminar, skill labs and clinical visits.

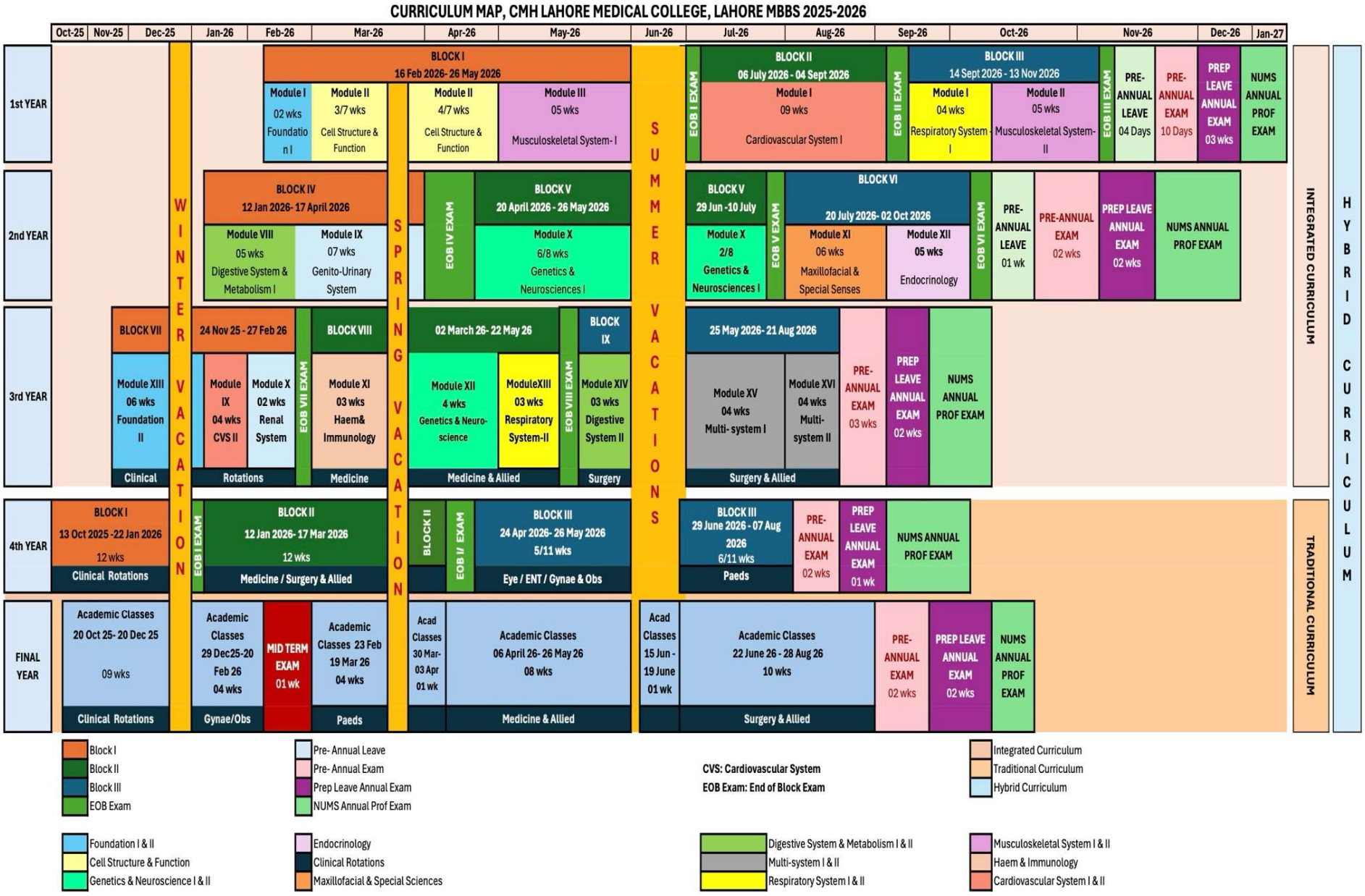
1. **PHASE 1 (Year 1 and 2):** Includes basic sciences namely, Anatomy, Physiology, and Biochemistry with horizontal integration within the basic sciences and vertical integration through integrated seminars and interactive lectures in Surgery, Medicine, and Behavioral Sciences.

2. **PHASE 2 (Years 3, 4 & 5)**: Includes paraclinical and clinical sciences namely, Pharmacology, General Pathology, Special Pathology, Community Medicine, Forensic Medicine, Behavioral Sciences, Eye, ENT, Medicine, Psychiatry, Pediatrics, Surgery, and OBGYN, Internal Medicine, Gastroenterology, Rheumatology, Dermatology, Pulmonology, Cardiology, Nephrology, Endocrinology, General Surgery, Orthopedics.

Academic Calendar – 2nd Year MBBS (2025-2026)

Weeks	Details	Dates	
		From	To
Block IV (12+1 weeks)			
	Start of New Class	12 Jan 2026	
1-5	**Academic Classes Block IV** **Module VIII** (Digestive System & Metabolism I) **(05 wks)**	12 Jan 2026	13 Feb 2026
	29 Jan 2026	**Drug Awareness Seminar**	
	Kashmir day Holiday	**05 Feb 2026**	
6-10	**Academic Classes Block IV** **Module IX** (Genitourinary System) **(5/7 wks)**	16 Feb 2026	19 Mar 2026
	Eid ul Fitr	**20 Mar 2026**	**22 Mar 2026**
	Pakistan Day	**23 Mar 2026**	
11	**Spring Vacations**	**24 Mar 2026**	**27 Mar 2026**
12-13	**Academic Classes Block IV** **Module IX** (Genitourinary System) **(2/7 wk)**	30 Mar 2026	10 Apr 2026
	Trifecta (CMH MUN)	**10 &12 April 2026**	
14	**Block IV Exam (1 Week)** (Date Sheet will be finalized by IEC in YCC meeting)	13 Apr 2026	17 Apr 2026
	Olympiad	**17 April 2026**	
Block V (08+01 weeks)			
15-20	**Academic Classes Block V** **Module X** (Genetics & Neurosciences 1) **(6/8 wks)**	20 Apr 2026	26 May 2026
	Sports Day	**23 April 2026**	
	Labor Day	**01 May 2026**	
	Mushaira	**06 May 2026**	
	Quiz Competition	**12 May 2026**	
	Qiraat & Naat Competition	**14 May 2026**	
	Irtiqa	**20 May 2026**	
	Inter Med Fest	**22 May 2026**	
	Eid ul Azha (Tentative)	**27-29 May 2026**	
21-24	**Summer Vacations (4x weeks)**	**01 June 2026**	**26 June 2026**
	Ashura (Tentative)	**24 -25 June 2026**	
25-26	**Academic Classes Block V** **Module X** (Genetics & Neurosciences 1) **(2/8 wks)**	29 June 2026	10 July 2026
	Life-line Symposium	**01 July 2026**	
	Purpose Over Popularity (SYNC)	**15 July 2026**	
27	**Block V Exam (1 Week)** (Date Sheet will be finalized by IEC in YCC meeting)	13 July 2026	17 July 2026
Block VI (11+1 weeks)			
28-33	**Academic Classes Block VI** **Module XI** (Maxillofacial & Special Senses) **(06 wks)**	20 July 2026	28 Aug 2026
	Annual Research Conference	**30 July 2026**	
	Eid Milad-un-Nabi	**25 Aug 2026**	
	Independence Day Event	**13 Aug 2026**	
	Independence Day	**14 Aug 2026**	
34-38	**Academic Classes Block VI** **Module XII** (Endocrinology) **(05 wks)**	31 Aug 2026	02 Oct 2026
39	**Block VI Exam (1 Week)** (Date Sheet will be finalized by IEC in YCC meeting)	05 Oct 2026	09 Oct 2026
40	**Pre-Annual/ Send-up Leave**	12 Oct 2026	16 Oct 2026
41-42	**Pre-Annual/ Send-up Exam (Theory)** (Date Sheet will be finalized by IEC in YCC meeting)	19 Oct 2026	30 Oct 2026
43-44	**Prep Leave Annual Exam**	02 Nov 2026	13 Nov 2026
	NUMS Annual Professional Exam	**16 Nov 2026**	

Curricular Map



Undergraduate Competencies

CMH Lahore Medical College and Institute of Dentistry envisions training undergraduate students in following competencies:

Yearly Outcomes

By the end of the second year, you will be able to:

a. Correlate the developmental and anatomical knowledge of different organ systems of the human body to their physiological and biochemical basis.
b. Communicate clearly and effectively.
c. Comprehend the significance of behavioral sciences for medical students
d. Discuss the attributes of professionalism
e. Demonstrate understanding of the significance of good leadership & Management
f. Analyze multiple perspectives of Pakistan studies
g. Discuss the basic principles of research

Exit Learning Outcomes of the MBBS program

Exit learning outcomes describe what students are expected to know and be able to do by the time they graduate. They relate to skills, knowledge, attitudes, and professional behavior that students acquire as they progress through the program. At CMH Lahore Medical College and Institute of Dentistry, our goal is to train every graduating student in demonstrating requisite characteristics and skills that are needed for the 21st-century medical graduate. Exit outcomes are directly linked to the list of competencies and enabling outcomes of each subject being taught over a span of 5 years in the MBBS program.

On completion of MBBS program, you will be able to:

1. Apply scientific principles, knowledge and skills to interpret history, examination and investigations to develop a differential diagnosis of medical conditions in a variety of situations such as indoor, outdoor, and emergency
2. Carry out consultations with patients using appropriate communication and clinical skills to diagnose health problems and refer, if required.
3. Demonstrate leadership, management skills, and professionalism while collaborating, ethically, with others in a health care delivery team, giving top priority to patients' safety and health
4. Reflect and continue improving professional skills by engaging in self-directed learning
5. Participate, initiate research and use published evidence to inform and improve clinical practice
6. Apply principles of public health to advocate health promotion and disease prevention to reduce burden of disease in the community
7. Perform basic life support skills to save life.

Weekly Timetable for 2nd Year MBBS

Weekly time table for 2nd Year MBBS can be seen on the portal and on this link:
https://docs.google.com/spreadsheets/d/1a857UIwIf71_YnOka7FcWZamIIv6j1bC/edit?gid=2111368006#gid=2111368006

Subjects for 2nd Year MBBS

Core Subjects:
The following are the core subjects for 2nd year MBBS.

Integrated Subjects:
The following are the integrated clinical subjects for which regular periodic assessment will be done throughout the academic year and their attendance would be carried forward towards the year of examination of relevant subject.

Student Led Integrated Seminar based on themes

Integrated led Integrated Seminars are a vital component of the 1st year MBBS curriculum, designed to foster a comprehensive understanding of medical science by connecting various disciplines. These seminars are a collaborative effort between the departments of Anatomy, Physiology, Biochemistry, Surgery, Medicine, and Medical Education.

By connecting theoretical knowledge with clinical scenarios these sessions aim to develop a cohesive schema that prepares students for the complexities of healthcare practice.

Standard Operating Procedures (SOP) of Integrated Seminars

1) Planning — Clinical topic themes are identified by NUMS and interdisciplinary coordination meetings are held to finalize scenarios, learning objectives, discussion questions, roles and logistics.

2) Scenario Development — Students are actively involved with faculty to develop clinical scenarios, questions, learning objectives and questions.

3) Group Preparation — Students work in assigned groups to prepare discussion responses and faculty guides and monitor students during presentaitons.

4) Seminar Execution — Sequential presentation of scenarios, student-led discussion, open Q&A, and faculty elaboration on more complex concepts.

5) Evaluation & Reflection — Group scoring, feedback exchange and reinforcement of take-home messages.

.

Through integrated sessions, students not only deepen their understanding of individual subjects but also learn to appreciate the interconnected nature of medical knowledge. By fostering collaboration, critical thinking, and effective communication, these sessions lay the foundation for lifelong learning and professional growth in the field of medicine

Contact hours Distribution: 2025-2026

SUBJECTS	Subject Teaching
Anatomy	250
Physiology	225
Medical Biochemistry	125
Basic of Radiology	10
Medicine & Allied	55
Surgery & Allied	55
Research Methodology & EBM	15
Behavioral Sciences	45
Communication Skills	20
Leadership and Management	15
Professionalism	15
Quran Kareem	25
Pakistan Studies	25
Co-curricular activities/sports	40
Total Hours	**920**

Teaching and Learning Methods

The teaching-learning will be through diverse methods and will include

Large Group Interactive Session

Flipped Classroom

Small Group Discussions

Practical Sessions

Skill Lab

Bedside Teaching

Ambulatory Care Teaching

Self-Directed Learning

Assessment Plan

The assessment plan comprises 2-3 term tests, 1 send-up, and 1 professional examination. Examination consists of one-best multiple-choice questions and short essay type questions along with OSPE/OSCE. All exams except for University's exam/professional exam contribute towards internal assessment of the respective subjects according to the institutional policy. The assessment schedule is given below

Type of Assessment	Weightage	Frequency and Time	Methods/ Tools for Assessment
Formative	-	Informally during and after the session.	Class tests (MCQs, SEQs), Class presentations, Assignments, Tutorials, Case Based Discussions, Team based learning, Portfolios
Summative	Internal assessment	20%	2-3 term tests (quarterly), Send up (before the professional exam) (80%) Attitude/ behavior/ attendance/ assignments/ achievements (throughout the year) (20%)
	University exam	80%	Once at the end of academic year

Annual Professional Examination (80% weightage)

a. The University will take second professional Examination at the end of the academic year.
b. There will be three papers (block-wise) of 150 marks each, with MCQs and SEQs/SAQs in 70:30 ratios.
c. Each theory paper has three sections of Anatomy, Physiology, and medical biochemistry with a total 40 Marks for each subject in each paper.
d. There will be 3 x Integrated Practical Exam and structured viva, block-wise, of 150 Marks each.
e. It is mandatory to secure minimum of 50% passing Marks, in theory & practical separately, in each Prof Exam. However, in theory, paper min. 40% Marks shall be secured in each subject, both theory and practical. The student will have to repeat the block-wise paper in which he/she secures less than 40% Marks in any section

Evaluation of the Course:

The major goals of the evaluation are to monitor quality of teaching and assessment and improve the implemented curriculums.

a. Feedback through CMS will be taken at the end of block from students and faculty members.
b. LQEC receives recommendation from Evaluation Committee compromising of
   - Head of QEC: Dr. Rizwana Kamran (Associate Professor SHaPE)
   - Officer 1: Dr. Hira Amar (Demonstrator SHaPE)
   - Any one student from each academic year.
   - Representation from each academic year.
c. LQEC generates reports to be shared with the yearly curriculum and institutional curricular committee for implementation of recommendation from students and faculty members.

Online Learning & Assessment

The COVID-19 pandemic has transformed education, introduced new challenges while fostered innovation catering for the unforeseen situations: Now institutions within Pakistan and across the world are expected to be ready to resume online learning and assessment in times of emergency. The Learning Management System (LMS) at CMH LMC & IOD ensures that online education is standardized, interactive, and aligned with academic and professional requirements.

Switch over to online learning will be notified a day before or on the same day before the first academic session depending upon the nature of national emergency situation.

The LMS combines **Moodle** and **Zoom**, designed to meet the needs of students. Key features include:

- **Access to Courses**: Students can view recorded lectures, access course materials, and engage with faculty.
- **Attendance Verification**: Attendance is tracked using a dual system:

1. Moodle login records.
2. Mandatory quizzes after each lecture (not-graded).

- **Progress Monitoring**: Regular assessments such as quizzes and assignments track students' performance.

Feedback Mechanisms: Integrated evaluation forms enable students and faculty to provide input for continuous improvement.

To ensure privacy and security:

- Students: Receive personalized logins to access course materials.
- Faculty: Have permissions to upload content, grade assignments, and track student progress.
- SHaPE & QEC: Monitor and evaluate LMS activities to monitor quality.
- IT Support: Manage user accounts, system updates, and security.

Special access requests are managed through the CE Secretariat in consultation with the IT department. Assessments are designed to support learning and maintain academic rigor:

- Formative Assessments: Quizzes and assignments contribute to assessment for learning but do not count toward final grades.
- Summative Assessments: Online term exams and send-ups.
- Feedback and Quality Assurance: Student evaluations collected through QEC proformas ensure ongoing improvement of online teaching practices.

System Maintenance & Confidentiality

- Planned Outages: The IT department notifies users in advance of any maintenance.
- Privacy Policies: All users are accordingly notified to must comply with institutional and PMDC regulations to protect intellectual property and personal information.
- Security: The IT team monitors and manages unauthorized access or inappropriate behaviors.

Roles and Responsibilities

User Role	Permissions
Students	Access lectures, take quizzes, and submit assignments.
Instructors	Upload course content, grade assignments, and track students' performance.
SHaPE & QEC	Review course quality, quizzes, assignments, and suggest modifications accordingly.
IT Department	Manage user accounts, add or remove courses, and deploy updates.

Block Planning Committee (2nd Year MBBS)

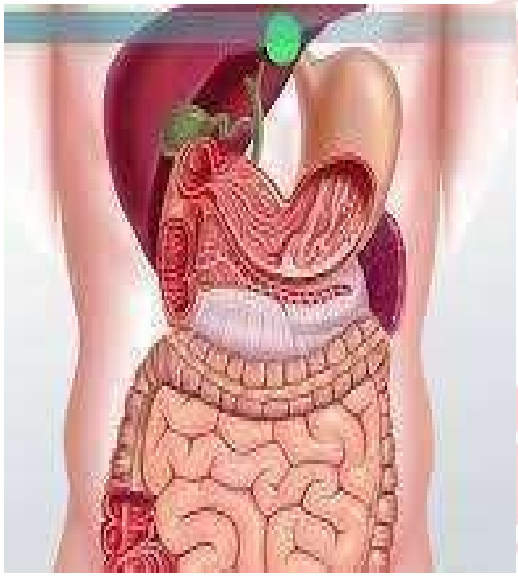
Block	Block Coordinator	Module		Module Coordinator	Focal Person
IV	Dr Hira Saeed (Biochemistry Department)	VIII	Anatomy	Dr. Aymen Sana	Dr. M. Bahadur Baloch
					Dr. Owais Khalid
					Dr. Syeda Javaria Bukhari
			Physiology	Dr. Amna Nadeem	Dr. Amna
					Dr. Shafia
					Dr. Ujala
			Biochemistry	Dr. Ghufranullah	Dr. Ghufran
					Dr. Danyal
					Dr. Rida Bibi
		IX	Anatomy	Dr. M. Bahadur Baloch	Dr. Aymen Sana
					Dr. Maryam Shahid
					Dr. Syeda Javaria Bukhari
			Physiology	Dr. Shafia Rasool	Dr. Amna
					Dr. Shafia
					Dr. Ujala
			Biochemistry	Dr. Danyal Faisal	Dr. Ghufran
					Dr. Danyal
					Dr. Rida Bibi
V	Prof. Dr. Amna Nadeem (Physiology Department)	X	Anatomy	Dr. M. Bahadur Baloch	Dr. Aymen Sana
					Dr. Owais Khalid
					Sr. Syeda Javaria Bukhari
			Physiology	Dr. Ujala	Dr. Amna
					Dr. Shafia
					Dr. Ujala
			Biochemistry	Dr. Ghufran	Dr. Ghufran
					Dr. Danyal
					Dr. Rida Bibi
VI	Dr. M. Bahadur Baloch (Anatomy Department)	XI	Anatomy	Dr. Maryam Shahid	Dr. Aymen Sana
					Dr. Owais Khalid
					Dr. Syeda Javaria Bukhari
			Physiology	Dr. Shafia	Dr. Amna
					Dr. Shafia
					Dr. Ujala
			Biochemistry	Dr. Rida Bibi	Dr. Ghufran
					Dr. Danyal
					Dr. Rida Bibi
		XII	Anatomy	Dr. Owais Khalid	Dr. Aymen Sana
					Dr. Maryam Shahid
					Dr. Syeda Javaria Bukhari
			Physiology	Dr. Ujala	Dr. Amna
					Dr. Shafia
					Dr. Ujala
			Biochemistry	Dr. Danyal	Dr. Ghufran
					Dr. Danyal
					Dr. Rida Bibi

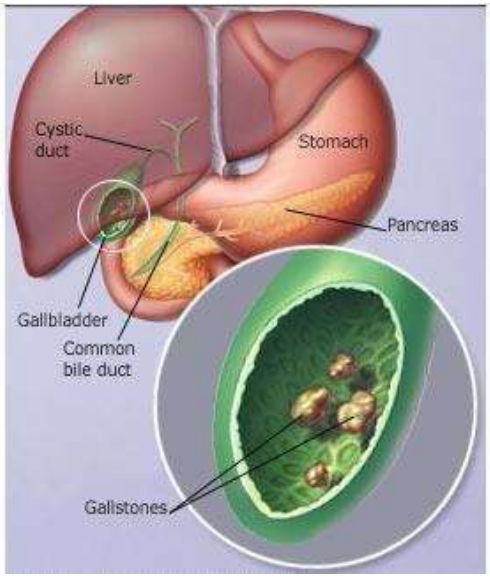
CMH Lahore Medical College – Policies

- Attendance and disciplinary policy https://cmhlahore.edu.pk/wp-content/uploads/2024/10/std-policy.pdf
- Policy for Steering Committee for the Selection of Class Representatives (BR and GR) Based on Student Feedback https://cmhlahore.edu.pk/wp-content/uploads/2025/01/Steering-committee.pdf
- Social Media Policy for Faculty, Staff, and Students https://cmhlahore.edu.pk/wp-content/uploads/2024/02/Social-Media-Policy-for-students-02-08-2023.pdf
- Internet Usage Policy https://cmhlahore.edu.pk/wp-content/uploads/2023/09/CMH-Internet-Usage-Policy-02-08-2023.pdf
- Healthcare Facility https://cmhlahore.edu.pk/wp-content/uploads/2023/09/Health-Care-Facility.pdf
- Complaint Cell https://cmhlahore.edu.pk/wp-content/uploads/2023/09/Complaint-Cell-CMH-LMC-IOD.pdf
- SOP for Online Teaching Backup Plan https://cmhlahore.edu.pk/wp-content/uploads/2025/11/online-teaching-backup.jpeg
- Drug and tobacco abuse/smoking https://cmhlahore.edu.pk/wp-content/uploads/2022/11/SOP-Drug-and-Tobacco.pdf
- Grievance Policy https://cmhlahore.edu.pk/wp-content/uploads/2025/10/DOC-20251028-WA0237.pdf
- Disciplinary Committee Policy https://cmhlahore.edu.pk/wp-content/uploads/2025/05/SOP-Disciplinary-Committee-CMH-LMC-IOD.pdf
- Co-curricular Activities https://cmhlahore.edu.pk/wp-content/uploads/2022/11/Co-curricular-privacy-policy.pdf
- Elective Policy https://cmhlahore.edu.pk/wp-content/uploads/2022/11/electives-policy.pdf
- CMH LMC Formative Assessment and Feedback Policy https://cmhlahore.edu.pk/wp-content/uploads/2022/11/CMH-LMC-Formative-Assessment-and-Feedback-Policy.pdf
- Anti-Harassment Policy for Students https://cmhlahore.edu.pk/wp-content/uploads/2025/10/Anti-Harrasment-policy-for-website.pdf
- Infection Control SOP's https://cmhlahore.edu.pk/wp-content/uploads/2025/05/Infection-Control-Protocol-SOP-1-30.pdf
- Attendance and Disciplinary Policy https://cmhlahore.edu.pk/wp-content/uploads/2024/10/std-policy.pdf
- NUMS policy on Diversity, Equity and Inclusion https://cmhlahore.edu.pk/wp-content/uploads/2025/07/NUMS-Policy-on-DiversityEquity-and-Inclusion.pdf

BLOCK IV

MBBS YEAR II
BLOCK IV
MODULE VIII
DIGESTIVE SYSTEM AND METABOLISM – I
DURATION: 05 WEEKS





Integration of Disciplines in this Module

MODULE PLANNING COMMITTEE

Module Coordinator	**Anatomy – Dr. Aymen Sana** **Physiology – Dr. Amna Nadeem** **Biochemistry – Dr. Ghufranullah**
Members	**Dr. M. Bahadur Baloch, Dr. Owais Khalid, Dr. Syeda Javaria Bukhari** **Dr. Amna, Dr. Shafia, Dr. Ujala** **Dr. Ghufran, Dr. Danyal, Dr. Rida Bibi**

Preamble

This module focuses on histo-morphological and embryological structure as well as physiological and biochemical functioning of digestive system. It also emphases on the carbohydrates' chemistry, metabolism, nutrition and role of vitamins in different metabolic disorders. It allows students to appraise integration and regulation of metabolic pathways in different tissues.

Learning process involves delivering the content with clinical relevance. At the very outset medical student should understand the importance of gastrointestinal system in the fields of Medicine. The Pakistan Studies, Research methodology and Behavioral Sciences will be taught as a part of the longitudinal theme.

Outcomes. By the end of this module, student should be able to:

1. Relate the gross anatomical, developmental & light microscopic features of GIT and Hepatobiliary system with their physiological functions and biochemical basis
2. Appraise the importance of protein chemistry, metabolism and nutrition in different metabolic disorders
3. Apply their relevant knowledge of this module in subsequent years of clinical training and practice

Block IV
Module VIII
Digestive System & Metabolism I

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
At the end of this module, students will be able to:			
1. Foundation of GIT System			
Relate the gross anatomy of anterior abdominal wall and peritoneum to their clinical significance	**Anatomy:** **Anterior Abdominal Wall** **Knowledge:** • Identify nine regions of abdominal cavity to locate the topographic arrangement of underlying abdominal organ. • Explain the clinical importance of membranous layer of superficial fascia with anatomical reasoning. • Describe the attachments & nerve supply and actions of muscles of anterolateral abdominal wall. • Describe the formation of rectus sheath at different levels of abdomen and enlist its contents. • Describe the blood supply, nerve supply & lymphatic drainage of anterolateral abdominal wall • Describe various types of abdominal hernias • Describe the extent and enlist the structures forming various walls of inguinal canal • 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 with regards to their relation with age, predisposing factor, frequency, coverings on exit from abdominal cavity, course, & exit from anterior abdominal wall • Describe extent, coverings & contents of spermatic cord **Clinical Relevance**	LGIS & CBL Dissection	MCQ, SAQ/ SEQ, OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	Justify an inguinoscrotal swelling on the basis of anatomical knowledge of anterior abdominal wall **Gross Anatomy of Peritoneum** **Knowledge:** • Describe Peritoneum and its modifications • Enumerate intraperitoneal, extra- peritoneal & secondarily retroperitoneal organs. • Define following with one example each: Mesentery, Omentum, Ligaments, Folds, Recesses, Pouches, Gutters • Explain peritoneal infection, adhesions & anatomical basis of spread of pathological fluid in various peritoneal compartments along with their surgical approach **Skills**: • Demonstrate the vertical and horizontal disposition of peritoneum on the model of abdomen and pelvis. • Demonstrate the attachment of greater & lesser omentum in the given model. • Demonstrate the differences in arrangement of peritoneum in males and females in the given model of pelvis		
Relate the basic physiological and biochemical principles of the gastrointestinal tract (GIT) to understand GIT functions	**Physiology** • Discuss the physiological anatomy of gastrointestinal tract • Identify the role of interstitial cells of Cajal in the electrical activity of G.I smooth muscle • Differentiate between slow wave potentials and spike potentials in GIT. • Explain the role of other factors like stretch & paracrine hormones in the generation of action potential in GI smooth muscle • Describe the organization of enteric nervous system and elaborate its role in control of G.I functions • Differentiate between myenteric and sub mucosal plexuses	LGIS. SGD, CBL	MCQs, SAQ/ SEQs, OSPE, Structured Viva
	• Analyze the interplay of autonomic and enteric nervous • system in GI functions		
	Medical Biochemistry Relate the biochemical aspects of GIT with clinical aspect	LGIS, SGD, CBL	MCQs, SEQs/ SAQs

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
2. Oral Cavity & Esophagus			
Relate the anatomical structures, physiological functionsand biochemical processes involved in oral cavity to its clinical significance	**Anatomy** • Outline the salient anatomical features of oral cavity and its contents	LGIS, SGD, CBL	MCQs, SEQs/SAQs, Structured Viva
	Physiology • Explain the physiological processes involved in mastication and salivation	LGIS, SGD	MCQs, SEQs, SAQs, Structured Viva
	Medical Biochemistry Discuss the biochemical composition of saliva and its role in digestion, mechanism of regulation, daily secretion, stimulants and depressants.	SGD	MCQs, SEQs/ SAQs, Structured Viva
	Clinical Relevance: Relate the hypo and hyper secretions of salivary glands with its physiological and biochemical basis	Integrated session	MCQs, SEQs/ SAQs, Structured Viva
Relate the developmental phenomenon, anatomical structures, physiological functions and biochemical processes involved in esophagus to its clinical significance	**Anatomy** • Describe abdominal esophagus regarding its relations, blood supply, nerve supply and lymphatic drainage • Describe the general plan of histological structure of GIT • Describe the histological structure of Esophagus • List derivatives of foregut • Describe the development of esophagus • Explain the embryological basis of the trachea-esophageal fistula, esophageal atresia and hiatal hernia	LGIS & CBL	MCQs, SAQ/ SEQs, OSPE, Structured Viva
	Physiology • Describe the mechanisms of peristalsis, esophageal motility, and the regulation of food passage from the oral cavity to the stomach, Law of Gut		
	Medical Biochemistry • Describe the protective biochemical mechanisms against gastric reflux.	LGIS. SGD	MCQs, SEQs, SAQs, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	Clinical Relevance: • Discuss disorders of swallowing (dysphagia, achalasia), esophageal disorders (e.g., GERD, esophagitis, Barrett's esophagus) and their clinical presentations • Describe the anatomical basis of bleeding esophageal varices	Integrated session/ LGIS/ SGDs	MCQs, SEQs, SAQs, Structured Viva
3. Stomach			
Relate the developmental events, anatomical structures, physiological functions and biochemical processes involved in stomach, to its clinical significance	**Anatomy:** • Describe the gross anatomy, blood supply, nerve supply and lymphatic drainage of the stomach • Demonstrate the position & gross features of stomach on the given model and identify the omenta attached • Enumerate the structures lying in stomach bed • Describe the development of stomach with special reference to its rotations and relocation of both vagi • Enlist derivatives of ventral and dorsal mesentery of foregut • Explain the formation of lesser sac • Explain the histological structure of stomach • Differentiate between a gastric gland and pit • Enumerate cells forming gastric glands • Describe the structure and function of cells forming gastric glands • Compare the histological structure of cardia, fundus and pylorus of stomach	LGIS, SGD, Practical	MCQs, SAQs, SEQs, OSPE, Structured Viva
	Physiology: • Describe the functions of stomach • Explain the hormonal and neuronal processes of gastric motility and gastric emptying • Describe mechanism (stimuli, pathways, center) and clinical significance of vomiting reflex	SGD, CBL	MCQs, SEQs/ SAQs, OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	Medical Biochemistry: • Describe the composition, mechanism of synthesis, daily secretion, stimulants, depressants, factors affecting HCl secretion, and biochemical regulation of gastric secretions • Describe the role of the stomach in the initial stages of protein digestion and the production of intrinsic factor for vitamin B12 absorption	LGIS, SGD	MCQs, SEQs/ SAQs, OSPE, Structured viva
	Clinical Relevance: • Correlate a case of gastritis with pernicious anemia with histological and biochemical basis • Explain the embryological basis of pyloric stenosis • Describe the mechanism of development of gastric ulcers and erosions • Describe the gastric functions tests • Explain gastric and peptic ulcers with reference to their common locations and blood vessels endangered as a consequence of perforation • Identify common stomach disorders such as gastritis, Helicobacter pylori infection, achlorhydria, peptic ulcer and gastric cancer	Integrated session, LGIS, SGD	
4. Small Intestine			
Relate the anatomical structures, physiological	**Anatomy:** • Describe the gross anatomical features of small intestine • Describe the histological structure of three parts of small intestine	LGIS, SGD Practical	MCQs, SEQs/ SAQs, OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
functions and biochemical processes involved in small intestine to its clinical significance	• Differentiate between three parts of small intestine on histological basis • Elaborate the adaptive structural modifications of small intestine for performing its functions • Describe physiological 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 • Describe the development of duodenum		
	Physiology: • Describe the functions of small intestine • Describe the motility patterns of the small intestine, including segmentation and peristalsis.	LGIS, SGD	MCQs, SEQs/ SAQs, OSPE, Structured Viva
	Medical Biochemistry: • Explain the processes of digestion and nutrient absorption in the small intestine • Explain the role of digestive enzymes and hormones (gastrin, secretin and CCk) in the breakdown and absorption of proteins • Describe the nutritional requirement of carbohydrate • Discuss the digestion and absorption of Carbohydrates biomedical importance of carbohydrates (lactose intolerance, Glycemic Index and Glycemic load) • Describe the nutritional requirement of Proteins • Discuss the digestion and absorption of Proteins, carbohydrates and lipids • Describe Protein turnover, amino acid Pool, Nitrogen Balance, Protein Quality • Explain the Biomedical importance of Protein (PEM) • Describe the nutritional requirement of Lipids • Discuss the digestion and absorption Lipids & Nucleic acids in human body **Nutrition** • Give the caloric requirements of the human body	SGD	MCQs, SEQs, SAQs, OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	• Define Balanced Diet and elaborate various DRIs (EAR, DA, AI, UL), AMDR • Describe Protein turnover, amino acid Pool, Nitrogen Balance, BMR, BMI, Respiratory quotient, Protein Quality and Glycemic Index. • Describe the nutritional requirement and biomedical importance of CHO, lipid & protein in human body • Discuss Malnutrition with Protein Energy Malnutrition in particular, Nutritional requirements in various stages of life and Nutritional tools • Elaborate obesity with respect to body weight assessment, body weight regulation, molecular influences, metabolic and health effects		
	Clinical Relevance: • Identify common disorders of the small intestine, such as celiac disease, and small intestinal bacterial overgrowth (SIBO), Sprue • Correlate development of midgut with abnormalities of mesenteries, vitelline duct abnormalities, gut rotation defects, gut atresia & stenosis • Differentiate between omphalocele, umbilical hernia and gastroschisis on the basis of embryology • Explain the nutritional requirements in Pregnancy, cirrhosis, end stage renal disease • Compare and contrast between Marasmus and Kwashiorkor	SGS	MCQs, SEQs, SAQs, OSPE, Structured Viva
5. Large Intestine			
Relate the anatomical structures, physiological functions and biochemical	**Anatomy:** • Describe the histological, and gross anatomical features of large intestine and appendix • Describe the partitioning of cloaca and its consequences	LGIS, SGD Practical	MCQs, SEQs, SAQs, OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
processes involved in large intestine to its clinical significance	• Describe the development of derivatives of anorectal canal		
	Physiology: • Categorize different functions of large intestine • Compare the propulsive and mixing movements taking place in colon • Identify the role of gastrocolic and duodenocolic reflexes in regulation of mass movements • Describe the nervous control of large intestine • Explain the process and reflexes of defecation	LGIS, SGD	MCQs, SEQs/ SAQs, OSPE, Structured Viva
	Medical biochemistry: **Protein Chemistry** • Classify proteins (physicochemical, functional, structural, nutritional etc) • Classify amino acids and give their nutritional significance • Explain Folding & Misfolding of proteins along with associated diseases **Protein Metabolism:** • Apply the knowledge of protein metabolism for understanding relevant metabolic disorders • Discuss amino acid pool, protein turnover and nitrogen balance • Outline the mechanism of Nitrogen excretion from the human body • Define and exemplify various mechanisms of transamination, deamination, decarboxylation, deamidation, mechanism of Amino acid oxidation • Describe the transport of amino group, role of Pyridoxal phosphate, Glutamate, Glutamine, Alanine • Draw Urea cycle and discuss its regulation in detail • Describe Genetic defects of Urea cycle • Explain in detail the concept of Ammonia intoxication	LGIS, SGD	MCQs, SEQs/ SAQs, OSPE, Structured Viva

Learning Outcomes	• Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	• Comprehend Carbon skeleton metabolism and its importance • Describe various metabolic fates of an amino acid and specialized products of amino acids (catecholamines, histamine, serotonin, creatine, melanin, melatonin etc) • Describe Functions, pathways of amino acid, degradation and genetic disorders of individual amino acids		
	Clinical Relevance: • Identify common disorders of large intestine, such as Crohn's disease, IBS, pain lower abdomen, appendicitis, haemorrhoids/ anal fissure and intestinal obstruction • Describe the embryological basis of hindgut abnormalities (Recto anal atresia, anal fistulas, imperforate anus and congenital mega colon) • Describe the common types, pathphysiology and presentations of diarrhea and constipation	LGIS, SGDs	MCQs, SEQs, SAQs, OSPE, Structured Viva
6. Liver & Biliary Tree			
Relate the anatomical structures, physiological functions and biochemical processes involved in Liver and Gallbladder to its clinical significance	**Anatomy:** • Identify and describe the histological, embryological and gross anatomical features of liver and gallbladder, including its structure, blood & nerve supply, lymphatic drainage, bile ducts, and relationship with the liver. • Describe the peritoneal covering, ligaments and supports of liver	LGIS, SGD	MCQs, SEQs/ SAQs, OSPE, Structured Viva
	Physiology: • Enlist metabolic and non-metabolic functions of liver • Elaborate the non-metabolic functions of liver and correlate with different functions of GIT • Explain the main functions of Gall bladder • Identify the factors affecting emptying of the gall bladder	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	Medical Biochemistry: • Elaborate the role of liver in the metabolism of bilirubin • Elaborate the role of liver in the metabolism of proteins • Compare the role of different body organs in integration of metabolism in health and disease • Describe the composition, functions, daily secretion, stimulants and depressants of Bile juice and related disorders: Cholelithiasis & Cholecystitis) • Elaborate the role of liver in the metabolism & LFTs	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Clinical Relevance: • Identify common disorders of the liver and gallbladder, such as fatty liver, cirrhosis, portal hypertension, cholelithiasis and cholecystitis. • Describe the types of jaundice and their presentations • Interpret LFTs • Describe the embryological basis of accessary hepatic duct, duplication of Gall bladder, extrahepatic biliary atresia, intrahepatic biliary duct atresia and hypoplasia • Describe the anatomical basis of referred pain in cholecystitis/ cholelithiasis	SGD	MCQs, SEQs/ SAQs, OSPE, Structured Viva
Relate the anatomical structures, physiological functions of spleen to its clinical significance	**Anatomy:** • Describe location, relations, supports, blood supply, nerve supply & lymphatic drainage of spleen **Skill** • Identify spleen, impressions, ligaments, nerves, muscles, blood vessels, related to digestive system on given models and specimens. **Clinical Relevance:** • Justify the possibility of splenic rupture in case of accidental injury • Describe the common causes of splenomegaly	LGIS, SGD	MCQs, SEQs/ SAQs OSPE, Structured Viva

7. **Pancreas**			
Learning Outcomes	**Subject Learning Outcomes**	**Teaching & Learning Strategies**	**Proposed Assessment Strategies**
Relate the anatomical structures, physiological functions and biochemical processes involved in Pancreas to its clinical significance	**Anatomy:** • Describe the location, parts, relations and ducts of pancreas • Describe the blood supply, nerve supply and lymphatic drainage of pancreas • Describe the light microscopic picture of pancreas • Explain the development of pancreas	LGIS, SGD, Practical	MCQs, SEQs, SAQs OSPE, Structured Viva
	Physiology: • Explain the regulation of exocrine secretions of the pancreas • Describe the regulation of feeding, hunger, appetite and energy expenditure	LGIS, SGD	MCQs, SEQs, SAQs OSPE, Structured Viva
	Medical Biochemistry: • Describe the composition, functions, daily secretion, stimulants and depressants of Pancreatic Juice • Discuss regulatory effects of Insulin and Glucagon on CHO metabolism. • Describe the regulation of Blood Glucose in human body • Describe Feed fast cycle and explain its adaptation by different tissues to changing energy conditions of the body	LGIS, SGD	MCQs, SEQs/ SAQs OSPE, Structured Viva
	Clinical Relevance: • Identify common disorders of the pancreas, such as CA head of Pancreas, malabsorption syndrome, acute and chronic pancreatitis and Zollinger-Ellison syndrome • Justify the referred pain of acute pancreatitis with anatomical reasoning • Explain the embryological basis of Annular pancreas and accessory pancreatic tissue • Explain Hyperglycemia, hypoglycemia and their regulating factors	SGD	MCQs, SEQs/ SAQs OSPE, Structured Viva

PRACTICALS

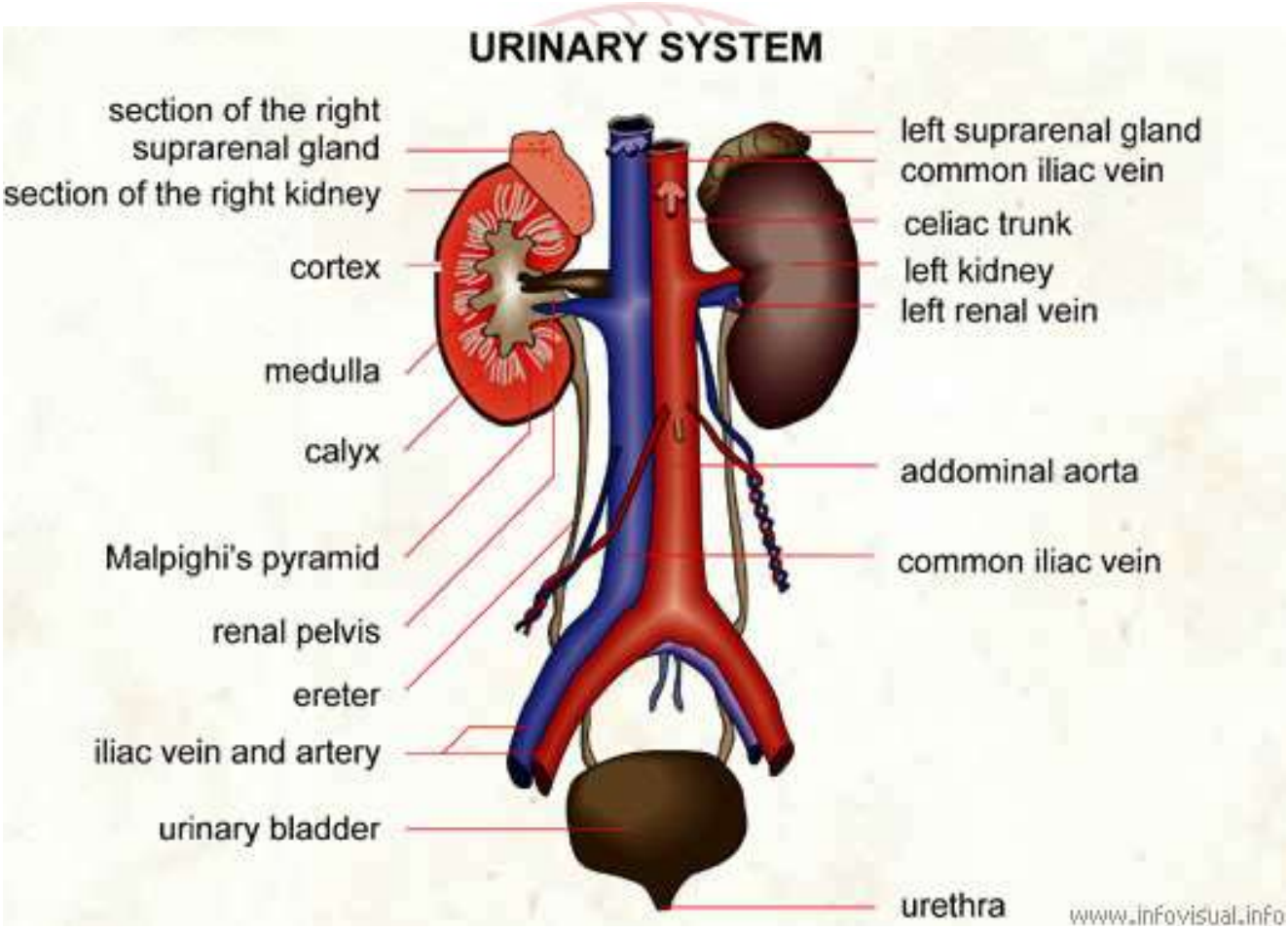
Practicals	Learning Outcomes	Tools
Anatomy		
	Identify and illustrate the microscopic structure of following: • Esophagus and Stomach • Cardiac end of stomach • Small Intestine • Colon and Appendix • Liver • Gall bladder and Pancreas • Anal canal	OSPE/ IPE
Physiology		
	• Calculate BMI & Waist Circumference on SP • Determine the Mean, Mode and Median for the batch on SP following correct sequence of inspection, palpation, percussion and auscultation	OSPE/ IPE
Biochemistry		
Biuret Test	• Explain the principle, results, interpretation and clinical significance/diagnostic application • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance
Ninhydrin Test	• Explain the principle, results, interpretation and clinical significance/diagnostic application • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance
Xanthoproteic Test	• Explain the principle, results, interpretation and clinical significance/diagnostic application • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance
Millon's Test	• Explain the principle, results, interpretation and clinical significance/diagnostic application • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance
Aldehyde Test	• Explain the principle, results, interpretation and clinical significance/diagnostic application • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance

Practicals	• Learning Outcomes	Tools
Sulphur Test	• Explain the principle, results, interpretation and clinical significance/diagnostic application • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance
Interpretation of diet chart and calculation of BMI	• Comprehend different diet charts • Calculate BMI • Explain hazards of obesity and its prevention	OSPE
Estimation & clinical interpretation of serum ALT, AST & ALP	• Explain the indications, pre-requisites, principle, results and clinical significance/diagnostic application • Interpretation of laboratory report • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance

Linkers of Integrated sessions:

- Swelling in groin/inguinal hernia
- Dysphagia/ Achlasia
- Nausea & Vomiting / Pain epigastrium/ Peptic Ulcer
- Diarrhea/ Constipation/ Abdominal distention
- Jaundice/ Cirrhosis
- Malnutrition

MBBS YEAR II
BLOCK IV
MODULE IX
GENITOURINARY SYSTEM MODULE
DURATION: 07 WEEKS



Integration of Disciplines in this Module

MODULE PLANNING COMMITTEE

Module Coordinator	**Anatomy – Dr. M. Bahadur Baloch** **Physiology – Dr. Shafia Rasool** **Biochemistry – Dr. Danyal Faisal**
Members	**Dr. Aymen Sana, Dr. Maryam Shahid, Dr. Syeda Javaria Bukhari** **Dr. Amna, Dr. Shafia, Dr. Ujala** **Dr. Ghufran, Dr. Danyal, Dr. Rida Bibi**

Preamble

This module includes basic understanding of histo-morphological embryological and physiological basis of genitourinary system Learning process involves delivering the content with clinical relevance. Learning process involves delivering the content with clinical relevance. At the very outset medical student should understand the importance of genitourinary system in the fields of Medicine. The research methodology and Behavioral Sciences will be taught as a part of the longitudinal theme.

Learning Outcome:

By the end of this module, student should be able to correlate the physiological and biochemical concepts related to genitourinary system with their anatomical knowledge and apply their relevant knowledge of this module in subsequent years of clinical training and practice.

Block IV Module X **Genitourinary System**			
1. "FLUID & ELECTROLYTE BALANCE			
Learning Outcomes	**Subject Learning Outcomes**	**Teaching & Learning Strategies**	**Proposed Assessment Strategies**
At the end of this module, student will be able to:			
Correlate the anatomical, physiological, and biochemical aspects of water and fluid homeostasis	**Anatomy** • List the groups of lymph nodes draining the abdomen. • Describe the terminal group of lymph nodes around abdominal aorta	LGIS , CBLs, SGDs, Hands- on activities, Seminars	MCQs SAQs/ SEQs OSPE, Structured Viva
	Physiology • Explain total body water content and its distribution in different body compartments • Compare and contrast the ionic composition of ECF and ICF • Explain the regulation of water balance • Explain the indicator dilution principle for the measurement of fluid volumes in the different body fluid compartments Explain the role of Starling forces in causing net filtration and absorption of fluid between vascular and interstitial compartments	LGIS , CBLs, SGDs, Hands- on activities, Seminars	MCQs SAQs/ SEQs OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	<u>Medical Biochemistry</u> • Discuss medical biochemistry of water and fluid homeostasis relating to electrolyte balance • Enumerate various types of particles and solutions about the importance of selectively permeable membrane • Describe the importance of selectively permeable membranes • Explain the effects of adding isotonic, hypotonic and hypertonic solution (to ECF) on ICF and ECF compartments • Enlist different functions of water in body • Discuss importance of osmosis and osmotic pressure • Mention importance of surface tension viscosity and their importance in relation to body fluids • Discuss importance of crystalloids and colloids • Explain basics of dialysis • Describe Electrolyte balance	LGIS, CBLs, SGDs, Hands- on activities, Seminars	MCQs SAQs/ SEQs OSPE, Structured Viva
	• Describe Ionization of water and weak acids, bases, pH and Pk values, pH scale, dissociation constant and titration curves of weak acids. • Explain clinical conditions of hyper and hypokalemia • **Acid base homeostasis:** • Apply Henderson-Hasselback equation • Explain the mechanism of buffering and pH homeostasis • Describe the role of buffer system • Comprehend acid base disorders • Describe anion gap and its clinical significance • **Role of kidney in metabolism**: Relate the metabolic role of kidney in health and disease • Interpret RFTs		

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	Clinical Relevance • Relate the pathophysiological basis of water balance in the body with its clinical implications (dehydration, hyper & hyponatremia, vomiting, circulatory shock and SIADH) • Explain the role of Starling forces in the development/ prevention of edema • Appreciate the significance of edema safety factor • Discuss the mechanism of fluid accumulation in the potential spaces • Compare and contrast the intracellular and extracellular edema	SGD, CBLs	MCQs/SAQs/ SEQs OSPE, Structured Viva
2. KIDNEY			
Relate the anatomical structures and physiological functions of kidney to its clinical significance	**Anatomy:** • Describe the gross features, coverings, surface marking, blood supply, nerve supply, & lymphatic drainage of kidney • Draw and label the relations of anterior and posterior surfaces of both kidneys • Describe location, gross features, relations, blood supply, nerve supply, & lymphatic drainage of suprarenal glands • Describe the development of kidney with reference to the sources of different parts of uriniferous tubule, rotation and ascent of kidneys • Describe the histological features of kidney and uriniferous tubules	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/SEQs, OSPE, Structured Viva
	• Identify the histological features of kidney on a slide under microscope • Explain the histological features of juxta glomerular apparatus		
	Physiology: • Describe in sequence the tubular segments through which ultrafiltrate flows • Describe the physiological anatomy of kidney (nephron, the glomerular tuft: the afferent and efferent arterioles, glomerular capillary network, mesangium, Bowman's capsule, and the juxtaglomerular apparatus including macula densa). • Distinguish between cortical and juxtamedullary nephrons. • Describe the functions and hormones of kidneys	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/SEQs, OSPE, Structured Viva

	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	Clinical Relevance: • Correlate following congenital anomalies with normal development: Wilm's tumour, Horseshoe kidney, Ectopic/Accessory kidney, Poly cystic kidneys, Malrotated kidney, Agenesis of kidney • Explain surgical significance of renal fascia and separate compartment for suprarenal gland • Describe the possible routes of spread of perinephric abscess • Explain the anatomical basis of typical renal colic	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/SEQs, OSPE, Structured Viva
Relate the glomerular histological structures, its physiological functions involved in regulation of GFR to its clinical significance	**Anatomy** • Describe the histological structure of glomerular filtration barrier	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/SEQs, OSPE, Structured Viva
	Physiology: • Describe the composition of the glomerular filtrate • Discuss the determinants of the GFR • Explain the physiological control of glomerular filtration and renal blood flow • Describe the myogenic, humoral and tubuloglomerular feedback mechanisms that mediate the autoregulation of renal plasma flow and glomerular filtration rate. • Identify the use of clearance methods to quantify kidney function • Describe the estimation of GFR by inulin clearance, and plasma creatinine clearance • Discuss PAH clearance for estimation of renal	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/SEQs, OSPE, Structured Viva
	plasma flow • Calculate filtration fraction, tubular reabsorption and secretion from renal clearance		
	Clinical Relevance: Argue the pathophysiology of proteinuria Discuss AKI due to sudden decrease in GFR	LGIS, SGDs, Hands on activities, Seminars	MCQs/ SAQs/SEQs, OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
Relate the histological structures, physiological functions and biochemical processes involved in tubular reabsorption along different parts of nephron to its clinical significance	**Anatomy** • Differentiate between microscopic features of PCT and DCT	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/ SEQs, OSPE, Structured Viva
	Physiology: • Describe reabsorption and secretion by the renal tubules • Describe the functions and importance of renal transporters and their predominant localization along the tubules with regard to nephron segment and apical versus basolateral membranes	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/ SEQs, OSPE, Structured Viva
	Medical Biochemistry: • Explain the distribution and biochemical functions of water	LGIS, SGDs, Hands on activities, Seminars	MCQs/SAQs/ SEQs,OSPE, Structured Viva
	Clinical Relevance: Discuss the pathophysiology of Glucosuria in poorly controlled diabetes.	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/ SEQs, OSPE, Structured Viva
Relate the physiological functions and biochemical processes involved in Formation of Urine to its clinical significance	**Physiology:** • Explain the mechanism of urine formation (dilution and concentration) • Discuss the control of extracellular fluid osmolarity and sodium concentration by kidneys • Elaborate osmo-receptor-ADH feedback system • Identify role of thirst in controlling extracellular fluid osmolarity and sodium concentration • Enumerate requirements for excreting a concentrated urine— high ADH levels and hyperosmotic renal medulla • Discuss the countercurrent mechanism for generating a hyperosmotic renal medullary interstitial Explain the role of distal tubule and collecting	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/ SEQs, OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	ducts in excreting a concentrated urine • Discuss the role of urea for generating hyperosmotic renal medullary interstitium and in the formation of concentrated urine • Describe the countercurrent exchange in the vasa recta in preservation of hyperosmolarity of the renal medulla • Revisit the regulation of blood pressure by kidneys		
	Medical Biochemistry: • Describe various types of particles and solutions in relation to the importance of membranes • Describe the importance of permeability of membranes, osmosis, osmotic pressure, surface tension, viscosity and their importance in relation to body fluids • Discuss the biochemical regulation of plasma/ECF osmolarity	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/ SEQs, OSPE, Structured Viva
	Clinical Relevance: • Discuss disorders of urine concentrating ability (diabetes insipidus: central and nephrogenic, SIADH) • Quantify urine concentration and dilution: "Free Water" and osmolar clearances • Identify and explain hazardous effects of sodium and potassium with clinical features.	CBLs, SGDs,	MCQs/SAQs/ SEQs OSPE, Structured Viva
Relate the physiological and biochemical processes involved in regulation of different electrolytes to its	**Physiology:** • Describe the regulation of sodium, potassium, calcium, phosphate and magnesium	ILs, CBLs, SGDs, Hands on activities, Seminars	MCQs/SAQs/ SEQs OSPE, Structured Viva
	Medical Biochemistry: ▪ Describe the sources, normal serum level and biochemical functions of sodium, potassium, calcium and magnesium ▪ Discuss causes and effects of imbalance of various electrolytes	ILs, CBLs, SGDs, Hands-on activities, Seminars	MCQs/SAQs/ SEQs OSPE, Structured Viva

clinic al significance	**Clinical Relevance:** ▪ Identify common electrolyte abnormalities with clinical case presentation. ▪ Correlate RFTs with clinical presentation (Oliguria/ Uremia/ Renal Failure) ▪ Discuss the pathophysiology of Nephrotic Syndrome ▪ Describe the principles of Dialysis (Artificial kidney, Hemodialysis and peritoneal dialysis)	SGDs, CBLs	MCQs/S AQs/ SEQs OSPE, Structured Viva
3. ACID BASE BALANCE			
Relate the physiological functions and biochemical processes involved in regulation of acid base status to its clinical significance	**Physiology:** • Discuss the role of respiratory system in acid base balance • Discuss the Renal Correction of acidosis—increased excretion of hydrogen ions and addition of bicarbonate ions to the extracellular fluid • Discuss the renal correction of alkalosis—decreased tubular secretion of hydrogen ions and increased excretion of bicarbonate ions	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/ SEQs OSPE, Structured Viva
	Medical Biochemistry: ▪ Describe PH metery and PH Scale ▪ Describe Ionization of water & weak acids, bases, pH pK values, pH scale, Dissociation constant & titration curve of weak acids ▪ Describe application of Henderson -Hassel Balch equation ▪ Explain the mechanism of chemical and physiological buffering and homeostasis.	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/ SEQs OSPE, Structured Viva
	Clinical Relevance: • Correlate the presentation of different acid base disorders with their etiology • Interpret person's acid base status through ABGs analysis • Describe anion gap and its clinical significance	CBLs, SGDs,	MCQs/ SAQs/ SEQs OSPE, Structured Viva

4. Ureter & Urinary Bladder

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
Relate the anatomical structures and physiological functions involved in process of micturition (urinary bladder) to its clinical significance	**Anatomy:** • Describe the gross features, relations, & course of both ureters on the model / specimen while emphasizing upon its constrictions. • Describe the blood and nerve supply of ureter. • Explain the anatomical basis of ureteric stone impaction • Describe the light microscopic structure of ureter (upper and lower parts) and Urinary bladder • Describe the gross features, peritoneal covering, blood supply nerve supply and lymphatic drainage of urinary bladder • Identify the anatomical routes of possible spread of bladder cancer • Differentiate between the relations of urinary bladder in models of both genders.	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/ SEQs OSPE, Structured Viva
	• Enumerate different parts and derivatives of urogenital sinus • Enlist the sources of ureter, urinary bladder and urethra • Describe the development of urinary bladder • Explain the anatomical relationship of ductus deferens with ureter with embryological reasoning • Identify the histological features of Ureter and Urinary bladder under microscope		
	Physiology: • Discuss the micturition reflex and facilitation or inhibition of micturition by the brain	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/ SEQs OSPE, Structured Viva
	Clinical Relevance: • Justify referred pain of ureteric colic with anatomical reasoning • Correlate various Urachal anomalies, exstrophy of bladder and exstrophy of cloaca with normal development • Identify common abnormalities of micturition such as atonic, automatic and neurogenic bladder.	LGIS, SGDs, Hands-on activities, Seminars	MCQs/ SAQs/ SEQs OSPE, Structured Viva

5. POSTERIOR ABDOMINAL WALL			
Learning Outcomes	**Subject Learning Outcomes**	**Teaching & Learning Strategies**	**Proposed Assessment Strategies**
Relate the knowledge of posterior abdominal wall with its clinical significance	**Lumbar Vertebral Column** • Describe the fascia of posterior abdominal wall • Distinguish lumbar vertebrae from cervical & thoracic vertebrae • Describe anatomical features of a typical lumbar vertebra	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/SEQs OSPE, Structured Viva
	Muscles • Explain the origin, insertion, nerve supply and actions of muscles 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	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/SEQs OSPE, Structured Viva
	Neuro-vasculature ▪ Describe the extent, relations, and branches of abdominal aorta along with their distribution. • Explain formation, & tributaries of inferior vena cava Identify the abdominal relations of inferior vena cava in the given model. • Describe formation, branches and distribution of lumbar plexus	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/SEQs OSPE, Structured Viva
	• Describe the course, associated ganglia and branches of sympathetic trunk		
6. PELVIS & PERINEUM			
Correlate the topographic anatomy of pelvis and perineum with presentation of relevant clinic al scenarios	**Anatomy** • Describe the boundaries of true and false pelvis. • Explain the bony landmarks & sites of muscular attachments on sacrum • Describe the type, articulations, ligaments & movements of joints of pelvis. • Enumerate the structures forming pelvic diaphragm. Describe the origin, insertion, nerve supply & actions of muscles of pelvic walls & floor • Explain the functional significance of pelvic floor in females • Demonstrate the orientation of pelvic girdle. • Demonstrate the features of bony pelvis in the given model • Demonstrate boundaries of pelvic inlet and pelvic outlet	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/SEQs OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	Clinical Relevance ▪ Correlate the autonomic nervous control of pelvic viscera with various clinical conditions ▪ Justify occurrence of low back pain in sacroiliac joint disease ▪ Analyze the clinical presentation of a case of injury to pelvic floor with anatomical reasoning	LGIS, SGDs, Hands-on activities, Seminars	
	Anatomy: ▪ Describe the gross anatomy of sigmoid colon and rectum ▪ List the structures palpated in males and females while performing rectal examination ▪ Differentiate between the relations of urinary bladder in models of both genders. ▪ Identify the site commonly selected for suprapubic aspiration of urine ▪ Discuss clinical importance of vasectomy ▪ Explain the gross anatomy of prostate, ovaries and fallopian tubes, uterus ▪ Illustrate sacral plexus showing its branches ▪ List the branches of internal iliac artery ▪ Enumerate different groups of lymph nodes of pelvis. ▪ Mark the following on the surface of given Subject:	LGIS, SGDs, Hands-on activities, Seminars	MCQs/SAQs/SEQs OSPE, Structured Viva

Learning Outcomes	▪ **Subject Learning Outcomes**	**Teaching & Learning Strategies**	**Proposed Assessment Strategies**
	▪ Kidneys, Suprarenal glands, Ureter, Abdominal aorta, Inferior vena cava ▪ Explain the indifferent stage of gonad development, development and descent of testis. ▪ Describe the embryological basis of cryptorchidism ▪ Explain the development of ovaries ▪ Enumerate the derivatives of mesonephric duct, paramesonephric duct and urogenital sinus in males and females. ▪ Describe the indifferent stage of genital ducts and development of genital ducts in the male and female. ▪ Describe the indifferent stage of external genitalia and development of external genitalia in the male and female. ▪ List common anomalies of the male genitalia. ▪ Describe the embryological basis of hypospadias and epispadias. ▪ Identify parts of developing genitourinary system on given models and diagrams showing different developmental phenomena ▪ Describe the histological features of testes and correlate the blood-testes barrier with its functions. ▪ Explain the light microscopic features of male genital ducts, accessory glands of the male reproductive system ▪ Differentiate and illustrate the light microscopic structure of male reproductive system; Testis, Epididymis Vas deferens, Seminal vesicle, Prostate ▪ Describe the light microscopic features of following female reproductive organs; Ovaries, Fallopian tubes, Uterus, Cervix, Vagina ▪ Differentiate and illustratefollowing components of female reproductive system; Ovaries, Fallopian tubes, Uterus, Cervix, Vagina		
	Clinical Relevance ▪ Apply the knowledge of histology to explain the clinical scenarios of Immotile cilia syndrome, benign prostatic hypertrophy and carcinoma of prostate		

Learning Outcomes	▪ Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	▪ Apply the knowledge of embryology to explain the following congenital anomalies: o Uterus didelphys o Uterus arcuatus o Uterus bicornis. o Vaginal atresia ▪ 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. ▪ Gonadal dysgenesis		
Relate the knowledge of perineum with its clinical significance	**Anatomy:** • Describe the borders, relations & divisions of perineum • Explain the boundaries of superficial and deep perineal pouches and enumerate their contents in both genders • Illustrate the cutaneous nerves of the perineum. • Describe perineal body with its attachments • Describe the relations, internal features, blood supply, lymphatic drainage, & innervation of anal canal • Describe the boundaries, contents & recesses of ischiorectal fossa • Describe the gross features of vagina including relations, blood supply, nerve supply & supports • Explain gross features of all parts of male & female urethra, its arterial supply, venous drainage & nerve supply • Apply anatomical reasoning in justifying the route of extravasation of urine in case of injury to different parts of male urethra • Enlist parts of external genitalia and describe their blood and nerve supply • 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, CBLs, SGDs, Hands-on activities, Seminars	MCQs/SAQs/SEQs OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching& Learning Strategies	Proposed Assessment Strategies
	Clinical Relevance • Differentiate between clinical presentation of internal and external hemorrhoids on anatomical basis • Elucidate perianal hematoma, fissure, abscess and fistulas of anal canal with anatomical basis of their occurrence and presentation • Justify the possible routes of spread of ischiorectal abscess with anatomical reasoning • Explain area of anesthesia, indications, & list steps of pudendal nerve block • Provide the anatomical basis of presentation of Bartholin cyst • Apply the anatomical knowledge in analyzing a case of vaginal prolapse (cystocele and rectocele, and vaginal fistula • Define culdocentecis and describe its diagnostic and therapeutic 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 • Correlate the anatomy of female genital tract with hysterosalpingography, ligation of uterine tubes, ectopic tubal pregnancy • Comprehend a case of uterine prolapse on the basis of 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 • Explain the role of lymphatics and lymph nodes in spread of malignancies of pelvis		

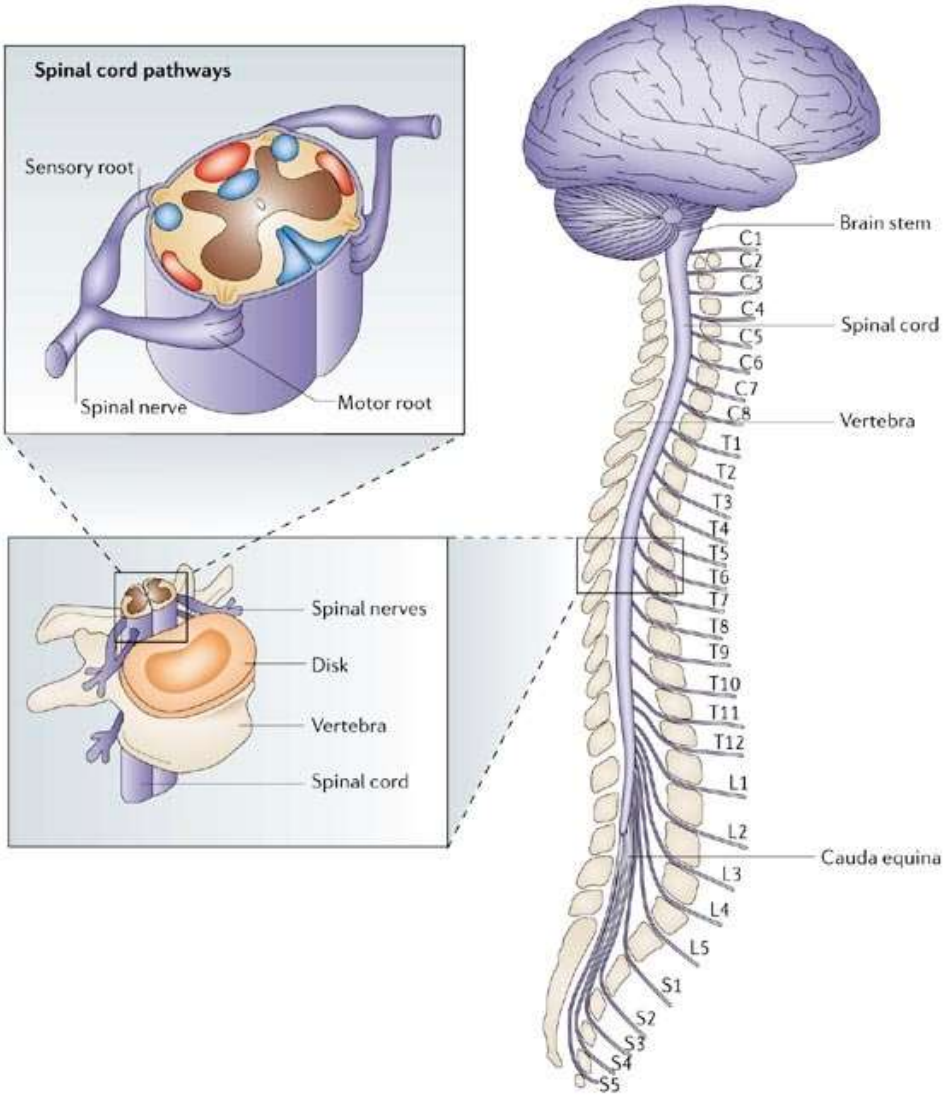
PRACTICALS		
BIOCHEMISTRY		
Practical	**Learning Outcomes**	**Assessment Strategies**
At the end of this practical, student will be able to:		
Physical and microscopic analysis of urine	• Explain the principle, results, interpretation and clinical significance/diagnostic application	OSPE
	• Calculate the specific gravity of urine sample • using specified procedure and appropriate glassware/equipment	
Chemical analysis of urine: Ehrlich's test, Rothera's test, Heat coagulation test, Sulfosalicylic acid test	• Explain the principle, results, interpretation and clinical significance/diagnostic application **2.** Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance
Interpretation of urine report	• Explain the different components of urine report 4. Interpret laboratory reports of clinical conditions (UTI, diabetic ketoacidosis, diabetes mellitus, nephrotic syndrome, phenylketonuria, bladder cancer, pre-eclampsia)	OSPE
Demonstrate the working and application of pH metery	• Explain the principle, results, interpretation and clinical significance/diagnostic application • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE
Interpretation of ABGs	• Explain the indications, pre-requisites, principle, results and clinical significance/diagnostic application 4. Interpret laboratory report	OSPE/ Practical Performance

Linkers of Integrated sessions:

1. Edema/ Dehydration
2. Pain in right flank
3. Polyuria
4. Oliguria
5. Acid base disorders
6. Uterine prolapse
7. Hemorrhoids

BLOCK V

MBBS YEAR II
BLOCK V
MODULE X
NEUROSCIENCES I & GENETICS
DURATION: 08 WEEKS



Integration of Disciplines in this Module

MODULE PLANNING COMMITTEE

Module Coordinator	**Anatomy – Dr. M. Bahadur Baloch** **Physiology – Dr. Ujala** **Biochemistry – Dr. Ghufran**
Members	**Dr. Aymen Sana, Dr. Owais Khalid, Dr. Syeda Javaria Bukhari** **Dr. Amna, Dr. Shafia, Dr. Ujala** **Dr. Ghufran, Dr. Danyal, Dr. Rida Bibi**

Preamble

The Neurosciences module is 08 weeks' module that focuses on the study of nervous system. It is a cross-disciplinary field that evolves around the development and functioning of the nervous system along with the mechanisms that underlie neurological disease. This module provides exposure to the field in depth and breadth. Through this module, students will develop an integrated, scientific knowledge that will help them in clinical setting, plus creative and problem-solving skills.

Learning Outcome:

By the end of this module, student should be able to correlate the physiological and biochemical concepts related to nervous system with their anatomical knowledge and apply their relevant knowledge of this module in subsequent years of clinical training and practice

Block V Module X
Neurosciences I & Genetics

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
At the end of this module, students will be able to:			
1. Foundations of Neurosciences			
Apply the basic anatomical and physiological principles of common neurological processes by correlating the structures forming the nervous system with their functions. Interpret the physiological mechanisms controlling the Neuronal signals transmitting through synapse Interpret the physiological mechanisms controlling the functions of sensory system	**Anatomy:** • List the major divisions, components of the central nervous system. • Summarize the histological features of neuron and neuroglia. • Classify neurons according to their morphology with one example of each. • Explain the histomorphological composition of peripheral nerve. • Differentiate between sensory and autonomic ganglia in tabulated form. • Describe the development of neural tube with reference to neurulation, vesicles, brain flexures and ventricles. • Demonstrate the structure of brain and spinal cord on prosected specimens and models. • Identify the normal structure of brain and spinal cord in the images of CT scan & MRI • ANS is not included	SGD, LGIS	MCQs, SEQs/ SAQs OSPE, Structured Viva

Learning Outcomes	Subject Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies
	Physiology • Describe the functions of different types of neurons and neuroglial cells • Differentiate between various types of synapses	Interactive Lectures CBL, TBL Skills	MCQs SAQs/ SEQs OSPE, Structured Viva
	Medical Biochemistry • Discuss synthesis, stimulus, mechanism of action and biochemical role of neurotransmitters	LECTURES PBL CBL SGD	MCQs, SAQs, SEQs, OSPE, Structured Viva
	Clinical Relevance: • Analyze the pathophysiology of demyelinating disorders like Multiple sclerosis. • Differentiate between tetnization, tetany, tetnus and treppe. • Enumerate ventricles and coverings of brain and spinal cord with special emphasis on intracranial hemorrhages. • Justify the importance of nucleotides, their derivatives, and nucleic acids in diagnosing and treating genetic disorders, cancers, and developing anti-viral drugs and advanced gene therapy. • Justify and correlate the role of different neurotransmitters in various Neurological & Immunological disorders		

2. CRANIAL CAVITY

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
Relate the developmental and anatomical features of cranial cavity to its clinical significance	**Anatomy:** • Describe the development of skull • Describe the importance of the fontanelle of the skull in new born regarding: - Changes in intracranial pressure. - Closure of different fontanelle • Explain the embryological basis of cranioschisis and various types of craniosynostosis • Demonstrate the anatomical position of skull with special emphasis on planes of anatomical position.	LGIS, SGD	MCQs SAQs/ SEQs OSPE, Structured Viva
	• Describe and demonstrate the boundaries and gross features of cranial fossae. • List and demonstrate foramina along with structures passing through them in anterior, middle and posterior cranial fossae. • Recognize and demonstrate the important sutures, fontanelle and impressions on the interior of cranial vault		
	Physiology: • Examine the cranial nerves on the SP • Explain the pathophysiological basis of the clinical manifestation of different cranial nerves	Lab Skills CBL, TBL	MCQs SEQs, SAQs OSPE, Structured Viva

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	Clinical Relevance: • Correlate the congenital anomalies of skull with their embryological basis • Identify Important landmarks on Skull • Explain the clinical presentations relevant to fracture of various bones of skull	SGD	MCQs SAQs, SEQs OSPE, Structured Viva
3. Meninges and Dural Venous Sinuses			
Relate the anatomical structures of meninges and Dural venous sinuses to its clinical significance	**Anatomy**: • Explain the meninges of brain and spinal cord along with the reflections of dura mater in brain. • Enlist paired and unpaired Dural venous sinuses along with their attachments • Describe the location, important relations, and communications of the cavernous sinus and enumerate structures passing through it.	• LGIS, SGD	MCQs, SAQs, SEQs OSPE, Structured Viva
	Clinical Relevance: • Describe the clinical presentation of following clinical disorders associated with meninges and Dural venous sinuses: • Meningitis • Epidural hemorrhage • Subdural hemorrhage • Subarachnoid hemorrhage		
4. Spinal Cord & Neural Pathways			
Explain the dorsal column medial leminiscal system and anterolateral pathways	**Anatomy:** • Describe the histological features of the white and grey matter of spinal cord. • Describe the development and positional changes of spinal cord. • Describe the formation and developmental changes in alar and basal plates. • Explain the gross appearance and the nerve cell groups in the anterior, posterior, and lateral	LGIS, SGD	MCQs, SEQs/SAQs OSPE, Structured Viva
Correlate the pathophysiological basis of pain pathways to their clinical significance	gray columns of the spinal cord • Enumerate and illustrate the arrangements of ascending and descending tracts (white matter) in spinal cord at various levels. • Explain the given clinical conditions related to ascending and descending tracts of spinal cord.		

	Physiology: • Compare and contrast the dorsal column medial leminiscal system and anterolateral pathways • Differentiate between different sensory tracts • Enlist different types of sensations carried by their relevant sensory tract	IL, CBL, TBL	MCQs, SAQs/ SEQs OSPE, Structured Viva

Learning Outcomes	• Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	• Explain the various thermal sensations, thermal receptors, and their excitation and transmission of thermal signals in the nervous system • Classify the different types of pain. • Compare the perception and transmission of the different types of pain. • Explain the pain suppression system in the brain and spinal cord. • Describe the brain's opiate system endorphins and enkephalins • Explain the role of proprioceptors (muscle spindles and Golgi tendon organs) in motor movements • Explain dynamic and static stretch reflex • Describe the flexor reflex and the crossed extensor reflex. • Explain the reciprocal inhibition and reciprocal innervation. • Identify the reflexes of posture and locomotion in the spinal cord. • Explain the role of primary motor cortex, premotor area, and supplementary motor area in the control of voluntary motor movements. • Identify the various pathways for the transmission of signals for voluntary motor control from the motor cortex to the muscles. • Explain the significance of anterior motor neurons as the lower motor neurons. • Identify the role of the brain stem in controlling motor function and role in posture of the body against gravity. • Explain the role of pyramidal and extrapyramidal tract in the voluntary motor movements		

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	Clinical Relevance: • Explain the embryological basis of various types of Spina Bifida. • Describe the clinical abnormalities of pain and other somatic sensations • Determine the anatomical and pathophysiological relevance of the following clinical conditions: o Upper motor neuron lesions, lower motor neuron lesions o Hemiplegia, paraplegia and Quadriplegia o Spinal shock syndrome o Complete cord transection syndrome o Anterior cord syndrome o Central cord syndrome o Brown sequard syndrome o Syringomyelia o Poliomyelitis o Multiple sclerosis o Amyotrophic lateral sclerosis	SGD, LGIS	MCQs, SEQs/ SAQs OSPE, Structured Viva
5. Brainstem			
Relate the anatomical structures, physiological functions of brainstem to its clinical significance	**Anatomy:** • Enumerate the derivatives of rhombencephalon and mesencephalon, • Summarize the characteristic developmental events of the following: - Medulla oblongata - Midbrain - Pons • Describe the gross appearance and internal structure of the medulla oblongata. • Illustrate the cross sections of medulla oblongata at different levels. • Explain the effects of raised pressure in the posterior cranial	LGIS, SGD	MCQs, SAQs/ SEQs OSPE, Structured Viva

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	fossa on the structures contained within it. • Describe the gross features and internal structure of pons. • Illustrate cross-section of pons at different levels showing major structures at each level. • Describe the gross appearance and internal structure of the midbrain. • Illustrate cross sections at the level of superior colliculus and inferior colliculus showing major structures at each level.		
	<u>Physiology:</u> • Discuss the functions of brainstem in regulation of various vital functions in body	LGIS, CBL, TBL	MCQs, SAQs, SEQs OSPE, Structured Viva
	<u>Clinical Relevance:</u> • Explain the anatomical features with relevant physiological significance of the following clinical conditions: - Arnold-chiari malformation - Medial medullary syndrome - Lateral medullary syndrome of Wallenberg. • Analyze the anatomical basis/relevance of clinical presentation in case of tumors of pons, Pontine hemorrhage and Infarction of pons. • Describe trauma and vascular lesions of the midbrain • Justify the clinical presentation of blockage of the cerebral aqueduct with anatomical and physiological basis.	SGD	MCQs, SEQs, SAQs OSPE, Structured Viva

6. Cerebellum			
Learning Outcomes	**Subjects Learning Outcomes**	**Teaching & Learning Strategies**	**Assessment**
Relate the macro and microscopic structure and physiological functions of cerebellum to its clinical significance	**Anatomy:** • Enumerate and illustrate histological layers of cerebellar cortices and different cell types of these layers. • Summarize the characteristic developmental events of Cerebellum • Describe the gross features of cerebellum. • List intracerebellar nuclei and types of fibers constituting white matter of cerebellum and explain their routes of entry and exit. • Explain the pathways carrying afferent and efferent fibers to and from the cerebellum.	SGD, LGIS	MCQs, SAQs/ SEQs OSPE, Structured Viva
	Physiology: • Explain the functional divisions and neuronal circuitry of the cerebellum. • Differentiate between the vestibulo, spino and cerebro cerebellum based on their individual functions.	LGIS, CBL, TBL	MCQs, SEQs/ SAQs OSPE, Structured Viva
	Clinical Relevance: • Describe the pathophysiological basis of the clinical abnormalities of the cerebellum • Correlate the clinical presentations of cerebellar disorders with anatomical and physiological basis	SGD	MCQs, SEQs, SAQs OSPE, Structured Viva
7. Cerebrum			
Relate the anatomical structures, and physiological functions of the cerebrum its clinical significance	**Anatomy:** • Explain the histological features of cerebral cortex • Summarize the characteristic developmental events of Cerebrum • Describe the topographic anatomy of the diencephalon and	LGIS, SGD	MCQs, SAQs, SEQs OSPE, Structured Viva

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	demonstrate its gross features on a given model. • Identify main sulci and gyri of cerebral hemispheres and describe the extent of each of them. • Explain the divisions of cerebral lobes on superolateral, medial, and inferior surfaces of cerebral hemispheres. • Enumerate fibers making up the white matter of cerebral hemispheres and describe each of them • Identify different components of cerebrum on prosected specimen • Describe the cortical functional areas in different lobes of cerebral hemispheres.		
	Physiology: • Describe the various functional areas of cerebral cortex • Relate the functions of specific cortical areas and association areas in the physiology of speech. • Discuss the higher intellectual functions of the prefrontal areas and the various cortical association areas. • Describe the functions of corpus callosum. • Identify the different types of brain waves and their origin • Explain the effect of varying levels of cerebral activity on the frequency of the EEG.	LGIS, SGD	MCQs, SAQs/ SEQs OSPE, Structured Viva
	Clinical Relevance: • Differentiate between Grand mal, petit mal epilepsy, and focal epilepsy • Correlate the clinical presentations of lesions of internal capsule and	SGD	MCQs, SEQs/SAQs OSPE, Structured Viva

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	motor cortex with motor and speech disorders • Explain the pathophysiological disorders related to speech. • Explain the pathophysiology, signs, symptoms, microscopic changes, diagnosis, and treatment of Alzheimer's disease • Assess higher mental functions on SP		
8. Diencephalon			
Relate the anatomical structures, and physiological functions of Diencephalon to its clinical significance	**<u>Anatomy:</u>** • Describe the general arrangement, functions and projections of reticular formation. • Illustrate components of limbic system on model ▪ Describe the development of Diencephalon • Enlist the divisions, nuclei and connections of thalamus. • Enlist the nuclei of hypothalamus. • Describe the hypothalamohypophyial portal system and tract	SGD, LGIS	MCQs, SAQs/ SEQs OSPE, Structured Viva
	<u>Physiology:</u> • Describe the functions of thalamus. • Explain the mechanisms of heat production and heat loss. • Describe the regulation of body temperature and role of the hypothalamus • Differentiate between slow-wave sleep and REM Sleep • Describe the basic theories of sleep and physiologic effects of sleep. Explain the changes in EEG	LGIS, SGD	MCQs, SAQs/ SEQs OSPE, Structured Viva

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment

	at different stages of wakefulness and sleep. • Explain the functions of various components of limbic system and role of hippocampus in memory. • Classify memories based on type of sensory experience, time of retention, synaptic facilitation and habituation • Explain the process of consolidation of memory through chemical and anatomical changes occurring at the synapse.		
	Clinical Relevance: ▪ Describe the pathophysiology and clinical presentation of various disorders of thalamus, hypothalamus and limbic system ▪ Interpret the various abnormalities of body temperature regulation with special focus on fever. • Discuss pathophysiology of various sleep disorders • Explain the effects of destruction of amygdaloid complex on behavior and memory • Compare various types of amnesia including retrograde, anterograde amnesia, Alzheimer's and dementia.	SGS	
9. Basal Nuclei			
Relate the anatomical structures, and physiological functions of basal ganglia to its clinical significance	**Anatomy:** • Describe connections and functions of different nuclei constituting basal ganglia	LGIS, SGD	MCQs, SAQs/ SEQs OSPE, Structured Viva
	Physiology:	LGIS, CBL, TBL	MCQs, SAQs/ SEQs

	• Relate the role of basal nuclei in cognitive control of sequences of motor patterns. • Explain the direct and indirect circuits of basal ganglia • Explain the role of various specific neurotransmitter substances in the basal ganglia and the pathophysiological disorders related to their deficiency.		OSPE, Structured Viva
	Clinical Relevance: • List hyperkinetic disorders related with various basal nuclei like chorea, hemiballismus and athetosis, • Describe Parkinson disease regarding etiology, pathophysiology, clinical features and treatment	SGD	MCQs, SEQs/ SAQs OSPE, Structured Viva
10. Ventricular System			
Relate the anatomical structures, and physiological functions of Ventricular system, the CSF, & the blood-brain & blood-CSF barriers to its clinical significance	**Anatomy:** • Describe the anatomical organization of ventricular system of brain • Explain the boundaries of each ventricle along with their choroid plexus. • Explain formation, circulation and absorption of CSF. • Enlist the structures forming blood brain and blood CSF barriers • Identify the features of various ventricles on models and prosected specimen. • Illustrate the floor of fourth ventricle	LGIS, SGD	MCQs, SEQs/ SAQs OSPE, Structured Viva
	Physiology: • Discuss the functions of CSF. • Differentiate between CSF and plasma	LGIS, SGD	MCQs, SEQs, SAQs OSPE, Structured Viva

Learning Outcomes	• Subjects Learning Outcomes	Teaching & Learning	Assessment
	• Explain the physiological significance of blood brain barrier.		
	Clinical Relevance: • Describe the process of lumbar puncture, including sequential enumeration of the anatomical structures that a needle passes through during a spinal tap. • Explain causes & varieties of Hydrocephalus	SGD	
11. Blood Supply of the Brain and Spinal Cord			
Relate the blood supply of different parts of brain and spinal cord to its clinical significance	**Anatomy:** • Describe the blood supply of different parts of brain and spinal cord emphasizing on circle of Willis • Explain the formation and importance of venous system • Identify various blood vessels of brain and spinal cord on models and prosected specimen.	LGIS, SGD	MCQs, SAQs, SEQs OSPE, Structured Viva
	Clinical Relevance: • Relate the interruption of cerebral circulation to cerebral artery syndromes due to anterior, middle and posterior cerebral artery occlusion • Correlate the clinical presentation of cerebrovascular accidents with the sites of lesion.	SGD	MCQs, SAQs, SEQs OSPE, Structured Viva
12. Cranial Nerves			
Relate the nuclei and intracranial course of all cranial nerves with their lesions	**Anatomy:** • Classify the cranial nerves into sensory, motor and mixed nerves. • Identify the nuclei and intracranial course of all cranial nerves.		
	Clinical relevance: • Explain the clinical presentations of lesions of nuclei and intracranial course of all cranial nerves:		

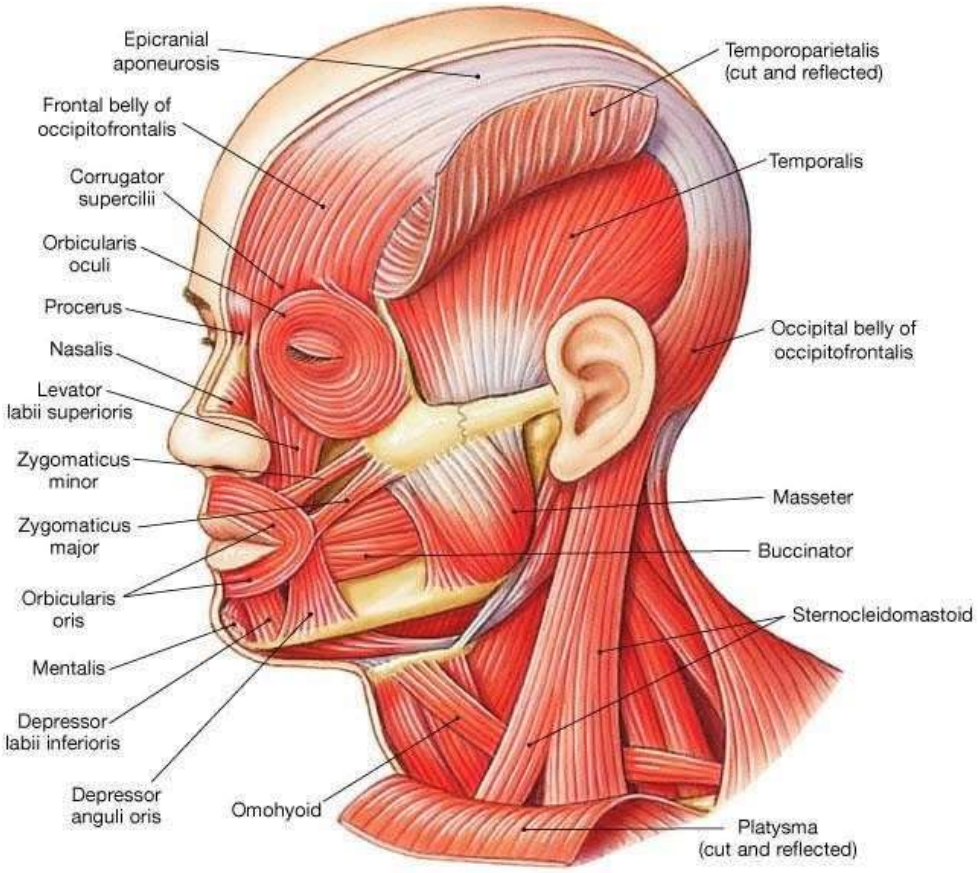
PRACTICALS			
ANATOMY			
▪ Histology of nerve and ganglia ▪ Histology of Spinal cord ▪ Histology of cerebellum ▪ Histology of cerebral cortex			
PHYSIOLOGY			
▪ Examine motor system on an SP ▪ Performs Deep tendon reflexes ▪ Examine the Cerebellar Functions on an SP ▪ Examine the autonomic nervous system on an SP ▪ Examine the Sensory system on an SP ▪ Perform superficial reflexes on an SP ▪ Record the normal body temperature ▪ Examine the 5th, 7th, 9th, 10th, 11th & 12th Cranial nerves on SP			
	Medical Biochemistry		
Apply the knowledge of Nucleotide Chemistry in understanding genetic disorders, cancers, and developing anti-viral drugs and advanced gene therapy	**Nucleotide Chemistry** ▪ Describe nitrogenous bases, nucleosides, nucleotides and nucleic acids, their types, structure, and functions ▪ Discuss the synthetic derivatives of purines, pyrimidines and nucleotides and their role in health and disease		
Apply the knowledge of nucleotide metabolism for understanding relevant metabolic disorders	**Nucleotide Metabolism** ▪ Explain nucleotide metabolism for understanding relevant metabolic disorders ▪ Outline the de novo synthesis of Purine, nucleotides and deoxyribonucleotides ▪ Explain the salvage pathway of purines and pyrimidines nucleotides ▪ Describe the degradation of purines and pyrimidines with related diseases	LGIS PBL CBL SGD	MCQs, SEQs, SAQs OSPE, Structured Viva
	Clinical Relevance: Relate the nucleotide metabolism with clinical disorders like gout, Lesch-Nyhan syndrome, orotic aciduria, immunodeficiencies and other metabolic disorders		
Apply the knowledge of	**Molecular Genetics** ▪ Describe DNA structure & types of state	LECTURES	MCQs, SEQs, SAQs

DNA, RNA and biotechnology , and their role in Genetics and molecular medicine	organization of Prokaryotic and Eukaryotic DNA ▪ Describe various types of RNA and their structure ▪ Outline Prokaryotic and Eukaryotic replication, transcription and translation ▪ Explain the Supercoiling of DNA ▪ Outline the different mechanisms of regulation of gene expression and their role in various metabolic and genetic disorders	PBL CBL SGD	OSPE, Structured Viva
	▪ Describe mutations, DNA Repair Mechanisms, Reverse transcription, post transcriptional modification, Post Translational Modification and various Genetic Diseases ▪ Relate genetics and molecular medicine in health and disease Describe PCR, different blotting techniques, RFLP, cloning, Probes, plasmids and their role in forensic, prenatal diagnosis and gene therapies **Clinical Relevance:** ▪ Analyze the role of DNA structure, types and eukaryotic DNA organizations in genetic testing and therapy. ▪ Justify the importance of molecular medicine, genetics and biotechnology in diagnosing and treating genetic disorders, cancers and infectious diseases. ▪ Evaluate the importance of DNA replication in prokaryotes and eukaryotes aiding in the development of antibiotics and antiviral drugs. ▪ Correlate the knowledge of mutations in diagnosing and treating genetic disorders and cancers		

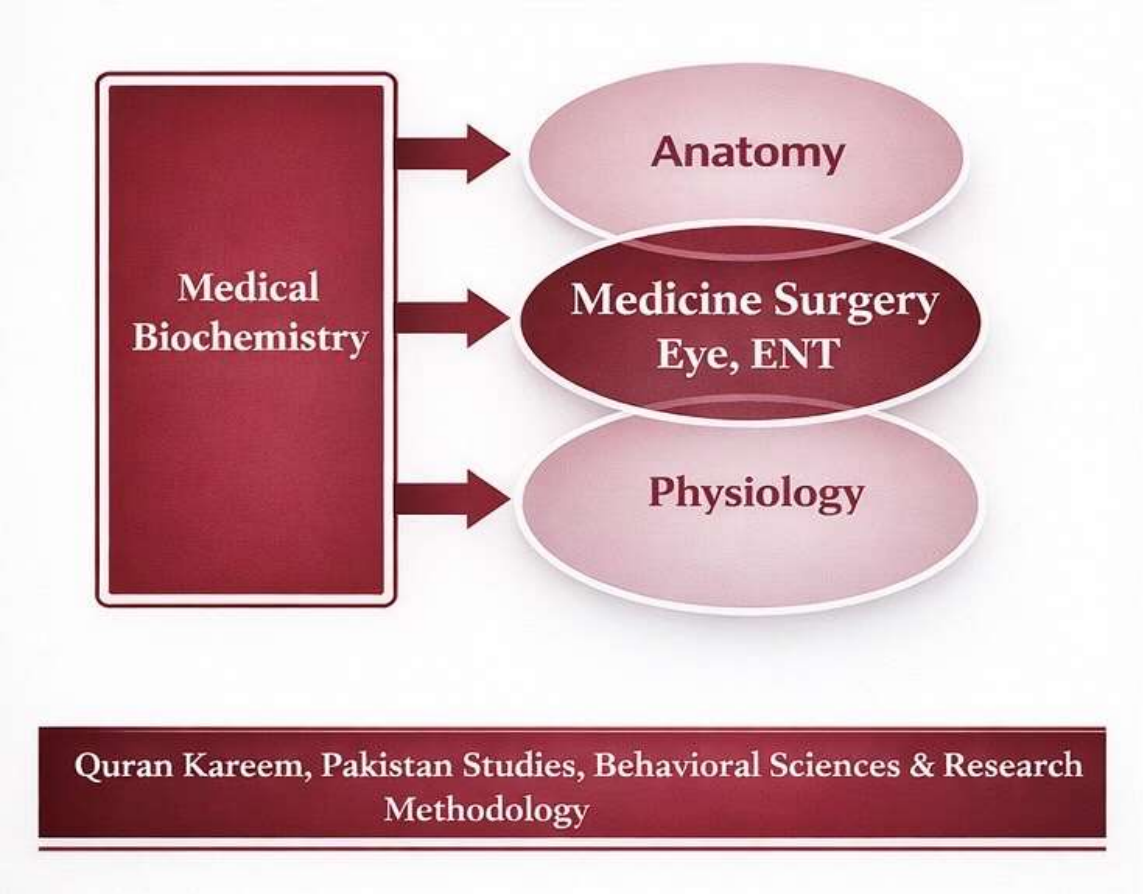
LIST OF MEDICAL BIOCHEMISTRY PRACTICALS (NEUROSCIENCES & GENETICS)		
Practical's	**Learning Outcomes**	**Tools**
Collection and preservation of clinical specimens	• Explain the guidelines, criteria, method of collection of biospecimens (blood, urine, feces, saliva, sputum, tissue sample) • Explain the use of different vacutainers, their additives and application in collection and preservation of blood samples	OSPE
Estimation and clinical interpretation of serum uric acid	• Explain the indications, pre-requisites, principle, results and clinical significance/diagnostic application • Interpretation of laboratory report • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance
DNA extraction	• Explain principle, method and application of phenol- chloroform DNA extraction method • Explain the procedure of visualization of DNA bands using Gel electrophoresis and Gel doc system	OSPE
PCR	• Explain the principle, protocol, procedure, application, advantages and types of PCR	OSPE
Justify the use of solutions in clinical practice	• Explain different types of solutions and their applications in clinical practice (ORS, normal saline, dextrose, Ringer's lactate, Heamaccel)	OSPE

BLOCK VI

MBBS YEAR II
BLOCK VI
MODULE XI
MAXILLOFACIAL & SPECIAL SENSES
DURATION : 06 WEEKS



Integration of Disciplines in this Module



MODULE PLANNING COMMITTEE

Module Coordinator	**Anatomy – Dr. Maryam Shahid** **Physiology – Dr. Shafia** **Biochemistry – Dr. Rida Bibi**
Members	**Dr. Aymen Sana, Dr. Owais Khalid, Dr. Syeda Javaria Bukhari** **Dr. Amna, Dr. Shafia, Dr. Ujala** **Dr. Ghufran, Dr. Danyal, Dr. Rida Bibi**

Preamble

The Maxillofacial & Special Senses module for 2nd year MBBS aims to integrate both basic and clinical sciences. In basic sciences, students will be able to explain developmental, gross and microscopic anatomy of the Head Region & Special Senses along with relevant physiology and biochemistry. Learning process involves delivering the content with clinical relevance. The research methodology and Behavioral Sciences will be taught as a part of the longitudinal theme.

Learning Outcome:

By the end of this module, student should be able to correlate the physiological and biochemical concepts related to maxillofacial and special senses with their anatomical knowledge and apply their relevant knowledge of this module in subsequent years of clinical training and practice

Block VI **MAXILLOFACIAL & SPECIAL SENSES**			
Learning Outcomes **At the end of this module, students will be able to:**	**Subjects Learning Outcomes**	**Teaching & Learning Strategies**	**Assessment**
1. Topographic anatomy of Skull			
Elucidate the topographic anatomy of the skull	**ANATOMY** • Appreciate the normas of skull from different views along with its foramina • Enlist the structures traversing the foramina of the bones of the skull • Identify important bony landmarks on the bones as viewed from lateral, superior, inferior, anterior and posterior views. • Identify the bones forming the boundaries of orbit, nasal cavity, oral cavity, temporal, infratemporal fossa &pterygopalatine fossa on the given bone. (detail to be done with relevant topics)	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
2. Topographic anatomy of mandible			
Elucidate the topographic anatomy of mandible	**ANATOMY:** • Describe the ramus and body of the mandible concerning its bony features and attachments. • Identify the anatomical parts of the mandible along with its foramina and structures passing through it • Explain the clinical presentation of different fractures of the mandible with relevant anatomical basis • Identify the bony landmarks and site of attachment of muscles	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE

3. Scalp			
Learning Outcomes	**Subjects Learning Outcomes**	**Teaching & Learning Strategies**	**Assessment**
Correlate the structure and neurovascular supply of scalp with anatomical basis of	**ANATOMY:** • Describe the layers of the scalp in a sequential order • Correlate gross features of each layer with an anatomical basis of black eye, profuse bleeding, gaping wound, spread of scalp infection and hematoma formation.	LGIS SGD CBL Dissection	MCQ, SEQ, Structured Viva, OSPE
relevant clinical conditions.	• Demonstrate the extent of the scalp on the given model. • Identify the muscles and neurovascular structures related to scalp on prosected specimen/given models		

4. Face

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
Appreciate the embryological basis of congenital anomalies related to Pharyngeal Arches and pouches, tongue, nose and paranasal sinuses, face and palate Correlate the gross anatomy of face with anatomical basis of relevant clinical conditions.	**ANATOMY** • Elucidate the cutaneous innervation of face • Enlist the group of facial muscles according to the orifices they guard. • 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. • Describe the course and distribution of facial nerve • Emphasize the relationship of facial nerve with pterygopalatine and submandibular ganglia • Highlight the effects of lesion of facial nerve at different levels • Differentiate anatomical basis of clinical presentation of UMN and LMN lesion of facial nerve • Correlate gross features of face with anatomical basis of danger area, trigeminal neuralgia, Bell's palsy. • Identify muscles of facial expressions • Demonstrate the cutaneous innervation of the face on the given model • List embryological sources of head and neck structures with special emphasis on pharyngeal apparatus. • Tabulate the nerve and blood supply and derivatives of all arches, pouches, clefts and membranes. • Describe the embryological basis of first arch syndrome and its relation to cardiac anomalies. • Elucidate development of face • Correlate various facial clefts with normal development. • Justify the association of Neural crest cells and craniofacial defects • Apply the knowledge of developmental	LGIS SGD CBL Dissection	MCQ, SEQ, Structured Viva, OSPE
	anatomy to explain Branchial fistulas, sinuses and cysts • Identify parts of developing head and neck on given models. • Indicate the different developmental phenomenon of head/ neck shown in the diagrams.		

5. Submandibular Region			
Learning Outcomes	**Subjects Learning Outcomes**	**Teaching & Learning Strategies**	**Assessment**
Appraise the location, neurovascular supply of major salivary glands with understanding of relevant clinical conditions on anatomical basis. Correlate the anatomy of Submandibular region with its clinical significance	**ANATOMY** • Describe the location of major salivary glands (anatomical relations) along with opening of their ducts. • Illustrate the secretomotor nerve supply of major salivary glands. • Revisit boundaries of submandibular triangle • Describe the parts, relations, neurovasculature of submandibular gland. • Illustrate the routes of submandibular ganglion • Describe the distribution of submandibular ganglion • Correlate the anatomy of submandibular fascial space with Ludwig's angina • Identify the nerves, vessels and glands in the sub mandibular regions on the given model. • Describe the histomorphological features of salivary glands with regards to their secretory and ductal systems • Identify H&E Stained slides of submandibular gland and sublingual glands and draw their labelled diagrams	LGIS SGD CBL Practical	MCQ, SEQ, Structured Viva, OSPE
6. Parotid Region			
Correlate the anatomy of the parotid region with its clinical significance	**ANATOMY** • Elucidate the surfaces, borders, shape, location, parts, relations and drainage of parotid gland • List contents of parotid region • Trace the pathway of autonomic supply of parotid gland. • Enumerate structures embedded in parotid gland in a sequential order. • Interpret the following clinical conditions related to parotid gland: Infection (mumps), tumor and stone of parotid gland and Frey's Syndrome	LGIS SGD CBL Dissection	MCQ, SEQ, Structured Viva, OSPE
	• Identify the nerves, vessels and glands in the parotid region on the given model • Identify H&E-Stained slides of parotid gland and draw their labelled diagrams		

7. Orbit

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
Explain the structure of the eye involved in perception of visual image with emphasis upon the functions of individual structures	**ANATOMY** • Revisit the skeletal framework of bony orbit and its communications • Enlist the contents of orbit • Describe the course and distribution of ophthalmic nerve and artery. • Enumerate different components of the lacrimal apparatus • Describe the nerve supply of the Lacrimal gland • Define Horner's Syndrome • Explain the developmental anomalies of the nasolacrimal duct • Identify extraocular muscles, and neurovascular structures of eyeball on given models	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
	PHYSIOLOGY • Explain refraction and concept of convergence and divergence. • Define focal length, focal point and power of lens. • Differentiate between emmetropia, myopia, hyperopia, astigmatism, presbyopia and describe their treatment • Discuss the concept of reduced eye and depth perception. • Describe physiological anatomy of retina and retinal handling of visual signals • Draw the Wald's visual cycle • Justify the role of vitamin A in night blindness • Describe phototransduction in photoreceptors • Explain the mechanism of regulation of retinal sensitivity (light and dark adaptation). • Determine the visual acuity of the subject for far and near vision. • Demonstrate the field of vision of the subject. • Demonstrate color vision using Ishihara chart	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
	OPHTHALMOLOGY Discuss presentation, investigation and management of errors of refraction	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE

▪ Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
▪ Explain the structure of the eye involved in perception of visual image with emphasis upon the functions of individual structures ▪ Correlate the anatomy of each cranial nerve with clinical presentation of their lesions	**ANATOMY** ▪ Describe the microscopic structure of sclera, cornea, uveal tract, retina and eyelids ▪ Revisit the anatomy of the optic pathway ▪ Tabulate the attachments, nerve supply, and actions of extraocular muscles ▪ Justify the movements of extraocular muscles based on their attachments ▪ Identify extraocular muscles, and neurovascular structures of the eyeball on given models ▪ Illustrate the course and distribution of 3, 4 and 6 CNs ▪ Outline the route and distribution of ciliary ganglion	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
	PHYSIOLOGY • Explain the process of formation, circulation, and regulation of aqueous humor • Describe intraocular pressure and pathophysiology of glaucoma. Illustrate the visual pathway and its lesions • Explain the importance of visual evoked potentials • Explain the visual cortex and its functional units. • Describe the mechanism of different types of eye movements • Describe the accommodation reflex, light reflex, and their pathway. • Discuss the effects of sympathetic and parasympathetic innervation of eye. • Discuss pathophysiology of strabismus, Horner's syndrome and Argyll Robertson pupil. • Explain colour vision	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
	• Demonstration of Reflexes of Eye (CN II) • Examine the fundus of a given SP • Demonstrate movements of the eye		
	Clinical Relevance • Revisit the course and distribution of CN III, IV and VI • Justify the peculiar position of eyeball in case of lesions of these nerves	LGIS	MCQ, SEQ, Structured Viva, OSPE

8. Tongue and Oral Cavity

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
Compare the different taste sensations based on the morphological structure of the taste buds and their differential sensitivity to various tastes Relate the anatomical and physiological basis of tongue and oral cavity to its clinical significance	**ANATOMY** • Outline the floor, roof, lateral walls and vestibule of oral cavity. • Describe topographic features of tongue. • Tabulate the actions and nerve supply of muscles (intrinsic and extrinsic) of tongue • Tabulate the attachments, nerve supply, actions of muscles of soft palate. • Illustrate the pathway of gag reflex • Describe the histological features of lip, with emphasis on transition in structure from cutaneous to vermillion to mucosal zone. • Explain the histological features of dorsal and ventral surfaces of tongue, with particular focus on tongue papillae, their shape, location, keratinization, number and presence or absence of taste buds • Identify an H&E-stained slide of lip and tongue and draw their labeled diagrams	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
	PHYSIOLOGY • Describe the primary sensations of taste • Describe the mechanism of stimulation of taste buds and the transduction of different transmission of signals to the CNS • Demonstrate perception of taste sensation		
	Clinical Relevance • Correlate the normal development of tongue with its congenital anomalies (tie, macro- and micro- glossia and bifid tongue) • Explain the development of palate and corelate it with palatal clefts • Differentiate a case of UMN and LMN lesion of hypoglossal nerve • Correlate Lymphatic drainage of different parts of tongue with spread of malignancy and infection of tongue	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
	• Explain the abnormalities of taste perception		

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
Correlate the location, boundaries and contents of temporal and Infratemporal fossa with relevant clinical conditions.	**<u>Temporal & Infratemporal regions + TMJ</u>** **ANATOMY** • Identify the location, boundaries, contents and communications of temporal and infratemporal fossa on a given model and skull. • Describe the course and distribution of mandibular nerve from origin to distribution • Tabulate the attachments, actions and nerve supply of muscles of mastication. • Trace location, various routes and distribution of otic 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. • Specify the origin and distribution of superficial temporal, First and second parts of the maxillary artery • Specify the origin and distribution of Chorda tympani till it joins the lingual nerve. • Outline the type, articular surfaces, capsule, ligaments, supporting factors, movements, and nerve supply of TMJ • Describe movements of TMJ regarding axes and muscles producing them • Correlate a case of dislocation and reduction of TMJ with anatomical knowledge of TMJ. • Identify the nerves, vessels and muscles in temporal and infratemporal fossa on the given model. • Identify the involved articular surfaces and site of attachment of muscles on the given model • Demonstrate the different movements at the temporomandibular joint on the given model	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
Describe the gross anatomical features of temporomandibular joint with clinical significance			

9. Nose and Paranasal Sinuses

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
Relate the functions of structures involved in transduction and perception of olfactory stimuli to its clinical significance	**NOSE & SMELL** **ANATOMY** • Describe the skeletal framework of different walls of nose • Describe the features, vascular supply, nerve supply and openings in lateral wall of nose • Describe the features, vascular supply, and nerve supply of the medial wall of the nose • Highlight the significance of Little's area in a case of epistaxis • Identify the location of pterygopalatine fossa on skull • List bones forming walls of pterygopalatine fossa • Enumerate its contents and communications • Describe the distribution of third part of maxillary artery, nerve and pterygopalatine ganglion • Justify the role of pterygopalatine ganglion in hay fever/allergies • Outline the development of nose and paranasal sinuses • Identify the location of paranasal sinuses in sagittal section of skull • Demonstarte the location and drainage of paranasal sinuses in skull and on radiograph • Demonstrate the structure of lateral wall of nose on the given model • Identify the location of pterygopalatine fossa on skull	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
	PHYSIOLOGY • Explain the physiological anatomy of olfactory membrane • Explain the mechanism of stimulation of olfactory cells. • Identify the primary sensations of smell • Describe the transmission of signals of olfaction into the central nervous system • Discuss the disorders of smell • Demonstrate the examination of olfactory nerve		
	CLINICAL RELEVANCE Explain the clinical importance of little's area of the nose with epistaxis Discuss presentation and management of epistaxis		

10. Ear and Hearing

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
Explain the structure of the ear involved in the perception of auditory signals and critique the function of individual structures	**EXTERNAL EAR ANATOMY** • Describe the gross anatomical features of the auricle, external auditory meatus, and tympanic membrane. • Correlate the role of first and second pharyngeal apparatus in development of ear. • Describe the differentiation of otic capsule into inner ear. • Correlate the anomalies of external ear with neural crest cells • Identify the histological structure of different parts of ear, particularly the external and internal ear • Identify the gross features of external ear on given model • Identify H&E-stained slide of pinna and cochlea and draw their labelled diagrams.	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
	PHYSIOLOGY Correlate the physiological significance of anatomical structures of the ear. • Explain the mechanism of conduction of sound waves through the ear to the cochlea		
	Clinical Relevance • Correlate nerve supply of external ear and tympanic membrane with clinical significance (perforation of tympanic membrane) • Justify the anatomical basis of otoscopy in infants and adults.		
	MIDDLE EAR ANATOMY • Describe the gross anatomical features, boundaries, structures and contents of middle ear cavity. • Describe the structures forming the walls	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	of middle ear cavity on the given model. • Trace/ Outline the pathway and distribution of facial nerve within petrous part of temporal bone • Identify the walls of middle ear on given model		
	PHYSIOLOGY • Describe "Impedance Matching" and its importance • Describe the process of attenuation of sounds		
	Clinical Relevance • Highlight the importance of infection in middle ear cavity in relation to its relevant communications.		
	INNER EAR ANATOMY • Identify the bony and membranous parts of inner ear on model • Describe the histological structure of sensory receptor areas of internal ear like Organ of Corti maculae acousticae and crista ampullaris • Identify the cells and spaces in cochlea • Identify the parts of bony and membranous parts of inner ear on given model	LGIS SGD CBL	MCQ, SEQ, Structured Viva, OSPE
	PHYSIOLOGY • Explain the Place Principle • Describe the functions of Organ of Corti • Demonstration of hearing tests • Explain the mechanism of determination of loudness • Recall the auditory pathway • Recognize the function of cerebral cortex in hearing • Explain the process of determination of direction from which sound is coming		
	Clinical Relevance ▪ Explain following clinical conditions – Motion sickness, Hearing loss, Meniere disease		

Learning Outcomes	▪ Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	▪ Describe various hearing Abnormalities ▪ Discuss the various hearing tests including auditory evoked potentials (especially in reference to menier's disease) ▪ Interpret audiometry findings in perceptive and conductive deafness ▪ Discuss presentation, investigation and management of hearing loss and common hearing disorders		
11. Neck			
Explain the Gross Anatomy of neck & Endocrine organs in interpreting the anatomical basis of relevant clinical scenarios. Demonstrate the topographic anatomy of structures of the neck on the protected specimens and models	**ANATOMY** **Hyoid bone & Cervical vertebrae** • Explain the gross features and attachments of the hyoid bone • Give distinguishing features of each cervical vertebra. Compare the key anatomical features of each cervical vertebra. • Enumerate structures passing through foramina • Identify the types and movements of atlantoaxial and atlanto-occipital joints • Outline ligamentous attachments on cervical vertebrae.	SGD and Dissection	MCQ, SEQ, Structured Viva, OSPE
	Superficial Fascia • Outline contents of the superficial fascia of the neck (platysma, external jugular vein) • Illustrate cutaneous innervation of neck	SGD and dissection	MCQ, SEQ, Structured Viva, OSPE
	Deep Cervical Fascia • Enumerate the layers of deep cervical fascia. • Trace / Specify the attachments of investing, pre-tracheal, carotid sheath, and prevertebral layers of fascia. • Identify various modifications and neck spaces formed by fascial attachments.	SGD and dissection	MCQ, SEQ, Structured Viva, OSPE

Learning Outcomes	• Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	• Comprehend / Describe the clinical importance of neck spaces in the spread of infection		
	Triangles of the Neck • Tabulate the attachments, nerve supply, actions of superficial and deep muscles of neck (sternocleidomastoid, suprahyoid, infrahyoid, suboccipital, prevertebral muscles,). • 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	SGD and Dissection	MCQ, SEQ, Structured Viva, OSPE
	Larynx • Describe laryngeal wall in detail with emphasis on cartilages, ligaments, muscles, vascular supply and nerve supply. • 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 • Explain the following with reference to their anatomical basis: - Laryngoscopy - Aspiration of foreign body from laryngopharynx	SGD and Dissection	MCQ, SEQ, Structured Viva, OSPE

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	Pharynx • Differentiate extent, anatomical features, vascular supply, nerve supply of three parts of pharynx on anatomical basis List muscles of pharynx with nerve supply and action • Name structures passing through the spaces between muscles of pharynx • Trace origin of pharyngobasilar fascia on base of skull. • Correlate anatomical knowledge of pharayngobasilar fascia with patency of nasopharynx • Justify role of Eustachian tube in equalizing middle ear pressure, age related obliquity • Describe anatomical route of spread of infections from nasopharynx to middle ear.	SGD and dissection	MCQ, SEQ, Structured Viva, OSPE
	• Relate boundaries of tonsillar fossa and tonsillar bed with significant structures that must be protected during tonsillectomy. • Define Kilian's dehiscence Skill Identify and locate different subdivisions and boundaries of pharynx on given model		
	Cervical part of trachea, esophagus and cervical chain Identify gross features of Cervical part of trachea, esophagus and cervical chain and relevant clinical conditions	SGD and Dissection	MCQ, SEQ, Structured Viva, OSPE
	Lymphatic drainage of neck • Enumerate the groups of lymph nodes draining the neck. • Describe their location and areas of drainage. • Describe the formation of jugular lymph trunk. • Describe the clinical importance of `lymphatic drainage of neck.	SGD and Dissection	MCQ, SEQ, Structured Viva, OSPE
	Great Vessels of the Neck • Describe the course and branches/tributaries of the respective vessels:	SGD and Dissection	MCQ, SEQ, Structured Viva, OSPE
	- Common carotid artery - External carotid artery - Internal carotid artery - Internal Juglar vein		

Integumentary System			
Learning Outcomes	**Subjects Learning Outcomes**	**Teaching & Learning Strategies**	**Assessment**
Appreciate the embryological basis of congenital anomalies related to the integumentary system. Appraise the various types of skin, their microstructure and the various skin appendages along with their clinical conditions	**ANATOMY** • Describe the development of skin, hair, nails and mammary gland • Describe the embryological basis of relevant congenital anomalies (vitiligo, ichthyoses, hemangiomas and dermatoglyphics and mammary gland anomalies) • Describe the components of skin, its epithelium (including the various cells of epidermis along with their functions), nail, hair and mammary gland. • Explain histological differences between thick and thin skin. • Describe the various appendages of the skin. • Distinguish the histological structure of mammary gland between inactive, active, and lactating phases. • Identify an H&E-stained slide of thick and thin skin and mammary gland (inactive and active phases) and draw their labelled diagrams	LGIS SGD CBL Practical	MCQ, SEQ, Structured Viva, OSPE
12. Molecular Insights: Cancer Markers, Aging, and Xenobiotics			
Elaborate on the biochemical aspects of cancer	**Cancer and Tumor Markers** **KNOWLEDGE** • Enumerate Tumor biomarkers and their biomedical role in screening, diagnosis and prognosis in various malignancies • Correlate tumor markers in different malignancies • ~~A~~ppraise the genetic basis of cancer • Describe the biochemical basis and hallmarks of cancer • Discuss the biochemical features of carcinogenesis • Enumerate the biochemical causes of genetic damage and genetic alterations affecting the regulation of key genes • Describe Oncogenes and tumor suppressor genes • Highlight the key role of oncogenes and tumor suppressor genes in carcinogenesis • Discuss Epigenetic mechanisms in carcinogenesis • Explain the biochemical basis of tumor metastasis • Effect of cancer on metabolism • Relation of cancer with inflammation and obesity • Measures to prevent carcinogenesis	• LGIS • SGD • CBL • Tutorials • Student presentations	MCQ SAQ/SEQ • Structured viva (Summative component)

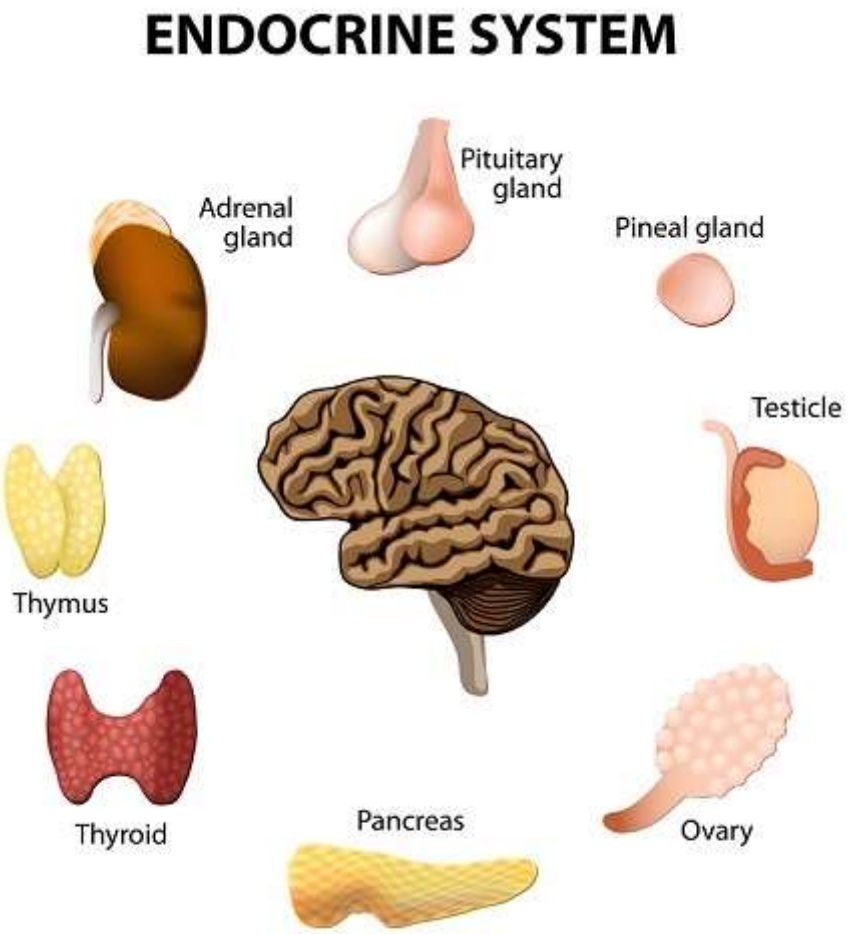
Learning Outcomes	Subjects Learning Outcomes	• Teaching & Learning Strategies	Assessment
Describe different ROS (reactive oxygen species), their mechanism of production, mechanism of scavenging and their effects on health and disease.	**Aging & Free Radicals** • Outline the essential feature of aging and genetic factors effecting aging • Co-relate the effect of reactive oxygen species with cell injury and aging • Enlist and explain different reactive oxygen species (ROS) produced by the human body and mechanism of their production • Explain the Effect of ROS on health and disease • Describe Mechanism of Scavenging of ROS • Explain Wear and tear theories of aging • Highlight Molecular repair mechanisms to combat wear and tear • Determine the Biochemical role of antioxidant (Vit E, Vit C, Glutathione, Lipoic acid, CoQ10 and NADPH) • Comprehend the concept of apoptosis and necrosis in aging • Rejuvenation therapies • Role of vitamins in special senses - Wald's visual cycle and vitamin A • Highlight the role of telomeres in cellular aging	• LGIS • SGD • CBL • Tutorials • Student presentations	MCQ SAQ/SEQ • Structured viva (Summative component)
Elaborate the role of xenobiotics in health and disease	**Xenobiotics** • Describe xenobiotics • Outline phase 1 and phase 2 reactions • Discuss biochemical properties of Cytochrome P450 and its functions with relevant clinical importance	• LGIS • SGD • CBL • Tutorials Student presentations	MCQ SAQ/SEQ • Structured viva (Summative component)
Interpret the results of given examination	**SKILL** • Describe the Principle of ELISA and its	• Demonstration • Practical	
clinical application	performance	• Practical performanc e • OSPE • Structured viva	clinical application

Linkers

1. Danger areas face/ Cavernous sinus thrombosis
2. Oral cavity cancers/ lesions
3. Parotid gland swelling/ Mumps
4. Commonly occurring Cranial Nerves lesions
5. Otitis Media/ Deafness
6. Anosmia

7.

MBBS YEAR II
BLOCK VI
MODULE XII
ENDOCRINOLOGY
DURATION: 05 WEEKS



Integration of Disciplines in this Module

MODULE PLANNING COMMITTEE

Module Coordinator	**Anatomy – Dr. Owais Khalid** **Physiology – Dr. Ujala** **Biochemistry – Dr. Danyal**
Members	**Dr. Aymen Sana, Dr. Owais Khalid, Dr. Syeda Javaria Bukhari** **Dr. Amna, Dr. Shafia, Dr. Ujala** **Dr. Ghufran, Dr. Danyal, Dr. Rida Bibi**

Preamble

The emphasis of this module is on histo-morphological and embryological structure of endocrinology system as well as the mechanisms involved in regulating hormone levels in an integrated manner. Similarly, this module of endocrine system will enable the students to recognize the clinical presentations of common endocrinological and metabolic disorders and relate clinical manifestations to basic sciences. This Endocrine module will be revisited in the following years. The research methodology and Behavioral Sciences will be taught as a part of the longitudinal theme.

Learning Outcome:

By the end of this module, student should be able to correlate the physiological and biochemical concepts related to genitourinary system with their anatomical knowledge and apply their relevant knowledge of this module in subsequent years of clinical training and practice

Block VI
Module XII
Endocrinology

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment		
At the end of this module, students will be able to:			K	S	A
1. Introduction to Endocrine glands					
Apply the basic anatomical, physiological, and biochemical principles of the Endocrine system in relevance to Endocrine functions and disease processes	**Anatomy:** • Classify the glands • Describe the structure and location of all endocrine glands in the body	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva		
	Physiology: • Differentiate between paracrine and autocrine function • of hormones • Describe the feedback control of hormone secretion	LGIS, SGD, CBL	MCQs, SAQs/ SEQs, OSPE, Structured Viva		
	Medical Biochemistry: • Classify hormones on the basis of structure, receptors and mechanism of action • Describe Cell surface receptors • Describe Intracellular second messenger signaling cascade • Explain Intracellular ligand receptor • Describe the key biochemical features of the endocrine glands concerning their specific secretions • Explain the key principles of the endocrine system • **Intracellular traffic and sorting of proteins**: • Discuss the basic concept of Golgi apparatus, cytosolic proteins and endoplasmic reticulum in performing intracellular trafficking and sorting. • **Eicosanoids metabolism**: Comprehend introduction, biosynthesis and functions of eicosanoids	LGIS, SGD, CBL	MCQs, SAQs/ SEQs, OSPE, Structured Viva		
2. Hypothalamus and Pituitary Gland					
Relate the anatomical structures,	**Anatomy;** • Describe the gross anatomy, neurovascular supply and clinical importance of pituitary	LGIS, SGD Practical	MCQs, SAQs/ SEQs, OSPE, Structured Viva		

physiological functions and biochemical processes involved in Hypothalamus & Pituitary gland related to its clinical significance	gland • Describe the development and congenital anomalies of pituitary gland • Describe the histological features of pituitary gland		
	Physiology • Describe the functional role of hypothalamic Hormones and hypothalamo - hypophysial portal system in the release of pituitary hormones • Describe the physiological function of Growth hormone and its regulation	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Medical Biochemistry • Explain the structure, site of synthesis, stimulus for secretion, mechanism of action, regulation, receptors, intracellular effects, Common regulatory hormones, target cells and biochemical roles of hypothalamus in hormonal regulation of pituitary gland • Describe Hormones of Pituitary gland • Explain the structure, site of synthesis, stimulus for secretion, inhibitors, mechanism of action, mechanism of regulation, intracellular effects, target cells and biochemical role of Growth Hormone	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Clinical Relevance Relate the knowledge of pituitary gland and hypothalamus to understand following diseases • Panhypopituitrism/ Sheehan's Syndrome • Pituitary Adenomas • Gigantism Vs Acromegaly • Dwarfism	**LGIS, SGD**	MCQs, SAQs/ SEQs, OSPE, Structured Viva

3. Thyroid Gland			
Learning Outcomes	**Subjects Learning Outcomes**	**Teaching & Learning Strategies**	**Assessment**
Relate the anatomical structures, physiological functions and biochemical processes involved in thyroid gland related to its clinical significance	**Anatomy** • Describe the gross anatomy, neurovascular supply and clinical importance of Thyroid gland • Describe the microscopic features of thyroid gland • Describe the development and congenital anomalies of thyroid gland (thyroglossal cyst and accessory thyroid gland)	LGIS, SGD Practical	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Physiology • Explain the physiological functions of the thyroid hormones and their feedback control	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Medical Biochemistry Explain the biochemical steps of synthesis, stimulus for secretion, mechanism of action, mechanism of regulation, intracellular effects, target cells and biochemical role of T3, T4, TSH	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Clinical Correlation Correlate the pathophysiology of hypo/hyper secretion of Thyroid hormones with the clinical presentation and biochemical profile	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
4. Parathyroid Gland			
Relate the anatomical structures, physiological functions and biochemical processes involved in parathyroid	**Anatomy** • Describe the gross anatomy, neurovascular supply and clinical importance of parathyroid glands • Describe the development and congenital anomalies of parathyroid glands • Describe the microscopic features of parathyroid gland	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
gland related to its clinical significance	**Physiology** • Explain the role of bone on calcium and phosphate regulation • Explain the regulatory effect of parathyroid hormone and calcitonin on calcium and phosphate metabolism • Explain the role of Vitamin D in calcium regulation	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Medical Biochemistry: • Explain the biochemical steps of synthesis, stimulus for secretion, mechanism of action, mechanism of regulation, intracellular effects, target cells and biochemical role of parathyroid hormone and calcitonin	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Clinical Correlation • Correlate the pathophysiology of Hypo and hyper parathyroidism with their clinical presentations and biochemical profile • Differentiate between Rickets and Osteomalacia	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
5. Adrenal Glands			
Relate the anatomical structures, physiological functions and biochemical processes involved in adrenal gland related to its clinical significance	**Anatomy:** • Revisit the gross anatomy, neurovascular supply and clinical importance of adrenal gland • Describe the development and congenital anomalies ofadrenal gland • Describe the microscopic features of adrenal gland	LGIS, SGD Practical	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Physiology: • Describe the functions of adrenocortical and medullary hormones and their regulations	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Medical Biochemistry: • Explain the site and steps of synthesis, stimulus for secretion, mechanism of action, regulation, receptors, intracellular effects, target cells, and	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	biochemical roles of glucocorticoids (corticosteroids), mineralocorticoids (aldosterone) and androgens		
	Clinical Correlations: Correlate the pathophysiology of Hypoadrenalism and Hyperadrenalism with its clinical presentation and biochemical profile	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
6. Pancreas as Endocrine Organ			
Relate the anatomical structures, physiological functions and biochemical processes involved in Endocrine part of Pancreas related to its clinical significance	**Anatomy:** • Revisit the gross anatomy, neurovascular supply and clinical importance of endocrine portion of pancreas. • Revisit the histological features of Pancreas	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Physiology: ▪ Describe the functions of pancreatic hormones and their regulations ▪ Compare the interplay of insulin, glucagon and other hormones during starvation and fed state	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Medical Biochemistry: Describe the structure, site of synthesis, steps of synthesis, stimulus for secretion, mechanism of action, regulation, receptors, intracellular effects, target cells, tissues and biochemical role of Insulin, glucagon and somatostatins. Integration and regulation of metabolic pathways in different tissues: Discuss metabolic effects of insulin and glucagon. Discuss regulatory effects of insulin and glucagon on metabolism of carbohydrates, protein, lipids and minerals. Describe feed fast cycle and explain its adaptation by different tissues to changing energy conditions of the body	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
	Clinical Correlation: ▪ Discuss the pathophysiology of various types of Diabetes Mellitus and associated micro and macrovascular complications ▪ Outline the treatment modalities of Diabetes Mellitus ▪ Correlate the clinical presentation of hypoglycaemia with varying levels of blood glucose	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
7. Male Reproductive System			
Relate the anatomical structures and physiological functions involved in Male Reproductive System along with their clinical significance	**Anatomy:** • Revisit the gross and histological features of male reproductive organs	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Physiology: • Explain the functional anatomy of the male reproductive organs • Describe the process of spermatogenesis • Explain the function of the seminal vesicles and prostate gland • Describe the secretion and functions of testosterone and feedback loop regulating its secretion • Describe the endocrine and nervous regulation of male sexual act	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Medical Biochemistry: Explain the chemistry, steps of synthesis, stimulus for secretion, regulation, mechanism of action, receptors, intracellular effects, target cells and biochemical roles of testosterone	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Clinical Correlation: Correlate the pathophysiology of male infertility with hormone profile and semen analysis	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva

8. Female Reproductive System

Learning Outcomes	Subjects Learning Outcomes	Teaching & Learning Strategies	Assessment
Relate the anatomical structures and physiological functions involved in Female Reproductive System along with their clinical significance	**Anatomy:** • Revisit the gross and histological features of female reproductive organs	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Physiology: • Describe the functional anatomy of the female sexual organs with emphasis on the functions of gonadotropins in regulating monthly cycles • Describe the steps of oogenesis and fertilization • Discuss the functions of female sex hormones • Describe the physiology of puberty, menarche and menopause • Discuss the response of the mother's body to pregnancy keeping in view the function of placenta as an endocrine organ • Explain parturition and onset of labor and the hormones regulating it • Explain the mechanism of lactation and the hormones regulating it • Explain the adjustments of infant to extra-uterine life	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Medical Biochemistry: Explain the structure, site of synthesis, steps of synthesis, stimulus for secretion, regulation, mechanism of action, receptors, intracellular effects, target cells and biochemical roles of LH, FSH, Estrogen, Progestins, placental hormones , oxytocin, Anti-mullerian hormone and Prolactin	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
	Clinical correlations: • Correlate the pathophysiology of female infertility with hormonal profile • Interpret pregnancy tests • Compare different contraceptive methods	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva

PRACTICALS			
Practicals of Anatomy Hands-on Tasks	Interpret the results	Identify the slides, illustrate and describe the light microscopic features with two points of identifications of the followings: • Pituitary gland, Thyroid gland, Parathyroid glands, Pancreas, Adrenal cortex and adrenal medulla • Male genital ducts + accessory genital glands • Female reproductive parts	OSPE and Performance
Practical's of Physiology Hands-on Tasks	Interpret the results	• Measure the blood glucose levels using the glucometer • Perform pregnancy test by kit and urinary dipstick method	OSPE, Performance

LIST OF MEDICAL BIOCHEMISTRY PRACTICALS		
ELISA	• Explain the principle, procedure, types, applications and advantages of ELISA	OSPE
Interpretation of Thyroid profile	• Explain the indications, pre-requisites, principle, results and clinical significance/diagnostic application • Interpretation of laboratory report	OSPE
Interpretation of OGTT	• Explain the indications, pre-requisites, principle, results and clinical significance/diagnostic application • Interpretation of laboratory report	OSPE
Interpretation of Sex hormones	• Explain the indications, pre-requisites, principle, results and clinical significance/diagnostic application • Interpretation of laboratory report	OSPE
Estimation and clinical interpretation of serum urea	• Explain the indications, pre-requisites, principle, results and clinical	OSPE/ Practical Performance

	significance/diagnostic application • Interpretation of laboratory report • Demonstrate the test using specified procedure and appropriate glassware/equipment	
Estimation and clinical interpretation of serum creatinine	• Explain the indications, pre-requisites, principle, results and clinical significance/diagnostic application • Interpretation of laboratory report • Demonstrate the test using specified procedure and appropriate glassware/equipment	OSPE/ Practical Performance

Linkers of Integrated sessions:

1. Disorders of pituitary gland
2. Disorders of thyroid/ parathyroid gland
3. Diabetes Mellitus
4. Disorders of adrenal gland
5. Disorders of male/ female reproductive system

Pakistan Studies

Description
This course is designed to provide students with a comprehensive exploration of Pakistan's identity spanning geographical, historical and cultural dimensions. It delves into the diverse landscapes, ancient civilizations and rich cultural heritage that define Pakistan. Moreover, it examines the socio-cultural and political transformations in Pakistan over time including democratic transitions and military interventions. The aim of this course is to inculcate in students a nuanced understanding of Pakistan's past, present and potential future trajectories, enabling them to critically evaluate the complex dynamics shaping the nations development
Course Learning Outcomes
By the end of this course, students will be able to: 1. Have enhanced knowledge of the geographical, historical and political aspects of Pakistan 2. Understand the society and cultural of Pakistan 3. Understand and explain the socio-economic developments in Pakistan 4. Explore contemporary issues and challenges faced by Pakistan and their implications for the future

Syllabus

1. **Introduction to Pakistan**
   - Geographical location and significance
   - Historical background: Ancient civilizations in the region
   - Factors leading to the creation of Pakistan
2. **Political History of Pakistan**
   - Formative Phase
   - Military interventions and democratic transitions
3. **Geography of Pakistan**
   - Physiography: Mountains, plains, plateaus, deserts, valleys and coastal areas
   - River systems: Indus River and its tributaries
   - Climates regions of Pakistan
4. **Society and culture of Pakistan**
   - Socio-cultural diversity
   - Languages and literature
5. **Economics Development of Pakistan**
   - Agriculture and industrial sectors of Pakistan
   - Economics challenges of Pakistan
6. **Contemporary Issues**
   - Foreign relations of Pakistan
   - Security challenges: terrorism, extremism and regional conflicts
   - Environmental problems and sustainable development (SDGs)
   - Media and social change

Suggested Instructional/ Reading Materials

1. "Jinnah of Pakistan| by Stanley Wolpert
2. "The Sole Spokesman: Jinnah, the Muslim League and the demand for Pakistan" by Ayesha Jalal
3. "The Struggle for Pakistan" by Ishtiaq Hussain Qureshi
4. "Pakistan, the formative Phase, 1857-1948" by Khalid B. Sayed
5. "Pakistan Studies: A book of Reading" by Sikandar Hayat.
6. "Constitutional and Political History of Pakistan" by Hamid Khan
7. "Trek to Pakistan" by Ahmed Saeed and Kh. Mansur Sarwar
8. "Pakistan: A Modern History" by Ian Talbot
9. "Politics in Pakistan: The Nature and Direction of changes" by Khalid B. Sayeed
10. "Physical Geography of Pakistan" by Umar Jahangir
11. "A Geography of Pakistan: Environment, People and Economy" by Fazle Karim Khan
12. "Pakistan's Foreign policy: An Historical analysis" byu S.M Burke
13. "Separatism in East Pakistan: by Rizwan Ullah Kokab
14. "Being Pakistani: Society, cultural and the Arts" by Raza Rumi
15. "Pakistan's Cultural Heritage: Socio-Economic and Technologies Aspects" edited by Abdul Jabbar Khan
16. "Languages and Politics in Pakistan" by Tariq Rahman
17. "Sociology" by Horton and Hunt
18. "Pakistan in the Twentieth Century: A Political History" by Lawrence Ziring
19. "Economics Development of Pakistan" by Ishrat Hussain
20. " Issues in Pakistan Economy" by S. Zaidi

Islamic studies

Description

This course is designed to provide students with a comprehensive overview of the fundamental aspects of Islam, its beliefs, practices, history and influence on society. It will further familiarize the students with a solid foundation in understanding Islam from an academic and cultural perspective. Through this course, students will have an enhanced understanding of Islam's multifaceted dimensions which will enable them to navigate complex discussions about Islam's historical and contemporary role, fostering empathy, respect, and informed dialogue**.**

S. No.	Learning Outcomes (By the end of this course, students will be able to:)	Course Contents	Instructional Strategies	Assessment Tool
1	• Demonstrate enhanced knowledge of Islamic foundational beliefs, practices, historical development, spiritual values and ethical principles. • Describe basic sources of Islamic law and their application in daily life. • Identify and discuss contemporary issues being faced by the Muslim world including social challenges, gender roles and interfaith interactions.	Introduction to Islam: • Definition of Islam and its core beliefs. • The Holy Quran (introduction, revelation and compilation). • Hadith and Sunnah (compilation, classification, and significance). • Key theological concepts and themes (Tawhid, Prophethood, Akhirah etc.). • Sirah of the Holy Prophet (Peace Be Upon Him) as Uswa-i-Hasana. • Life and legacy of the Holy Prophet (PBUH). • Diverse roles of the Holy Prophet PBUH (as an individual, educator, peace maker, leader etc)	Lecture / Presentation / Large group interactive session (LGIS) / SGD	Quizzes, presentations, assignments, group projects and reflective writing
2		Islamic History and Civilization: • World before Islam. • The Rashidun Caliphate and expansion of Islamic rule. • Contribution of Muslim scientists and philosophers in shaping world civilization.		
3		Islamic Jurisprudence (Fiqh): • Fundamental sources of Islamic jurisprudence. • Pillars of Islam and their significance. • Major schools of Islamic jurisprudence. • Significance and principles of Ijtihad.		
4		Family and Society in Islam: • Status and rights of women in Islamic teachings. • Marriage, family, and gender roles in Muslim society. • Family structure and values in Muslim society.		

5		Islam and the Modern World: • Relevance of Islam in the modern world (globalization, challenges and prospects). • Islamophobia, interfaith dialogue, and multiculturalism. • Islamic viewpoint towards socio-cultural and technological changes.		

Suggested instructional / reading materials

1. "The Five Pillars of Islam: A Journey Through the Divine Acts of Worship" by Muhammad Mustafa Al-Azami.
2. "The Five Pillars of Islam: A Framework for Islamic Values and Character Building" by Musharraf Hussain.
3. "Towards Understanding Islam" by Abul A' la Mawdudi.
4. "lslami Nazria e Hayat" by Kliurshid Ahmad.
5. "An Introduction to Islamic Theology" by John Renard.
6. "Islamic Civilization Foundations Belief & Principles" by Abul A' la Mawdudi.
7. "Women and Social Justice: An Islamic Paradigm" by Dr. Anis Ahmad.
8. "Islam: Its Meaning and Message" by Khurshid Ahmad.

Note: This course is compulsory for Muslim and optional for non-Muslim undergraduate students. Non-Muslim students can opt for any course of at least the same or more credits in subjects such as religious studies, ethics, theology, comparative religion, Christian ethics, etc

Ethics for Non-Muslims

1. Description:

The subject of 'Ethics' is offered to Non-Muslim undergraduate students in lieu of Islamiyat which is a compulsory subject for all Muslim students. In developing this syllabus, the aims and objectives laid down in the National Education Policy, 2017 has been kept in mind. The proposed topics in the National Curriculum for Ethics are pertinent to the moral dilemmas of everyday life and can be applied to all students studying this subject.

It is extremely significant to introduce the students to the subject of Ethics as it deals with the major aspects of human conduct. It gives the students an insight into the morality of human behaviour in terms of right or wrong and good or evil. This syllabus has been developed to address the major aspect of ethical learning using modern teaching methodologies to discuss and comprehend their relevance and application in their lives and in the society as a whole. It directs the attention of students and teachers to examine how ethical values can guide their actions. Thus, the syllabus of Ethics is progressive and all inclusive. It covers ethical and moral dilemmas with special reference to the cultural diversity of Pakistan.

This syllabus has five major themes:

1. Introduction to Ethic
2. Historical development of Ethics
3. Moral Ethics and Society
4. Professional Ethics
5. Multiculturalism

2. Course Objectives:

The specific objectives encompassing the progressive, and all-inclusive syllabus of 'Ethics' are as follows:

- To build character of the students so as to enable them to play a vital and positive
- role in the society.

- To develop a sense of moral reasoning for decision making in life.
- To equip students with social skills and to bring about a change in their thought and behaviour
- towards fellow human beings.
- To develop students as responsible members of society.
- To understand the importance of religious teachings and their value in social life.
- To discuss the tenets of professionalism e.g. integrity, accountability, humanism and altruism.
- To translate human values into practice, through 'role-models'. (Therefore, various
- outstanding personalities are included in the syllabus.)
- To promote and practice multi-culturism for global understanding and world peace

3. Learning Outcomes:

After studying this course, students will be able:

- Become responsible citizens for the development of the country and to provide them opportunities to adjust themselves in the global changes
- Understand how religious and secular cultures and belief systems sustain different ways of life, and can co-exist harmoniously in society

Themes/Topics	**Student Learning Outcomes (Students should be able to:)**
1. Introduction to Ethics	
1.1 Definition and scope	• Define ethics. • Discuss the importance of ethics in a society. • Illustrate with examples different ways in which ethics manifests in various disciplines. • Suggest ways in which ethics can be applied in personal, social and public life.
1.2 Impact of ethics on society in general	• Define society. • Discuss some ethical values that should be a part of a society.
1.3 Common Beliefs and Values of different Religions	• Discuss some of the common basic beliefs of various religions. • Explore ways to make people realise that all religions have common moral values. • Discuss the importance of inter-faith dialogue in today's society.
1.4 Ethics and Science	• Elaborate the scientific process (observation, examination, experiment, testing, validation). • Discuss the relationship between ethics and science. • Discuss ethical & unethical approaches in science. • Discuss the impact of unethical practices in science/research.
2. Historical development of Ethics	
2.1 Development of ethics from ancient, medieval to modern eras	• Explore the origins and development of various ethical eras. • Discuss various theories of ethical and moral development.
2.2 Theories and their impact on modern times	• Evaluate various theories and their impact on modern times.
3. Moral Ethics and Society	
3.1 Moral Philosophy & ethics education	• Discuss the significance and role of ethics in a society. • Identify & explain elements that can corrupt a society. • Explain how different religions and society interact with each other. • Discuss whether a society can survive without ethics.
3.2 Justice Bhagwan Das	• Critically analyse the life of the mentioned personality for promotion of justice.

3.3 Emotion, Habit & Social Life	• Discuss virtuous habits and emotions for moral, social and political life. • Compare approaches to emotions and moral cultivation (emotional intelligence).
3.4 Bishop Anthony Lobo	• Critically analyse the life of the mentioned personality for promotion of education and social justice.
MID TERM	
3.5 Social Justice	• Define social justice and trace its historical background. • Discuss environment, race, gender and other causes and manifestations of inequality in society. • Discuss rights and duties of individuals in a society. • Critically analyse lives of mentioned personalities for promotion of social justice.
3.6 Abdul Sattar Edhi / Ardeshir Cowasjee (Philanthropist/Businessman)	
4. Professional Ethics	
4.1 Work Ethics	• Define work ethics. • Exemplify ethical work practices (honesty, self-respect, discipline, punctuality, respect for others). • Demonstrate importance of time and punctuality at workplace. • Explain workplace etiquette/behaviour. • Explain impact of ethical environment on performance. • Discuss personality of Quaid as example of excellence.
4.2 Quaid-e-Azam Muhammad Ali Jinnah	• Discuss moral values demonstrated by the personality.
4.3 Professionalism	• Define professionalism. • Discuss role of professionalism in medicine. • Consider tenets of professionalism in medical education. • Define reflection. • Analyse a case using Gibbs model of reflection.
4.4 Mohtarma Fatima Jinnah	• Explain how her life promotes professional values. • Explain how to adopt her exemplary behaviour.
4.5 Medical Ethics	• Define and discuss medical ethics. • Discuss role of ethics in healthcare careers. • Critically analyse unprofessional behaviour and its implications.
5. Multiculturalism	
5.1 Cultural pluralism	• Define cultural pluralism. • Discuss ways to preserve cultural identity.
5.2 Inter-culturalism	• Define inter-culturalism. • Suggest ways for acceptance of multiculturalism. • Discuss cultural dialogue and interaction.
5.3 Capt. Cecil Chaudhry	• Explore contribution as a human rights activist.

References

- American Psychological Association. (2002). Ethical principles of psychologists and code of conduct. American Psychologist, 57, 1060– 1073.
- Auer A., Morale autonoma e fede cristiana, Edizioni Paoline, Milano 1991.
- Bayles M.D. (1989). Professional Ethics, 223 pp. Belmont: Wadsworth. [A detailed philosophical presentation by a leading legal philosopher. Very good on duties and obligation
- Goodhart, David. 2008. Has Multiculturalism had its Day? Literary Review of Canada 16 (3):3–4

- Graham, G. (2004). Eight theories of ethics. London: Routledge/Taylor and Francis Group.
- Masner, C. M. (2007). The ethic of advocacy. Doctoral dissertation, University of Denver.Available: http://www/dissertation.com
- M. Král, Civilizace a mravnost. Perspektivy moderní civilizace, Praha 2010, 50
- National Association of School Psychologists. (2008). Ethical and Professional Practices Committee Procedures. Available: http://www.nasponline.org
- Smith, Anthony. 1981. The Ethnic Revival in the Modern World. Cambridge: Cambridge University Press.
- Tully, James. 2000. The Challenge of Reimagining Citizenship and Belonging in Multicultural and Multinational Societies. In The Demands of Citizenship, eds. Catriona McKinnon and Iain Hampsher-Monk. London: Continuum.
- Williams, B., Armistead, L., & Jacob, S. (2008). Professional ethics for school psychologists: A problem solving model casebook. Bethesda, MD: National Association of School Psychologists.

BEHAVIOURAL SCIENCES & PROFESSIONALISM

The Behavioural Sciences and Professionalism curriculum represents an innovative curricular framework revised by the Behavioural Sciences Department & Department of Medical Education. Its aim is to cultivate future physicians capable of providing society with exceptional care and empathy. This module is integrated longitudinally throughout the initial
three years of MBBS training, covering behavioural sciences, professionalism, leadership and management. This document outlines the topics, learning objectives, yearly placement of topics, hours allocated to each topic, and the methods of assessment. The first section of the module study guide outlines the overarching learning outcomes, while the second part delves into the specific learning objectives and table of specification.

BEHAVIOURAL SCIENCES & PROFESSIONALISM

The Behavioural Sciences and Professionalism curriculum represents an innovative curricular framework revised by the Behavioural Sciences Department & Department of Medical Education. Its aim is to cultivate future physicians capable of providing society with exceptional care and empathy. This module is integrated longitudinally throughout the initial three years of MBBS training, covering behavioural sciences, professionalism, leadership and management. This document outlines the topics, learning objectives, yearly placement of topics, hours allocated to each topic, and the methods of assessment. The first section of the module study guide outlines the overarching learning outcomes, while the second part delves into the specific learning objectives and table of specification.

Table of Abbreviations

FA	Final Assessment
IA	Internal Assessment
GS	Guest Speaker

2nd Year (75 Hours MBBS)				
Behavioural Sciences				
1. Introduction to Behavioural Sciences and Its Importance in Health				
Learning Outcomes	**Course Content**	**Instructional Strategies**	**Assessment Tool**	**Teaching Faculty**
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	• Psychologist or Psychiatrist / Behavioural Scientist • Anthropologist (GS) • Sociologist (GS)
Demonstrate understanding of holistic and bio medicine model in clinical practice along with understanding of culture and medical practice	Differentiate: 1. Holistic Vs. Traditional Allopathic Medicine 2. Culture & Medical Practice	Lectures/ Presentations	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios	• Psychologist or Psychiatrist / • Behavioural Scientist • Physician (GS)

Comprehensive 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 them Clinical Applications 1. Bio-PsychoSocial Model of health and disease 2. The Integrated Model of Health Care: Correlation of Body, Brain, Mind, Spirit and Behavioural Sciences 3. The Public Health Care Model	• Lectures/Presentations • Small group discussions (SGD)/seminars	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios	• Psychologist or Psychiatrist / • Behavioural Scientist • Anthropologist (GS) • Sociologist (GS) • Public Health specialist (GS)
2. Understanding Behaviour				
Analyze 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 1. Sensation and sense organs 2. Perception 3. Attention and concentration 4. Memory 5. Thinking 6. 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	Psychologist or Psychiatrist / Behavioural Scientist
3. Individual Differences				

Understand and assess types of human personality and phases of personality development along with intelligence.	Understand individual human differences 1. Intelligence 2. 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	Psychologist or Psychiatrist/ Behavioural Scientist
Understand the complex interplay of Brain and Behaviour.	Describe Neurobiological and Psychological Basis of Behaviour 1. Emotions 2. Motivation/need/drive 3. 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	Psychologist or Psychiatrist / Behavioural Scientist
4. Medical Ethics and Mental Health Acts				
Integrate the principles of medical ethics in professional life and medical practice	Medical Ethics and Professionalism Describe and Demonstrate relevance of Ethics in the Life of a Doctor 1. Scope and Meaning of Medical Ethics 2. Guiding Principles of Medical Ethics 3. Common Ethical 4. Issues in Medical Practice 5. Common Ethical Dilemmas in a Health Professional's Life 6. Doctor-Patient Relationship	• Lectures/Presentations • Small Group Discussion • Lectures/Presentations • Declamation, Contests, Dramas, Documentaries, Short Films and Videos (e.g. on common ethical dilemmas) • Role-playing with peers • Case-Based Learning (CBL)	FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios	• Psychologist or Psychiatrist / Behavioural Scientist • Physicians Psychologist or Psychiatrist / Physicians

			FA: MCQs, SAQs, SEQs and OSCE IA: quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios	
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	• Psychologist or Psychiatrist / Behavioural Scientist • Anthropologist (GS)

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	Psychologist or Psychiatrist / Behavioural Scientist
5. Doctor-Patient Relationship				
Analyze critical situations/ challenges in clinical practice to solve clinical problems	**Discuss Rights and Responsibilities of Patients and Doctors** 1. Rights of the Patient 2. Responsibilities of the Patients 3. Rights of the Doctor 4. 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	Psychologist or Psychiatrist /Physician
Critique the ethical boundaries of conduct in doctor patient relationship	**Understand Psychological Reactions in Doctor-Patient Relationship** 1. Social bonding 2. Dependence 3. Transference 4. Countertransference 5. Resistance 6. Unwell Physician / Burn-out	• Lectures/Presentations • Case-Based Learning (CBL) • Large group Interactive session (LGIS) • Storytelling by students • Role-playing with peers	**FA**: MCQs, SAQs, SEQs and OSCE **IA:** quizzes, presentations, assignments, group projects, case studies, reflective writing and	Psychologist or Psychiatrist / Behavioural Scientist

			student portfolios	
Demonstrate professional excellence of a doctor to maintain healthy doctorpatient relationship	**Understand Professionalism in Health Care** 1. Knowledge 2. Skills 3. Attitudes	• Lectures/Presentations • Large group Interactive session (LGIS)	**EA**: MCQs, SAQs, SEQs and OSCE **IA:** quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios	• Psychologist or Psychiatrist t/ Behavioural Scientist • Physician (GS)

6. Non Pharmacological Interventions: Communication Skills, Counselling, Crisis Intervention, Conflict Resolution, Informational Care and Breaking Bad News				
Demonstrate effective communication skills in clinical practice, assimilate and handle patient information in different clinical scenarios. Handling uncertain situations in clinical practice.	**Demonstrate Non Pharmacological Interventions (NPIs) in Clinical Practice** 1. Communication Skills 2. Counselling 3. Informational Care (IC) 4. Handling Difficult Patients and their Families 5. Breaking Bad News 6. Crisis Intervention and Disaster Management 7. Conflict Resolution 8. 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	Psychologist or Psychiatrist / Behavioural Scientist

Equip medical students with the required skills to cope with critical psychosocial issues in exceptional hospital settings	**Discuss Psychosocial Issues in Special Hospital Settings** 1. Coronary Care Unit 2. Intensive Care Unit 3. The Emergency Department 4. Psychosocial Aspects of Organ Transplantation 4. The Dialysis Unit 5. Reproductive Health 6. Paediatrics Ward 7. Oncology 8. Operating Theatre	• 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	• Psychologist or Psychiatrist / Behavioural Scientist • Surgeon (GS) • Nephrologist (GS) • Oncologist (GS) Gynaecologist (GS Pediatric (GS)
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	**EA**: MCQs, SAQs, SEQs and OSCE **IA:** quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios	• Psychologist or Psychiatrist / Behavioural Scientist • Dentist (GS)
7. Life Events: Psychotrauma, Psychological Reactions, Stress and Stressors, Stress Management				
Identify sources of stress and its management towards patients, self and other staff members	**Define and discuss Stress and its Management** 1. Job-related Stress & Burnout 2. Response to stress 3. 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	Psychologist or Psychiatrist / Behavioural Scientist

Equip medical students with knowledge and skills in order 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	Psychologist or Psychiatrist / Behavioural Scientist
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	• Psychologist or Psychiatrist / Behavioural Scientist • Anthropologist (GS)
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	**EA**: MCQs, SAQs, SEQs and OSCE **IA:** quizzes, presentations, assignments, group projects, case studies, reflective writing and student portfolios	• Psychologist or Psychiatrist / Behavioural Scientist

Identify the correlation of aging with life span, psychological factors and sociological factors.	Discuss Psychosocial. Aspects of Aging	Lectures/Prese ntations 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	Psychologist or Psychiatrist / Behavioural Scientist Gerantologist

2nd Year (8 Hours MBBS)				
Learning Outcomes	**Course Content**	**Instructional Strategies**	**Assessment Tool**	**Teaching Faculty**
Professionalism				
1. Professional Misconduct and Unprofessional attitudes				
Understand professional misconduct and unprofessional attitudes	• Define professional misconduct and list its elements and give examples • List the types of misconduct and its punishments • Define Medical Malpractice	Interactive lecture / Role plays / Case scenarios / Small group discussion (SGD)	FA: MCQs, SAQs, SEQs and OSCE	Behavioural Scientist / DME Faculty
2. Steps to inculcate Medical Professionalism in Students				
Identify steps to inculcate medical professionalism in students	Recognize probable path towards medical professionalism through: • Confess • Teach • Assess • Reward • Foster	Interactive lecture / workshop / Small group discussion (SGD) / Case scenario / Seminar	Formative	Behavioural Scientist / DME Faculty
3. Personal Development Plan (PDP)				

Prepare personal development plan (PDP)	• Prepare personal development plan & reflective portfolios • Feedback on PDP	Small group discussion (SGD)/ Interactive Lecture/	Assignment	Behavioural Scientist / DME Faculty
4. Emotional Intelligence in Medical Profession				
Understand the role of Differentiate medical List Professionalism	Define Emotional Intelligence (EQ) play/ Case Faculty elements of EQ	Interactive Lecture, Role intelligence in profession EQ	Formative Scientist / between EQ & and	Behavioural DME emotional IQ scenarios
5. Practice of Medical Doctor and Good Medical Practices				
Practice of medical doctor and good medical practices	Describe the ethical standards of • Conduct of the practitioner • Examination, consultation of female patient • Describe the ethical standards of • Handling of prisoner patients • Confidentiality • End of life care • Defined duty count of a doctor • Describe essential components of good clinical care • List the steps required to maintain Good Medical Practice. • Describe basic attributes for working in a team. • What steps will be taken in case of conflict of religious or moral belief between patient and yourself?	Interactive lecture/Role play/ Case scenarios	MCQ/ SEQ	Behavioural Scientist / DME Faculty

Leadership & Management (8 Hours MBBS)				
Learning Outcomes	**Course Content**	**Instructional Strategies**	**Assessment Tool**	**Teaching Faculty**
1. Leadership Styles and Theories				
Examine and describe various attributes and leadership styles within their respective cultural contexts	**Leadership styles and their impact on healthcare team** **Contemporary Leadership Theories** • Exploration of various leadership theories • Application of leadership models in medical contexts	Interactive lecture/ Role plays/ Case Scenarios	FA: MCQs, SAQs, SEQs and OSCE	Behavioral Scientist/ DME faculty
2. Classic and Modern Management Theories				
Compare various models of leadership and management and assess their application in a medical context	**Classic and Modern Management Theories** • Exploration of various Management theories • Managerial Styles	Interactive lecture/workshop / Group Discussion	FA: MCQs, SAQs, SEQs and OSCE	Behavioral Scientist/ DME faculty

3. Healthcare Decision-Making & Leadership				
Analyze and implement effective decisionmaking strategies in crisis leadership within the context of medical emergencies	**Healthcare Decision-Making & Leadership** • Decision-making processes in healthcare • Risk management & mitigation • Crisis leadership in medical emergencies	Group discussion/ Lecture	FA: MCQs, SAQs, SEQs and OSCE	Behavioral Scientist/ DME faculty

Leadership & Management (9 Hours MBBS)				
Learning Outcomes	**Course Content**	**Instructional Strategies**	**Assessment Tool**	**Teaching Faculty**
1. Technology-Driven Healthcare Leadership				
Assess the role of modern technology in the management and leadership within the medical field	• Integrating technology in medical management/ leadership • Modernization of Healthcare Services	Lecture, Role play	FA: MCQs, SAQs, SEQs and OSCE	Behavioral Scientist/ DME faculty

2. Enhancing Healthcare Team Performance				
Foster teamwork and develop the ability to identify, raise, and address concerns to effectively resolve conflicts	• Understanding and managing healthcare teams • Collaboration and interdisciplinary teamwork • Conflict resolution in medical settings	Interactive lecture/Role play	FA: MCQs, SAQs, SEQs and OSCE	Behavioral Scientist/ DME faculty
3. Ethical and Legal Issues in Healthcare				
Participate confidently in problem-solving scenarios and strategically choose and apply the most appropriate leadership style	Ethical and Legal Issues in Healthcare • Ethical Principles (Autonomy, Beneficence, Non maleficence, Justice) • Legal responsibilities of medical leaders • Patient rights and confidentiality	Interactive lecture/Role play	FA: MCQs, SAQs, SEQs and OSCE	Behavioral Scientist/ DME faculty
4. Strategies to Improve Performance				
Demonstrate a willingness to contribute to positive system change, uphold a respectful approach towards the leadership and management roles of team members, and foster collaboration for collective success	Strategies to Improve Performance • Change Management • Respect for Colleagues	Interactive lecture/Group Discussion Role play	FA: MCQs, SAQs, SEQs and OSCE	Behavioral Scientist/ DME faculty
5. Strategic Management of Healthcare Resources				
Formulate and implement effective strategies for managing healthcare resources	• Strategic planning in healthcare • Financial management in medical institutions • Quality improvement initiatives	Lecture / Role play / Case scenarios	FA: MCQs, SAQs, SEQs and OSCE	Behavioural Scientist / DME faculty

6. Patient-Centered Approach to Safety				
Implement patient-centered approaches in healthcare settings to enhance the quality of care and patient satisfaction	• *Fostering patient centered approaches* • *Ensuring patient safety in medical settings* • *Balancing patient needs with organizational goals*	Interactive lecture/workshop/ Group Discussion	FA: MCQs, SAQs, SEQs and OSCE	Behavioral Scientist/ DME faculty/GS

Bench to Bedside (B2B) Learning Patient Safety Module

1. **Overview**

   The "Bench to Bedside" (B2B) learning module is designed to facilitate the seamless transition of pre- clinical practical application. By providing hands-on training in a controlled environment such as a simulation lab, this module aims to augment students' clinical skills, boost their confidence, and prepare them to apply their knowledge effectively at the patient bedside. Through experiential learning, students will gain proficiency in various clinical procedures, communication techniques, and teamwork, thereby laying a strong foundation for their future clinical practice.

   Simulation–based learning in skill lab will help students of second year to have clinical training, history taking and physical examination skills, practicing diagnostic and therapeutic procedural skills in a simulated environment before practicing these skills on real patients. Students will be given demonstration followed by constructive feedback to promote learning. To provide safe and supportive learning environment range of clinical scenarios will be provided to students to facilitate active learning according to individual needs.

2. **Rationale**

   The transition from pre-clinical to clinical years can be challenging for medical students as they encounter real patients with learning module addresses this challenge by creating a safe and supportive environment where students can practice clinical skills, receive patients. By allowing students competence before working with actual technical proficiency and interpersonal skills in a controlled setting, this module enhances patient safety and the overall quality of care delivered during their clinical rotations.

3. **Level** 2nd Year MBBS (Pre-Clinical Years)
4. **Duration** 2 Weeks One Week for Medicine One Week for Surgery
5. **Contact hours**: 12 hours of Medicine & 12 hours of Surgery
6. **Batch Size**: 25 Students
7. **Educational Strategies**

   Skill Lab

   Hands on Training
8. **Instructors**. Clinical Faculty of medicine and surg depts

9. **Competencies**

Communication skills
Clinical skills
Critical thinking
Ethical practices

10. **Assessment**

Formative and summative assessment OSCE

f. Based on series of timed stations each one focused on different

g. A checklist of specific behaviors or global rating form to evaluate students'

h. Minimum number of 10 stations will be given to students to

i. Students' evaluation will be added into internal assessment as per university

2. **Contents**

As per table attached

Bench to Bedside module			
Skill	**Learning Outcome**	**Educational Strategies**	**Assessment**
Checking Vital Signs: a. Blood Pressure Measurement b. Pulse c. Temperature d. O_2 Saturation Measurement	a. Perform general physical examination of patient b. Approach patient ethically c. Will be able to measure and interpret vital signs of the patient as per the normal range	a. Demonstration on b. Manikin / simulator c. Videos d. Pulse Oximeter e. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided • Marks being added to Internal assessment

IM / IV Injection	a. Perform general physical examination of patient b. Approach patient ethically c. Educate and counsel the patient according to need. d. Follow SOPs of Patient safety a. Perform the procedure as demonstrated	a. Demonstration on Manikin b. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided Marks being added to Internal assessment
IV Cannulation	b. Perform general physical examination of patient c. Approach patient d. ethically e. Educate and counsel the patient according to need. Perform the procedure as demonstrated	b. Demonstration on IV simulator c. Videos d. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided • Marks being added to Internal assessment
Blood Sampling	a. Perform general physical examination of patient b. Approach patient ethically c. Educate and counsel the patient according to need. d. Follow SOPs of Patient safety guidelines as per procedure a. Perform the procedure as demonstrated	a. Demonstration on Manikin b. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided Marks being added to Internal assessment

Inhaler Technique	a. Perform general physical examination of patient b. Approach patient c. ethically d. Educate and counsel the patient according to need Follow SOPs of Patient safety e. Follow SOPs of Patient safety guidelines as per procedure f. Perform the procedure as demonstrated	a. Demonstration on Manikin b. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided • Marks being added to Internal assessment
Use of Insulin syringe	a. Perform general physical examination of patient b. Approach patient ethically c. Educate and counsel the patient according to need Follow SOPs of Patient safety d. Follow SOPs of Patient safety guidelines as per procedure e. Perform the procedure as demonstrated	a. Demonstration on Manikin b. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided • Marks being added to Internal assessment
Hand Washing / sanitization	a. Be able to demonstrate WHO five moments of handwashing / sanitization b. Approach patient ethically c. Follow SOPs of Patient safety	a. Demonstration b. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided • Marks being added to Internal assessment

Donning & Doffing	Be able to follow the procedure as per demonstration	a. Demonstration b. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided • Marks being added to Internal assessment
Wound Care/ Bandage	a. Approach patient ethically b. Educate and counsel the patient according to need. c. Follow SOPs of Patient safety d. Be able to perform the procedure as demonstrated	a. Demonstration b. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided. • Marks being added to Internal assessment
Urinary Catheterization (Male and Female)	a. Approach patient ethically b. Educate and counsel the patient according to need. c. Follow SOPs of Patient safety d. Be able to perform the procedure as demonstrated	a. Demonstration on Manikin c. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided Marks being added to Internal assessment

Immobilization of Arm & Leg	b. Perform general physical examination of patient c. Approach patient d. ethically e. Educate and counsel the patient according to need. f. Follow SOPs of g. Patient safety h. Be able to perform the procedure as demonstrated	b. Demonstration on Simulated Patient c. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided • Marks being added to Internal assessment
Care of Cervical Spine	1. Perform general physical examination of patient 2. Approach patient ethically 3. Educate and counsel the patient according to need. 4. Follow SOPs of Patient safety 5. Be able to perform the procedure as demonstrated	a. Demonstration on Simulated Patient b. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided • Marks being added to Internal assessment
Log Roll	1. Perform general physical examination of patient 2. Approach patient ethically 3. Educate and counsel the patient according to need. 4. Follow SOPs of Patient safety 5. Be able to perform the procedure as demonstrated	a. Demonstration on Simulated Patient b. Feedback	**OSCE** **Formative Assessment:** Feedback to individual student **Summative Assessment:** • 10 stations on different tasks • Students being graded on checklist provided • Marks being added to Internal assessment

Study Tips

Categories	Study Tips	How will it help?
1. Study Planning	Create a **structured timetable** with dedicated blocks per subject & revision sessions.	Ensures balanced coverage and avoids last-minute cramming
2. Active Learning	Use flashcards, mnemonics, and spaced repetition (e.g., Anki, Quizlet) for key facts.	Enhances recall and memory retention
3. Conceptual Understanding	Focus on understanding concepts over rote memorization through diagrams, flowcharts & analogies.	Deep learning improves applications in clinical scenarios.
4. Active Recall & Practice	Regular self-testing, MCQs & practice questions after each topic.	Retrieval practice strengthens memory.
5. Collaborative Learning	Form small study groups with defined goals and peer teaching roles.	Peer teaching enhances understanding.
6. Digital & E-Learning Tools	Supplement textbooks with online videos, simulations & 3D tools for Anatomy/Physiology.	Visual and interactive tools improve comprehension.
7. Self-Assessment & Reflection	Set goals and evaluate progress weekly; reflect on weak areas.	Reflection and feedback improve self-regulated learning.
8. Curriculum & Faculty Support	Seek feedback, guidance on depth of knowledge and regular formative assessments.	Improve learning outcomes.
9. Time & Energy Management	Use techniques like Pomodoro (focused 25 minutes separate by 5 minutes break) & regular breaks to prevent burnout.	Balanced study energy maintains focus.
10. Physical & Mental Well-being	Prioritize sleep, nutrition, exercise & stress management.	Physical health strongly influences learning.

References

1. Cape Farewell Foundation (2023) Study tips for medical students. Available at: https://capefarewellfoundation.com/study-tips-for-medical-students/
2. Ayers, J. (2022) 'Effective study techniques for medical students', Journal of Medical Education, 56(3), pp. 145–150.
3. Jungle AI (2023) How to study effectively in medical school. Available at: https://jungleai.com/blog/how-to-study-in-medical-school/
4. Dunlosky, J. et al. (2013) 'Improving students' learning with effective learning techniques', Psychological Science in the Public Interest, 14(1), pp. 4–58. https://doi.org/10.1177/1529100612453266
5. ACE Med Boards (2022) Time management and study strategies for medical students. Available at: https://acemedboards.com/medical-student-study-tips/
6. HARDEN, J.M. LAIDLAW, E.A. HESKETH, R. M. (1999). AMEE Medical Education Guide No 16: Study guides-their use and preparation. *Medical* ***Teacher*****,** ***21*****(3), 248–265.** https://doi.org/10.1080/01421599979491

Feedback

Submit your feedback at the following email: shapeofficial@cmhlahore.edu.pk