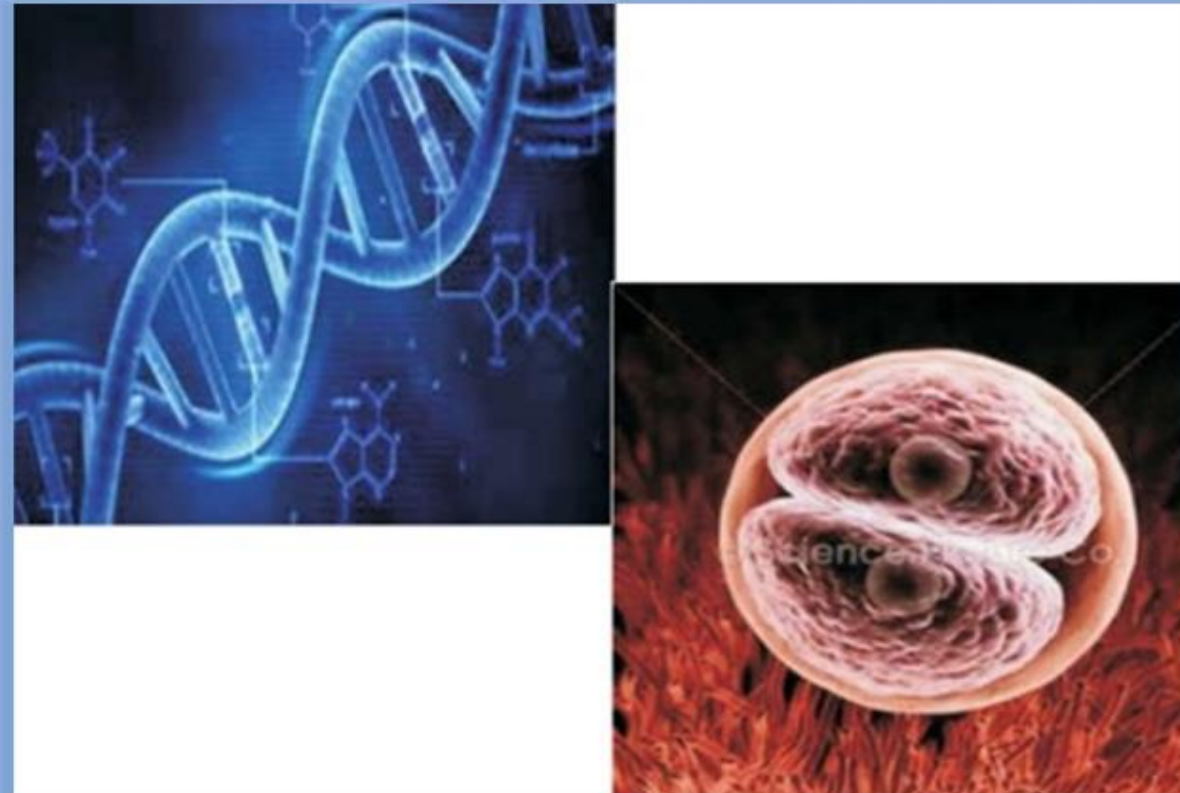





**Foundation Module**

**Study Guide**  
**First Year MBBS 2022 - 2023**



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Additional Director Medical Education, Asst. Director Medical Education,	Curriculum Committee	Vice Chancellor

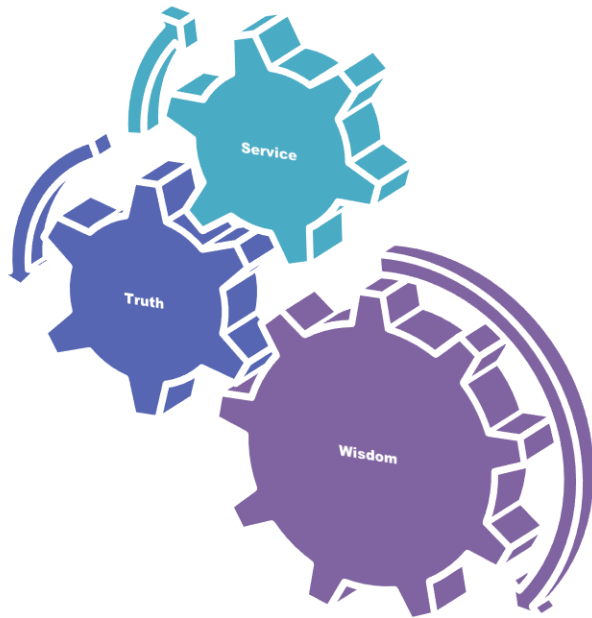


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## RMU Motto



## University Moto, Vision, Values & Goals

### Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

### Vision and Values

Highly recognized and accredited centre of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

### Goals of the Undergraduate Integrated Modular Curriculum

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the Health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of knowledge to help you attain personal and professional growth & excellence.

**First Year MBBS 2023**

**Study Guide**

**Foundation Module**



## Discipline wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
1	<ul style="list-style-type: none"> <li>Anatomy</li> </ul>	Introduction To General Anatomy	General Embryology <ul style="list-style-type: none"> <li>Introduction To Human Development</li> <li>Oogenesis</li> <li>Spermatogenesis</li> <li>Female Reproductive Cycles</li> <li>Ovulation And Fertilization</li> <li>Cleavage And Blastocyst Formation</li> <li>Development Of Mammary Gland</li> </ul>	General Histology <ul style="list-style-type: none"> <li>Types Of Epithelium</li> <li>Specialization Of Apical Cell Surface</li> <li>Intercellular Junctions and Adhesions</li> <li>Glandular Epithelium</li> <li>Histology Of Mammary Gland</li> </ul>	<ul style="list-style-type: none"> <li>Anatomicomedical Terminologies I</li> <li>Anatomicomedical Terminologies II (Anatomical Terms And Axis Of Movements)</li> <li>Anatomicomedical Terminologies III (Cell and Tissues)</li> <li>Anatomicomedical Terminologies IV (Skin &amp; Body System)</li> <li>Clavicle</li> <li>Scapula</li> <li>Humerus</li> <li>Anterior Axioappendicular Muscles</li> <li>Posterior Axioappendicular Muscles</li> <li>Axilla</li> <li>Brachial Plexus</li> <li>Brachial Plexus Injuries</li> <li>Breast</li> <li>Sternoclavicular And Acromioclavicular Joints</li> <li>Radiograph And Surface Anatomy of Axioappendicular Region</li> </ul>
	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>Cell And Cell Organelles, Cell Membrane and Transport Across Cell Membrane, Physicochemical Properties, Enzymes, Cancer, Nucleic Acid Chemistry, Genetics</li> </ul>			
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>Functional Organization of The Human Body and Control of the "Internal Environment</li> <li>The Cell and Its Functions</li> <li>Genetic Control of Protein Synthesis, Cell Function, And Cell Reproduction</li> <li>Transport Of Substances Through the Cell Membrane</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>The Holy Quran Translation Component</li> </ul>			
	<ul style="list-style-type: none"> <li>Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to history of medical ethics</li> </ul>			

	<ul style="list-style-type: none"> <li>• Artificial Intelligence</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to Artificial Intelligence</li> </ul>
	<ul style="list-style-type: none"> <li>• Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to Family Medicine &amp; its application in health care system</li> </ul>
	<ul style="list-style-type: none"> <li>• Research Innovation (IUGRC)</li> </ul>	<ul style="list-style-type: none"> <li>• Research I Introduction of health research process</li> <li>• Research II characteristic of reserch process</li> <li>• Research III Basis of ethics in health research</li> <li>• Research IV Basics of ethics in medical reserch</li> </ul>
	<ul style="list-style-type: none"> <li>• Behavioral Sciences</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to Behavioral Sciences</li> <li>• Management of stress</li> </ul>
	<ul style="list-style-type: none"> <li>• Vertical Integration</li> </ul>	<p>Clinically content relevant to Foundation module</p> <ul style="list-style-type: none"> <li>• Opening ceremony (DME)</li> <li>• Introduction To Different Teaching Strategies, Role Of Team Leader Facilitator And Students SGD/LGIS/TBL/PAL/INTERNET &amp; Literature Group activity (DME)</li> <li>• Leadership Professionalism (DME)</li> <li>• Orientation to integrated modular system (DME)</li> <li>• Lecture on feedback (DME)</li> <li>• Mission and vision (DME)</li> <li>• Introduction to Pharmacology</li> <li>• Routs of drug administration (Pharmacology)</li> <li>• Absorption of drugs (Pharmacology)</li> <li>• Factors affecting drug absorption (Pharmacology)</li> <li>• Distribution of drugs (Pharmacology)</li> <li>• Introduction to Pathology</li> <li>• Cellular response to injury (Pathology)</li> <li>• Intracellular accumulations (Pathology)</li> <li>• Pigments (Pathology)</li> <li>• Free radical and reactive oxygen species (Pathology)</li> <li>• Irreversible cell injury/apoptosis (Pathology)</li> <li>• Genetic disorders (Pathology)</li> <li>• Introduction to Community Medicine (Community Medicine)</li> <li>• Introduction to medicine (Medicine)</li> <li>• History of medicine (Medicine)</li> <li>• Medicine and allied subjects (Medicine)</li> <li>• Chromosomal abressions (Medicine)</li> <li>• History taking and general physical examination (Medicine)</li> </ul>

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## Foundation Module Team

Module Name : Foundation Module  
 Duration of module : 06 Weeks  
 Coordinator : Dr. Mohtasham Hina  
 Co-coordinator : Dr. Zeneera Saqib  
 Reviewed by : Module Committee

Module Committee			Module Task Force Team	
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator Dr. Mohtasham Hina (Associate Professor of Anatomy)
2.	Director DME	Prof. Dr. Rai Muhammad Asghar	2.	DME Focal Person Dr. Sidra Hamid
3.	Convener Curriculum	Prof. Dr. Naeem Akhter	3.	Co-coordinator Dr. Zeneera Saqib (Demonstrator of Anatomy)
4.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	4.	Co-Coordinator Dr. Uzma kiayani (Senior Demonstrator of Physiology)
5.	Additional Director DME	Prof. Dr. Ifra Saeed	5.	Co-coordinator Dr. Shahrukh Khan (Senior Demonstrator of Biochemistry)
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar	<b>DME Implementation Team</b>	
7.	Chairperson Biochemistry	Dr. Aneela Jamil		
8.	Focal Person Anatomy First Year MBBS	Prof. Dr. Ayesha Yousaf	1.	Director DME Prof. Dr. Rai Muhammad Asghar
9.	Focal Person Physiology	Dr. Sidra Hamid	2.	Implementation Incharge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME Prof. Dr. Ifra Saeed
10.	Focal Person Biochemistry	Dr. Aneela Jamil	3.	Deputy Director DME Dr Shazia Zaib
11.	Focal Person Pharmacology	Dr. Zunera Hakim	4.	Module planner & Implementation coordinator Dr. Sidra Hamid
12.	Focal Person Pathology	Dr. Asiya Niazi	5.	Editor Muhammad Arslan Aslam
13.	Focal Person Behavioral Sciences	Dr. Saadia Yasir		
14.	Focal Person Community Medicine	Dr. Afifa Kulsoom		
15.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar		
16.	Focal Person Family Medicine	Dr. Sadia Khan		

## Module I - Foundation Module

**Introduction:** In the Foundation Module students will develop understanding of the basic concepts of cell Physiology, Biochemistry, Anatomy, Pathology, Pharmacology, Community medicine and study skills through an integrated course.

**Rationale:** The foundation module is designed to impart basic knowledge about the normal structure, organization, functions and development of human body. This knowledge will serve as a base on which the student will construct further knowledge about the etiology, pathogenesis and prevention of diseases; the principles of their therapeutics and management.

### Module Outcomes

Each student will be able to:

#### Knowledge

- Acquire the basic science knowledge and terminology necessary to understand the development and functioning of normal structures of human body starting from biochemical level to organ system level, as well as the concepts of diseases in the community and drug dynamics.  
Use technology based medical education including
- **Artificial Intelligence.**  
Appreciate concepts & importance of:
- **Family Medicine**
- **Biomedical Ethics**
- **Research.**

#### Skills

- Identify different anatomical planes and correlate the importance of these with clinical medicine.
- Identify various apparatus used in lab.
- Preparation and identification of microscopic slides.
- Preparation of solutions of various strengths.

#### Attitude

- Demonstrate **professional attitude, team-building spirit and good communication skills.**

This module will run in 6 weeks' duration. The content will be covered through introduction of topics. Instructional strategies are given in the timetable and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

## SECTION - I

### Terms & Abbreviations

#### Contents

- Domains of Learning
- Teaching and Learning

#### Methodologies/Strategies

- Large Group Interactive Session (LGIS)
- Small Group Discussion (SGD)
- Self-Directed Learning (SDL)
- Case Based Learning (CBL)
- Problem- Based Learning (PBL)
- Skill Labs/Practicals (SKL)

#### Tables & Figures

- Table1. Domains of learning according to Blooms Taxonomy
- Figure 1. Prof Umar's Model of Integrated Lecture
- Table2. Standardization of teaching content in Small Group Discussions
- Table 3. Steps of taking Small Group Discussions
- Figure 2. PBL 7 Jumps Model



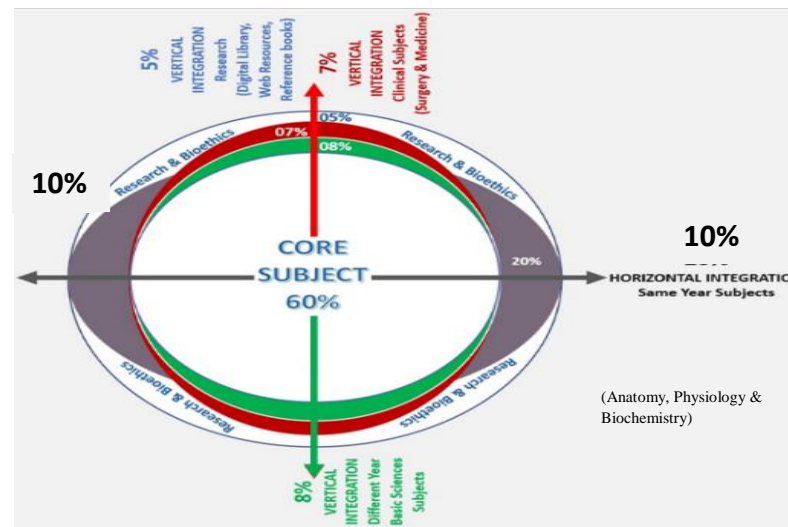
**Table1. Domains Of Learning According to Blooms Taxonomy**

Sr. #	Abbreviation	Domains of learning
1.	C	<b>Cognitive Domain:</b> knowledge and mental skills.
	• C1	Remembering
	• C2	Understanding
	• C3	Applying
	• C4	Analyzing
	• C5	Evaluating
	• C6	Creating
2.	P	<b>Psychomotor Domain:</b> motor skills.
	• P1	Imitation
	• P2	Manipulation
	• P3	Precision
	• P4	Articulation
	• P5	Naturalization
3.	A	<b>Affective Domain:</b> feelings, values, dispositions, attitudes, etc
	• A1	Receive
	• A2	Respond
	• A3	Value
	• A4	Organize
	• A5	Internalize

## Teaching and Learning Methodologies / Strategies

### Large Group Interactive Session (LGIS)

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will be followed for delivery of all LGIS. The lecturer will introduce a topic or common clinical condition and explain the underlying phenomena through questions, pictures, videos of patients, interviews and exercises, etc. Students are actively involved in the learning process.



**Figure 1. Prof Umar's Model of Integrated Lecture**

## Small Group Discussion (SGD)

This format helps students to clarify concepts acquire skills and attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics or power point presentations. Students exchange opinions and apply knowledge gained from lectures, SGDs and self study. The facilitator role is to ask probing questions, summarize and help to clarify the concepts.

**Table 2. Standardization of teaching content in Small Group Discussions**

S. No	Topics	Approximate %
1	Title Of SGD	
2	Learning Objectives from Study Guides	
3	Horizontal Integration	5%+5%=10%
4	Core Concepts of the topic	60%
5	Vertical Integration	20%
6	Related Advance Research points	3%
7	Related Ethical points	2%

**Table 3. Steps of Implementaion of Small Group Discussions**

Step 1	Sharing of Learning objectives by using students Study guides	First 5 minutes
Step 2	Asking students pre-planned questions from previous teaching session to develop co-relation (these questions will be standardized)	5minutes
Step 3	Students divided into groups of three and allocation of learning objectives	5minutes
Step 4	ACTIVITY: Students will discuss the learning objectives among themselves	15 minutes
Step 5	Each group of students will present its learning objectives	20 min
Step 6	Discussion of learning content in the main group	30min
Step 7	Clarification of concept by the facilitator by asking structured questions from learning content	15 min
Step 8	Questions on core concepts	
Step 9	Questions on horizontal integration	
Step 10	Questions on vertical integration	
Step 11	Questions on related research article	
Step 12	Questions on related ethics content	
Step 13	Students Assessment on online MS teams (5 MCQs)	5 min
Step 14	Summarization of main points by the facilitator	5 min
Step 15	Students feedback on the SGD and entry into log book	5 min
Step 16	Ending remarks	

### Self Directed Learning (SDL)

- Self- directed learning is a process where students take primary charge of planning, continuing, and evaluating their learning experiences.
- Time Home assignment
- Learning objectives will be defined
- Learning resources will be given to students = Textbook (page no), web site
- Assessment:
  - i Will be online on LMS (Mid module/ end of Module)
  - ii.OSPE station

### Case Based Learning (CBL)

- It's a learner centered model which engages students in discussion of specific scenarios that typically resemble real world examples.
- Case scenario will be given to the students
- Will engage students in discussion of specific scenarios that resemble or typically are real-world examples.
- Learning objectives will be given to the students and will be based on
  - i. To provide students with a relevant opportunity to see theory in practice
  - ii. Require students to analyze data in order to reach a conclusion.
  - iii. Develop analytic, communicative, and collaborative skills along with content knowledge.

### Problem Based Learning (PBL)

- Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.
- This problem is what drives the motivation and the learning.

The 7- Jump-Format of PBL (Masstricht Medical School)	
Step 7	Synthese & Report
Step 6	Collect Information from outside
Step 5	Generate learning Issues
Step 4	Discuss and Organise Ideas
Step 3	Brainstorming to Identify Explanations
Step 2	Define the Problem
Step 1	Clarify the Terms and Concepts of the Problem Scenario
	Problem- Scenario

**Figure 2. PBL 7 Jumps Model**

## Practical Sessions/Skill Lab (SKL)

Practical Session/ Skill Lab (SKL)	
Demonstration/ power point presentation 4-5 slide	10-15 minutes
Practical work	25-30 minutes
Write/ draw and get it checked by teacher	20-25 minutes
05 mcqs at the end of the practical	10 minutes
At the end of module practical copy will be signed by head of department	
At the end of block the practical copy will be signed by	
Head of Department	
Dean	
Medical education department	
QEC	

## SECTION – II

### Learning Objectives, Teaching Strategies & Assessments

#### Contents

- **Introduction to RMU and Disciplines**
- **Medical Education and Integrated Disciplines**
- **Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)**
- **Large Group Interactive Session:**
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- **Small Group Discussions**
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- **Self Directed Topic, Learning Objectives & References**
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- **Skill Laboratory**
  - Anatomy
  - Physiology
  - Biochemistry

## Orientation Week

### Introduction to RMU and Disciplines

Medical Education and Integrated Disciplines				
Topic	Facilitator	Learning Objectives	Teaching Strategy	Assessment Tool
Introduction to RMU and Allied Hospitals	Vice Chancellor	Honorable VC will welcome and introduce the University and Allied Hospitals.	LGIS	MCQS
<b>The students will be able to:</b>				
Introduction to Medical Education Department Introduction to Integrated Modular System and Foundation Module	Assistant Director DME	• Introduce DME	LGIS	MCQS
		• Define Medical Education		
		• Discuss its role		
		• Describe CME		
		• Appreciate role of DME in their curriculum		
		• Appreciate role of DME in attendance monitoring		
		• Illustrate the application		
		• Leave submission process		
		• Outline the RMU Curriculum structural organization, (integrated modular system)		
• Describe Learning resources used in study guides				
Introduction to Basic Sciences	Lecture by HODs	• Define Anatomy	LGIS	MCQS
		• Define Physiology		
		• Define Biochemistry		
		• Define Pathology		
		• Define Community Medicine		
		• Define Forensic Medicine		
		• Define Pharmacology		
Introduction to Medicine & Allied	Lecture by Dean of Medicine & Allied	• Define medicine	LGIS	MCQS
		• Discuss History of medicine		
		• Describe Islamic concepts of medicine		
		• Identify Basic sciences involved in medicine		
		• Identify Clinical subjects and their role		



		<ul style="list-style-type: none"> <li>Describe practice of medicine</li> </ul>		
Introduction To Teaching And Learning Strategies With Emphasis On SGD/LGIS/TBL (Team base learning)/PAL (Peer Assisted learning)/Internet & Literature Search	Basic Science Team & DME	<ul style="list-style-type: none"> <li>Differentiate between various Teaching &amp; Learning strategies</li> </ul>	LGIS	MCQS
		<ul style="list-style-type: none"> <li>Describe the process</li> </ul>		
		<ul style="list-style-type: none"> <li>Enlist different roles of students and facilitator in mentioned teaching sessions</li> </ul>		
Introduction To Use Of Laboratory Facilities / Equipment And Safety Measures (Biochemistry and Pathology)	Team members (Biochemistry and Pathology)	<ul style="list-style-type: none"> <li>Recall precautionary measures mandatory during practical sessions and skill lab</li> </ul>	LGIS	MCQS
		<ul style="list-style-type: none"> <li>Recall safety measures during blood handling</li> </ul>		
		<ul style="list-style-type: none"> <li>Demonstrate use of various glass ware</li> </ul>		
		<ul style="list-style-type: none"> <li>Demonstrate use of lab instruments</li> </ul>		
Study Skills-I (Medical Educationist And Behavioral Sciences)	Behaviour Science and DME team member	<ul style="list-style-type: none"> <li>Define study skills or study strategies (how to study?)</li> </ul>	LGIS	OSPE
		<ul style="list-style-type: none"> <li>Describe the:</li> </ul>		
		<ul style="list-style-type: none"> <li>Methods based on memorization such as rehearsal and rote learning</li> </ul>		
		<ul style="list-style-type: none"> <li>Methods to retain the content in long term memory</li> </ul>		
		<ul style="list-style-type: none"> <li>Methods based on communication skills e.g., reading and listening</li> </ul>		
Study Skills-II	Behaviour Science and DME team member	<ul style="list-style-type: none"> <li>Principles of TBL &amp; PAL</li> </ul>	LGIS	MCQS
		<ul style="list-style-type: none"> <li>Describe the:</li> </ul>		
		<ul style="list-style-type: none"> <li>Methods based on condensing information, summarizing and the use of keywords</li> </ul>		
		<ul style="list-style-type: none"> <li>Methods based on visual imagery</li> </ul>		
		<ul style="list-style-type: none"> <li>Methods based on acronyms and pneumonics</li> </ul>		
Islam and Medical Science	Mufti Naem sab	<ul style="list-style-type: none"> <li>Discuss role of Islam and importance of Islam in Medical Science</li> </ul>	LGIS	MCQS

**Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)**  
**Anatomy Large Group Interactive Session (LGIS)**

Topic	Learning Objectives At The End of The Lecture the Student Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to General Anatomy	<ul style="list-style-type: none"> <li>Define the term Anatomy and its various branches</li> </ul>	C1	LGIS	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>Define different terminologies related to Anatomy</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe different Anatomical planes and directions in relation to anatomical position</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Elaborate different phases in life span of man</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Define basic tissues of human body</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Discuss general outlines and functions of basic tissues</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Describe formation of different systems of body</li> </ul>	C1		
<b>Embryology</b>				
Introduction to Human development	<ul style="list-style-type: none"> <li>Discuss significance and importance of studying Embryology</li> </ul>	C2	LGIS	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>Define different terminologies to describe developmental stages</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe series of critical events that take place during embryonic development</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Appreciate difference between embryonic and fetal period</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>State chromosomal theory of inheritance</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Discuss common chromosomal abnormalities</li> </ul>	C2		
Oogenesis	<ul style="list-style-type: none"> <li>Discuss role of female hormones during oogenesis</li> </ul>	C2	LGIS	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>Describe different stages of oogenesis</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Correlate clinical aspects of gametogenesis</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>To understand the bio-physiological aspects of gametogenesis</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Know to use digital library</li> </ul>	C3		
Spermatogenesis	<ul style="list-style-type: none"> <li>Define spermatogenesis.</li> </ul>	C1	LGIS	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>Describe different phases of spermatogenesis</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Discuss stages of spermiogenesis</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Elaborate functions of male hormones during spermatogenesis</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Know to use digital library</li> </ul>	C3		
Embryology Female Reproductive	<ul style="list-style-type: none"> <li>understand Ovarian and Uterine cycle</li> </ul>	C1	LGIS	SAQ
	<ul style="list-style-type: none"> <li>Correlate Ovarian and Uterine cycles</li> </ul>	C3		

Cycles	• Describe different phases of Ovarian and Uterine cycles	C1		MCQ VIVA
	• Enumerate female sex hormones	C1		
	• Discuss functional significance of female reproductive hormones in reproductive cycles	C2		
	• Discuss the anovulatory cycle in female	C3		
	• Understand the bio-physiological aspects female reproductive cycle	C2		
	• Able to read a relevant research article	C3		
	• Know to use digital library	C3		
Embryology Ovulation and Fertilization	• Describe follicular development, ovulation and subsequent events in ovary	C1	LGIS	SAQ MCQ VIVA
	• Give an account on role of leutinizing hormone in ovulation	C1		
	• Discuss capacitation in female genital tract	C2		
	• Describe different phases and results of fertilization	C1		
	• Enlist causes of infertility.	C1		
	• Enlist different technologies of assisted fertilization	C1		
	• Discuss different techniques of assisted reproduction with special emphasis on IVF	C3		
	• Discuss the bio-physiological aspects of ovulation and fertilization	C2		
	• Able to read a relevant research article	C3		
	• Know to use digital library	C3		
Embryology Cleavage and Formation of Blastocyst	• Define cleavage	C1	LGIS	SAQ MCQ VIVA
	• Define compaction	C1		
	• Describe blastocyst formation	C1		
	• Understand the bio-physiological aspects of cleavage and blastocyst	C2		
	• Correlate clinical condition of cleavage and blastocyst formation	C3		
	• Able to read a relevant research article	C3		
	• Know to use digital library	C3		
Embryology Development of mammary gland	• Describe the Sources of development of mammary gland	C1	LGIS	SAQ MCQ VIVA
	• Discuss different stages of activity of mammary gland	C2		
	• Understand the bio-physiological aspects of mammary gland	C2		
	• Correlate clinical conditions of mammary gland	C3		
	• Able to read a relevant research article	C3		
	• Know to use digital library	C3		

**Histology**

Types of Epithelium	• Define Epithelium	C1	LGIS	SAQ MCQ VIVA
	• Discuss general features of Epithelial cells (basal, apical and lateral surfaces)	C2		
	• Classify epithelium	C2		
	• Explain the histological structure of simple epithelium	C2		
	• Describe the location and functions of simple epithelium	C1		
	• Classify stratified epithelium.	C2		
	• Describe the functions and distribution of stratified epithelium	C1		
	• Appreciate the differences between stratified and psuedostratified epithelium	C2		
	• Describe characteristics of transitional epithelium	C2		
	• Correlate clinical aspects of different types of epithelia	C3		
	• To understand the bio-physiological aspects of different types of epithelia	C3		
	• Able to read a relevant research article	C3		
• Know to use digital library	C3			
Specializations of apical cell surface	• Enumerate different apical modifications of cells	C1	LGIS	SAQ MCQ VIVA
	• Describe histological structure of each apical modification.	C1		
	• Discuss functions of each type of apical modifications	C2		
	• Correlate clinical aspects of Specializations of apical cell surfaces	C3		
	• Understand the bio-physiological aspects of specilizations of apical cell surface	C2		
	• Able to read a relevant research article	C3		
	• Know to use digital library	C3		
• Enlist causes of infertility.	C1			
Histology Intercellular junctions and adheasions	• Enumerate different cell junctions	C1	LGIS	SAQ MCQ VIVA
	• Describe histological structure of different cell junctions	C1		
	• Understand the bio-physiological aspects of intercellular junctions and adhesions	C2		
	• Able to read a relevant research article	C3		
	• Know to use digital library	C3		
Histology Glandular Epithelium	• Define gland	C1	LGIS	SAQ MCQ VIVA
	• Compare between exocrine and endocrine glands with examples	C2		
	• Classify glands on the basis of morphology, secretory product, and mode of secretion	C2		
	• Understand the bio-physiological aspects of glands	C2		
	• Able to read a relevant research article	C3		

	<ul style="list-style-type: none"> <li>• Know to use digital library</li> </ul>	C3		
Histology Development and histology of mammary gland	<ul style="list-style-type: none"> <li>• Describe the Sources of development of mammary gland</li> </ul>	C1	LGIS	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>• Discuss the ultra structure of mammary gland</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>• Discuss different stages of activity of mammary gland</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Understand the bio-physiological aspects of mammary gland</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Correlate clinical conditions of mammary gland</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Able to read a relevant research article</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Know to use digital library</li> </ul>	C3		

### Physiology Large Group Interactive Session (LGIS)

Topic	Learning Objectives At The End Of Lecture Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
Introduction to Physiology & Physiology Department	<ul style="list-style-type: none"> <li>• Introduce faculty members</li> </ul>	C1	LGIS SGD	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>• Define physiology</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Classify different branches of physiology</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Explain the importance of physiology in medical and clinical sciences</li> </ul>	C1		
Cell physiology & Homeostasis	<ul style="list-style-type: none"> <li>• Understand functional organization of human body from cell to systems</li> </ul>	C2	LGIS SGD	M SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>• Differentiate between prokaryotes and eukaryotes.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss salient features of cell theory</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Define homeostasis</li> </ul>	C1		
Concept of Body Fluid and Internal Environment	<ul style="list-style-type: none"> <li>• Describe homeostatic mechanisms of the major functional systems.</li> </ul>	C1	LGIS SGD	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>• Describe distribution of total body water</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>• Enlist the proportion of intra cellular and extra cellular fluids.</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>• Differentiate between ECF &amp; ICF</li> </ul>	C2		
Homeostatic Control System I	<ul style="list-style-type: none"> <li>• Recall Physical characteristics of normal ECF constituents</li> </ul>	C1	LGIS SGD	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>• Understand the concept of internal environment (which student can differentiate for unicellular and multi cellular organisms.)</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Describe the characteristic of control system of the body.</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>• Enlist four control mechanisms of body</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>• Understand the mechanism of positive feedback, negative feedback, feed forward control and adaptive control with examples.</li> </ul>	C2		

Homeostatic Control System II	• Recall control mechanisms	C1	LGIS SGD	SAQ MCQ VIVA
	• Give examples	C1		
	• Compare and contrast feed forward and adaptive mechanisms	C2		
	• Define gain of control system	C1		
	• Comprehend gain of the control system	C2		
	• Calculate gain of the feedback system and understand the significance of sign in the formula	C3		
Cellular organelles and cell functions	• Describe cytoskeleton & cell locomotion	C1	LGIS Group presentations	SAQ MCQ VIVA
	• Discuss functions of cilia and amoeboid movement	C2		
	• Describe the mechanism of ATP generation	C1		
	• Enlist three major processes of ATP consumption in the body	C1		
	• Understand cell ingestion and other independent roles of cell	C2		
Cell Membrane and Cell Organelles I & II	• Enlist functions of ER, golgi apparatus, lysosome & peroxisome, mitochondria	C1	LGIS SGD Group presentations	SAQ MCQ VIVA
	• Compare and contrast RER & SER, lysosomes & peroxisomes	C2		
	• Understand Docking mechanism	C2		
	• Discuss physiological importance of mitochondria & ATP	C2		
	• Describe the structure of cell membrane: fluid mosaic model	C1		
	• Enlist functions of cell membrane	C1		
	• Enlist membrane bound and non-membrane bound organelles	C1		
	• Differentiate between cytoplasm and cytosol	C2		
Cell membrane Ion channels, Transport across the cell membrane: Diffusion	• Enlist various types of ion channels	C1	LGIS SGD	SAQ MCQ VIVA
	• Enumerate modes of transport mechanism across the cell membrane	C1		
	• Define and discuss factors affecting diffusion	C1		
Transport across cell membrane: Osmosis	• Recall transport mechanism across the cell membrane with special emphasis on osmosis and osmotic pressure	C1	LGIS SGD	SAQ MCQ VIVA
	• Recall factors affecting osmosis	C1		
	• Comprehend the concept of moles and osmoles	C2		
	• Recall osmolarity of body fluids	C1		
	• Discuss tonicity	C2		
	• Comprehend concept of isotonic, hypertonic and hypotonic	C2		
Transport across	• Define active transport	C1	LGIS	SAQ

cell membrane: Active transport I & II	<ul style="list-style-type: none"> <li>Classify active transport</li> </ul>	C2	SGD	MCQ VIVA
	<ul style="list-style-type: none"> <li>Comprehend various types of active transport with examples with special emphasis on Na-K pump</li> </ul>	C2		
Structure of nucleus and ribosomes, Cell Division	<ul style="list-style-type: none"> <li>Describe structure of nucleus and ribosome</li> </ul>	C1	LGIS PBL	SAQ MCQs VIVA
	<ul style="list-style-type: none"> <li>Discuss vaults</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Understand basic concepts about DNA and</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>RNA</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Recall various types of RNA and their functions</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Enlist and Draw steps of mitosis and meiosis</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Comprehend role of different parts of chain of DNA as genes like TATA box</li> </ul>			
Genetics Transcription & Translation	<ul style="list-style-type: none"> <li>Define &amp; Explain Genetics, Transcription &amp; Translation</li> </ul>		LGIS PBL	SAQ MCQs VIVA
	<ul style="list-style-type: none"> <li>Describe Genetic control of protein synthesis</li> </ul>			
	<ul style="list-style-type: none"> <li>Differentiate between apoptosis &amp; Necrosis</li> </ul>			
Cellular control mechanism ,Cell cycle, Programmed cell death	<ul style="list-style-type: none"> <li>Describe different cellular control mechanisms regarding gene regulation</li> </ul>	C1	LGIS PBL	SAQ MCQs VIVA
	<ul style="list-style-type: none"> <li>Explain Cell differentiation, apoptosis and cellular changes in cancer</li> </ul>	C2		
Intracellular communication and cell junctions	<ul style="list-style-type: none"> <li>Describe the structure of various intracellular connections</li> </ul>	C1	LGIS SGD	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>Give the physiological importance of cell junctions</li> </ul>	C1		
Signal Transduction	<ul style="list-style-type: none"> <li>Describe the various 2nd messenger systems</li> </ul>	C1	LGIS	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>Discuss physiological significance</li> </ul>	C2		

## Biochemistry Large Group Interactive Session (LGIS)

Topic	Learning Objectives At the end of lecture students should be able to	Learning domain	Teaching strategy	Assessment tool
<b>Cell organelles</b>				
Cell and cell organelles	<ul style="list-style-type: none"> <li>Explain composition of normal cell</li> </ul>	C2	LGIS	SAQ MCQ VIVA
	<ul style="list-style-type: none"> <li>Describe methods to separate different organelles of cell</li> <li>Describe structure, functions and marker enzymes of ER &amp; Golgi</li> </ul>	C2 C2		
	<ul style="list-style-type: none"> <li>apparatus</li> <li>Describe structure, functions and marker enzymes of lysosome, peroxisome &amp; ribosome</li> <li>Describe structure, functions and marker enzymes of mitochondria and Nucleus</li> <li>Illustrate the clinical conditions and congenital defects of cell organelles</li> </ul>	C2 C2 C3		
<b>Cell membrane and transport across cell membrane</b>				
Cell membrane	<ul style="list-style-type: none"> <li>Explain composition of cell membrane</li> <li>Understand fluid mosaic model</li> <li>Describe functions performed by each component</li> </ul>	C2 C2 C2	LGIS	SAQ MCQ VIVA
Functions of cell membranes	<ul style="list-style-type: none"> <li>Discuss functions &amp; importance of cell membrane</li> </ul>	C2	LGIS	SAQ MCQ VIVA
Transport across cell membrane	<ul style="list-style-type: none"> <li>Explain transport of various substances by active and passive transport, diffusion, phagocytosis, endocytosis and exocytosis</li> <li>Correlate the clinical disorders with defective transport across cell membrane</li> </ul>	C2 C3	LGIS	SAQ MCQ VIVA
<b>Physicochemical properties of cell</b>				
Osmosis, osmotic pressure and oncotic pressure	<ul style="list-style-type: none"> <li>Define osmosis and osmotic pressure.</li> <li>Discuss biochemical application of osmotic and oncotic pressure and methods to measure them.</li> <li>Correlate oncotic pressure with clinical scenarios</li> </ul>	C1 C2 C3	LGIS	SAQ MCQ VIVA
Phenomenon of viscosity, surface tension.	<ul style="list-style-type: none"> <li>Define phenomenon of viscosity, surface tension.</li> <li>Explain Biochemical applications and methods to measure them.</li> </ul>	C1 C2	LGIS	SAQ MCQ VIVA
Donnan equilibrium, adsorption and	<ul style="list-style-type: none"> <li>Define Donnan equilibrium, adsorption and ion exchange resins.</li> <li>Describe their effects on tissue fluids and biochemical importance</li> </ul>	C1 C2	LGIS	SAQ MCQ VIVA



ion exchange resins				
Water and pH	<ul style="list-style-type: none"> <li>Define pH, Pka, body buffer</li> <li>Discuss water distribution in the body</li> <li>Understand dehydration and overhydration</li> </ul>	C1 C2 C3	LGIS	SAQ MCQ VIVA
<b>Enzymes</b>				
Enzymes	<ul style="list-style-type: none"> <li>Define Enzymes.</li> <li>Explain general functions of enzymes.</li> <li>Differentiate between coenzyme and cofactors</li> </ul>	C1 C2 C2	LGIS	M SAQ MCQ VIVA
Mechanism of enzyme action	<ul style="list-style-type: none"> <li>Describe different mechanisms of enzyme action.</li> </ul>	C2	LGIS	SAQ MCQ VIVA
Classification of enzymes	<ul style="list-style-type: none"> <li>Discuss different classes of Enzymes</li> </ul>	C2	LGIS	SAQ MCQ VIVA
Properties of Enzymes	<ul style="list-style-type: none"> <li>Elaborate the Properties of Enzymes such as specificity for substrate and stereo specificity.</li> </ul>	C2	LGIS	SAQ MCQ VIVA
Factors affecting Enzyme action	<ul style="list-style-type: none"> <li>Discuss different factors which increase or decrease the activity of enzymes</li> </ul>	C2	LGIS	SAQ MCQ VIVA
Enzyme inhibitors	<ul style="list-style-type: none"> <li>Describe enzyme inhibitors and how the activity of the regulatory enzymes can be modulated for benefit of body</li> </ul>	C2	LGIS	SAQ MCQ VIVA
Marker enzymes	<ul style="list-style-type: none"> <li>Interpret the role of measuring activity of different enzymes in the diagnosis and prognosis of different diseases</li> </ul>	C3	LGIS	SAQ MCQ VIVA
Enzyme as medicines	<ul style="list-style-type: none"> <li>Interpret the role of Enzyme as medicine and their effects on body.</li> </ul>	C3	LGIS	SAQ MCQ VIVA
Nucleic acids.	<ul style="list-style-type: none"> <li>Explain biochemical aspects of Nucleic acids</li> <li>State analogs of Nucleic acids</li> </ul>	C2	LGIS	SAQ MCQ VIVA
DNA	<ul style="list-style-type: none"> <li>Explain structure and biological importance of DNA, types of DNA</li> <li>Differentiate between DNA &amp;RNA</li> </ul>	C2 C2	LGIS	SAQ MCQ

				VIVA
RNA	<ul style="list-style-type: none"> <li>Explain structure, types and functions of RNA</li> </ul>	C2	LGIS	SAQ MCQ VIVA
Replication	<ul style="list-style-type: none"> <li>Describe mechanism of replication of prokaryotes &amp; Eukaryotes</li> </ul>	C2	LGIS	SAQ MCQ VIVA
Transcription	<ul style="list-style-type: none"> <li>Describe mechanism of Transcription of prokaryotes &amp; Eukaryotes</li> </ul>	C2	LGIS	SAQ MCQ VIVA
Translation	<ul style="list-style-type: none"> <li>Discuss genetic code</li> <li>Describe mechanism of Translation in prokaryotes &amp; Eukaryotes</li> <li>Illustrate mechanism of action of antibiotics at different stages of translation</li> </ul>	C2 C2 C3	LGIS	SAQ MCQ VIVA
DNA damage & Repair	<ul style="list-style-type: none"> <li>Describe mechanism of DNA damage &amp; Repair</li> <li>Apply knowledge of DNA repair mechanisms in related clinical cases</li> </ul>	C2 C3	LGIS	SAQ MCQ VIVA
PCR	<ul style="list-style-type: none"> <li>Define PCR</li> <li>Explain mechanism and indications of PCR</li> </ul>	C1 C2	LGIS	SAQ MCQ VIVA
Cancer	<ul style="list-style-type: none"> <li>Explain biochemical basis of cancer</li> </ul>	C2	LGIS	SAQ MCQ VIVA

### Anatomy Small Group Discussion (SGDs)

Demonstration/Dissection	At The End Of The Demonstration Student Should Be Able To	Learning Domains	Teaching Strategy	Assessment Tool
Anatomicomedical terminology I (anatomical position and planes)	<ul style="list-style-type: none"> <li>Describe different anatomical planes of human body and correlate with radiological sections</li> </ul>	C2	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	<ul style="list-style-type: none"> <li>Demonstrate anatomical position of human body</li> </ul>	P		
Anatomicomedical terminology (anatomical terms and axis of movements)-II	<ul style="list-style-type: none"> <li>Define different terms related to body parts</li> </ul>	C1	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	<ul style="list-style-type: none"> <li>Describe axis of movement</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Demonstrate axis of movement</li> </ul>	P		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article</li> </ul>			
	<ul style="list-style-type: none"> <li>Know to use digital library</li> </ul>	C3		
Anatomicomedical terminology -III (cell and tissues)	<ul style="list-style-type: none"> <li>Define cell</li> </ul>	C1	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	<ul style="list-style-type: none"> <li>Define tissue</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe basic tissues of human body</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Know to use digital library</li> </ul>	C3		
Anatomicomedical terminology (skin and body systems)	<ul style="list-style-type: none"> <li>Describe general organization of different systems of body</li> </ul>	C2	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	<ul style="list-style-type: none"> <li>Discuss concepts of skin and fascia</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe the classification of blood vessels</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Describe the concepts of divisions of nervous system</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe the formation of spinal nerve</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Know to use digital library</li> </ul>	C3		
Clavicle	<ul style="list-style-type: none"> <li>Determine the side</li> </ul>	C2	Dissection Skill lab SGD	MCQ SAQ VIVA
	<ul style="list-style-type: none"> <li>Demonstrate anatomical position, general features, attachments and articulations (medial and lateral).</li> </ul>	P		
	<ul style="list-style-type: none"> <li>Describe Intramembranous development and cleido-cranial dysostosis.</li> </ul>	C3		

	<ul style="list-style-type: none"> <li>Elaborate pectoral girdle formation movement and dislocation.</li> </ul>	C3		OSPE
	<ul style="list-style-type: none"> <li>Describe ossification in detail and Fracture Of clavicle.</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Know to use digital library</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article</li> </ul>	C3		
Scapula	<ul style="list-style-type: none"> <li>Determine the side</li> </ul>	C2	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	<ul style="list-style-type: none"> <li>Demonstrate anatomical position, general features, attachments, and articulation. (clavicle and shoulder joints)</li> </ul>	P		
	<ul style="list-style-type: none"> <li>Describe scapular anastomosis and its clinical significance</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Demonstrate Scapular movements.</li> </ul>	P		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Able to use digital library.</li> </ul>			
Humerus	<ul style="list-style-type: none"> <li>Determine the side</li> </ul>	C2	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	<ul style="list-style-type: none"> <li>Demonstrate anatomical position, general features, attachments and articulation (shoulder and elbow).</li> </ul>	P		
	<ul style="list-style-type: none"> <li>Describe the importance of anatomical and surgical neck of humerus</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Correlate axillary, radial, median and ulnar nerve damage with respect to various fractures of humerus.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Describe Significance of bicipital groove, angle of humeral torsion and carrying angle</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Discuss Ossification and fractures</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article and use digital library</li> </ul>	C3		
Anterior axioappendicular region	<ul style="list-style-type: none"> <li>Describe Superficial fascia with cutaneous nerve and vessels of anterior axioappendicular region and tabulate muscles of the anterior axioappendicular region</li> </ul>	C1	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	<ul style="list-style-type: none"> <li>Understand the bio-physiological aspects of anterior axioappendicular region.</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article and use digital library</li> </ul>	C3		
Posterior axioappendicular muscles	<ul style="list-style-type: none"> <li>Tabulate muscles of the pectoral region (origin, insertion, nerve supply, action and applied).</li> </ul>	C2	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	<ul style="list-style-type: none"> <li>Identify and describe the pectoral and clavipectoral fascia.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Know to use digital library</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Able to read a relevant research article</li> </ul>	C3		

Axilla	• Define axilla	C2	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe its boundaries,			
	• Enumerate the Contents of axilla, (axillary artery with its branches, axillary vein and tributaries, axillary lymphatics, lymph nodes and brachial plexus).	C2		
	• Describe the clinical significance of axillary lymph nodes	C3		
	• Able to read a relevant research article • Know to use digital library	C3		
Brachial plexus	• Describe the formation of brachial plexus its roots and trunks.	C1	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe the origin and root value of different nerves arising	C2		
	• Able to read a research article on brachial plexus	C3		
	• Able to use digital library	C3		
Brachial plexus injuries	• Describe the different neurological deficits arising as a result of damaged to roots, trunks and branches of brachial plexus at different levels.	C3	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe the origin and root value of different nerves arising	C3		
	• Able to read a research article on brachial plexus	C3		
	• Know to use digital library			
Breast	• Describe the extent of breast	C1	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe the relations of breast	C2		
	• Describe structure of gland.	C1		
	• Discuss the blood supply, venous drainage and lymphatics.	C1		
	• Correlate Clinical picture and lymphatic spread in breast carcinoma.	C3		
	• Discuss congenital anomalies of breast	C3		
	• Able to read a relevant research article • Know to use digital library	C3		
Sternoclavicular and acromioclavicular joints	• Classify joints and discuss the attachment of capsule and ligaments and discuss the different movement on these joints alongwith muscles involved in these movements.	C2	Dissection Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe neurovascular supply.	C2		
	• Able to read a relevant research article	C3		
	• Know to use digital library	C3		
	• Know to use digital library	C3		
Radiographs/surface anatomy of axioappendicular region	• Discuss the surface anatomy of axioappendicular region.	C2	Dissection Skill lab SGD	MCQ VIVA OSPE
	• Able to interpret the normal radiologic appearance of bones and viscera in axioappendicular region.	C3		

### Physiology Small Group Discussion (SGDs)

Topic	Learning Objectives	Learning Domain	Teaching Strategy	Assessment Tools
Cell and homeostasis	Understand functional organization of human body	C2	SGD	MCQ SAQ VIVA
	Discuss homeostasis/control systems of the body	C2		
Cell cytoskeleton and locomotion and cell functions	Discuss the functions of cell	C2	SGD	MCQ SAQ VIVA
	Describe cell cytoskelation	C1		
Transport across cell membrane	Describe the structure of cell membrane	C1	SGD	MCQ SAQ VIVA
	Enlist various ion channels	C1		
	Discuss transport mechanism across the cell membrane with special emphasis on diffusion and osmosis	C2		
	Explain the types of active transport	C2		
Intracellular communication and cell junction, signal transduction	Describe the structure and function of various intracellular connections	C1	SGD	MCQ SAQ VIVA
	Discuss second messenger system	C2		

### Biochemistry Small Group Discussion (SGDs)

Topic	Learning Objectives	Learning Domain	Teaching Strategy	Assessment Tools
Cell and Cell Membrane	Explain Composition of Normal Cell & Cell Organelles	C2	SGD	MCQ SAQ VIVA
	Describe Composition of Cell Membrane	C2		
	Understand Fluid Mosaic Model			
Physicochemical Aspects of Cell	Define osmosis and osmotic pressure.	C1	SGD	MCQ SAQ VIVA
	Discuss biochemical application of osmotic and oncotic pressure and methods to measure them.	C2		
	Correlate oncotic pressure with clinical scenarios	C3		
	Define phenomenon of viscosity, surface tension.	C1	SGD	MCQ SAQ VIVA
	Explain Biochemical applications and methods to measure them.	C2		
Define Donnan equilibrium, adsorption and ion exchange resins. Describe their effects on tissue fluids and biochemical importance	C1 C2			

## Anatomy Self Directed Learning (SDL)

Topics Of SDL	Learning Objectives	Learning Resources
Clavicle	<ul style="list-style-type: none"> <li>• Determine the side</li> <li>• Demonstrate anatomical position, general features, attachments and articulations (medial and lateral).</li> <li>• Describe Intramembranous development.</li> <li>• Describe ossification in detail and Fracture of Clavicle</li> <li>• Able to read a relevant research article</li> </ul>	❖ Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. Clavicle (Chapter 3, Page143,153,154).
Scapula	<ul style="list-style-type: none"> <li>• Determine the side</li> <li>• Demonstrate anatomical position, general features, attachments and articulations (medial and lateral).</li> <li>• Describe scapular anastomosis and its clinical significance</li> <li>• Able to read a relevant research article</li> </ul>	❖ Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. Scapula (Chapter 3, Page143-145,154,171,172).
Anterior axioappendicular muscles	<ul style="list-style-type: none"> <li>• Describe Superficial fascia with cutaneous nerve and vessels of anterior axioappendicular region.</li> <li>• Understand the bio-physiological aspects of anterior axioappendicular region.</li> <li>• Able to read a relevant research article and use digital library</li> </ul>	❖ Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. Anterior axioappendicular muscles (Chapter 3, Page 168,169).
Posterior axioappendicular muscles	<ul style="list-style-type: none"> <li>• Tabulate Muscles of the pectoral region (origin, insertion, nerve supply, action and applied).</li> <li>• Identify and describe the pectoral and clavipectoral fascia.</li> <li>• Able to read a relevant research article and use digital library</li> </ul>	❖ Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. Posterior axioappendicular muscles (Chapter 3, Page 170,171).
Axilla	<ul style="list-style-type: none"> <li>• Define axilla</li> <li>• Describe its boundaries,</li> <li>• Enumerate the Contents of axilla, (axillary artery with its branches, axillary vein and tributaries, axillary lymphatics, lymph nodes and brachial plexus).</li> </ul>	❖ Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. Axilla (Chapter 3, Page 183-190,197,198).
Brachial plexus	<ul style="list-style-type: none"> <li>• Describe the formation of brachial plexus its roots and trunks.</li> <li>• Describe the origin and root values of different nerves arising</li> <li>• Able to read a research article on brachial plexus</li> <li>• Able to use digital library</li> </ul>	❖ Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. Brachial plexus (Chapter 3, Page 191-196).
Brachial plexus injuries	<ul style="list-style-type: none"> <li>• Describe the different neurological deficits arising as a result of damaged to roots, trunks and branches of brachial plexus at different levels.</li> <li>• Able to read a research article on brachial plexus</li> </ul>	❖ Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. Brachial plexus injuries (Chapter 3, Page 199-200).
Breast	<ul style="list-style-type: none"> <li>• Describe the extent of breast</li> <li>• Describe the relations of breast</li> <li>• Describe structure of gland.</li> <li>• Discuss related clinical</li> </ul>	❖ Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. Breast (Chapter 4, Page 315-318,323-326).

## Physiology Self Directed Learning (SDL)

Topics Of SDL	Learning Objectives	Learning Resources
Concept of body fluids & internal environment.	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Concept of extracellular and intracellular fluid</li> <li>• Homeostasis</li> <li>• Examples of control system</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition, General principles and Energy production in Medical Physiology (chapter 01, Page 03)</li> <li>❖ Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup>Edition. Introduction to physiology, control systems and homeostasis, chapter no. 1, page no. 40.49</li> <li>❖ Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular physiology, chapter 01. Page 1</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Introduction to Physiology.(Section 01, Chapter1, page 03).</li> </ul>
Cell membrane & classification of cell organelles	<ul style="list-style-type: none"> <li>• Structure of cell membrane</li> <li>• Cell cytoskeleton</li> <li>• Cytoplasm and various organelles</li> <li>• Golgi Apparatus and its function</li> <li>• Lysosomes and peroxisomes</li> <li>• Secretory vesicles</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ganong's Review of Medical Physiology.25<sup>TH</sup>Editions, Overview of Cellular Physiology in Medical Physiology (chapter 02, Page33)</li> <li>❖ Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Compartmentation, chapter 3, page95</li> <li>❖ Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. The cell (chapter 01,section 1 Page 03, 18)</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Introduction to Physiology.(Section 1, chapter 03, page 31)</li> </ul>
Intracellular communication and cell junction	<ul style="list-style-type: none"> <li>• Receptors and its types</li> <li>• Cellular signaling and various mechanisms</li> <li>• Signal transduction</li> <li>• Hormone receptors and their activation</li> <li>• Second messenger mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition., Overview of Cellular Physiology in Medical Physiology (chapter 02, Page 33-44)</li> <li>❖ Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup>Edition. Compartmentation, chapter 3, page109</li> <li>❖ Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Gastrointestinal Physiology</li> <li>❖ Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition The cell (chapter 01, Page14)</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>Edition. Introduction to Endocrinology.(Section 14, Page 920)</li> </ul>



<p>Receptors and signal transduction</p>	<ul style="list-style-type: none"> <li>• Receptors and its types</li> <li>• Cellular signaling and various mechanisms</li> <li>• Signal transduction</li> <li>• Hormone receptors and their activation</li> <li>• Second messenger mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ganong's Review of Medical Physiology.25<sup>TH</sup>Editions, Overview of Cellular Physiology inMedical Physiology (Chapter 02, Page 41)</li> <li>❖ Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Communication, chapter 6, page204</li> <li>❖ Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 7, principles ofhormone action and endocrine control (Chapter 50, Page817)</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Introduction to Physiology.(Section 1, Chapter 02, page 13)</li> </ul>
<p>Homeostasis Control System- I (Negative Feedback System, Conceptof Error and Gain)</p>	<ul style="list-style-type: none"> <li>• Control systems of body</li> <li>• Negative and positive feedback mechanism and their examples</li> <li>• Apoptosis and necrosis</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition, Overview of Cellular Physiology inMedical Physiology (Chapter 02, Page 62)</li> <li>❖ Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Introduction to physiology, chapterno. 1, page no. 45</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Introduction to Physiology.(Section 1, Chapter 1, page 04,07) (Chapter 03, Page 45)</li> </ul>
<p>Genetics, Transcriptionand Translation</p>	<ul style="list-style-type: none"> <li>• Building blocks of DNA</li> <li>• Genetic code</li> <li>• Process of transcription and translation</li> <li>• Types of RNA</li> <li>• Cell division</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition, General principles and Energy productionin MedicalPhysiology (Chapter 01, Page 63)</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>Edition. (Section 01, Chapter03, Page31)</li> </ul>
<p>Structure of Nucleus, Ribosomes andCell Division</p>	<ul style="list-style-type: none"> <li>• Structure of Nucleus</li> <li>• Ribosomes</li> <li>• Mitosis &amp; Overview of cancer</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition, Overview of Cellular Physiology inMedical Physiology (Chapter 02, Page42)</li> <li>❖ Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup>Edition. Compartmentation, chapter 3, page100</li> <li>❖ Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. the cell (Chapter 01,Page7,)</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>Edition. (Section 01, Chapter02, Page 19)</li> </ul>

<p>Transport across cell membrane and its various types (osmosis, diffusion, primary and secondary active transport)</p>	<ul style="list-style-type: none"> <li>• Types of transport across cell membrane</li> <li>• Diffusion and osmosis</li> <li>• Concept of gating of channels</li> <li>• Primary active transport</li> <li>• Secondary active transport</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition, Overview of Cellular Physiology in Medical Physiology (Chapter 02, Page 45)</li> <li>❖ Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Membrane dynamics chapter 5, page 160</li> <li>❖ Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular physiology, chapter 1, page 5</li> <li>❖ Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. Properties and functions of cell membrane, chapter 2, page 18</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Membrane Physiology. (Section 02, Chapter 04, Page 51)</li> </ul>
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### Biochemistry Self Directed Learning (SDL)

Topics Of SDL	Learning Objectives	Learning resources
<p>Cell and cell organelles</p>	<ul style="list-style-type: none"> <li>• Explain composition of normal cell</li> <li>• Describe methods to separate different organelles of cell</li> <li>• Describe structure, functions and marker enzymes of ER &amp; Golgi apparatus</li> <li>• Describe structure, functions and marker enzymes of lysosome, peroxisome &amp; ribosome</li> <li>• Describe structure, functions and marker enzymes of mitochondria and Nucleus</li> <li>• Illustrate the clinical conditions and congenital defects of cell organelles</li> </ul>	<ul style="list-style-type: none"> <li>❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9<sup>th</sup> edition (chapter 1, page 3)</li> </ul>
<p>Cell membrane</p>	<ul style="list-style-type: none"> <li>• Explain composition of cell membrane</li> <li>• Understand fluid mosaic model</li> <li>• Describe functions performed by each component</li> </ul>	<ul style="list-style-type: none"> <li>❖ Harper's illustrated biochemistry 32<sup>nd</sup> edition (chapter 40 page - 460)</li> </ul>
<p>Transport across cell membrane</p>	<ul style="list-style-type: none"> <li>• Explain transport of various substances by active and passive transport, diffusion, phagocytosis, endocytosis and exocytosis</li> <li>• Correlate the clinical disorders with defective transport across cell membrane</li> </ul>	<ul style="list-style-type: none"> <li>○</li> <li>❖ Harper's illustrated biochemistry 32<sup>nd</sup> edition (Chapter 40 page 467)</li> </ul>

Osmosis, osmotic pressure and oncotic pressure	<ul style="list-style-type: none"> <li>Define osmosis and osmotic pressure.</li> <li>Discuss biochemical application of osmotic and oncotic pressure and methods to measure them.</li> <li>Correlate oncotic pressure with clinical scenarios</li> </ul>	❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9 <sup>th</sup> edition (Chapter 02 page 46)
Phenomenon of viscosity, surface tension.	<ul style="list-style-type: none"> <li>Define phenomenon of viscosity, surface tension.</li> <li>Explain Biochemical applications and methods to measure them.</li> </ul>	❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9 <sup>th</sup> edition (Chapter 02 page 52, 55)
Donnan equilibrium, adsorption and ion exchange resins	<ul style="list-style-type: none"> <li>Define Donnan equilibrium, adsorption and ion exchange resins.</li> <li>Describe their effects on tissue fluids and biochemical importance</li> </ul>	○ ❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9 <sup>th</sup> edition (Chapter 02 page 50)
Marker enzymes	<ul style="list-style-type: none"> <li>Interpret the role of measuring activity of different enzymes in the diagnosis and prognosis of different diseases</li> </ul>	❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9 <sup>th</sup> edition (Chapter 6 page 168)
Enzyme as medicines	<ul style="list-style-type: none"> <li>Interpret the role of Enzyme as medicine and their effects on body.</li> </ul>	❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9 <sup>th</sup> edition (Chapter 06 page 169) ❖ Lippincott Illustrated reviews of biochemistry 8 <sup>th</sup> edition (Chapter 05 page 69)
Nucleic acids.	<ul style="list-style-type: none"> <li>Explain biochemical aspects of Nucleic acids</li> <li>State analogs of Nucleic acids</li> </ul>	❖ Lippincott Illustrated reviews of biochemistry 8 <sup>th</sup> edition (Chapter 30 page 459)
DNA	<ul style="list-style-type: none"> <li>Explain structure and biological importance of DNA, types of DNA</li> <li>Differentiate between DNA &amp; RNA</li> </ul>	❖ Lippincott Illustrated reviews of biochemistry 8 <sup>th</sup> edition (Chapter 30 page 460)
RNA	<ul style="list-style-type: none"> <li>Explain structure, types and functions of RNA</li> </ul>	❖ Lippincott Illustrated reviews of biochemistry 8 <sup>th</sup> edition (Chapter 31 page 482)
Transcription	<ul style="list-style-type: none"> <li>Describe mechanism of Transcription of prokaryotes &amp; Eukaryotes</li> </ul>	❖ Lippincott Illustrated reviews of biochemistry 8 <sup>th</sup> edition (Chapter 31 page 484)
Cancer	<ul style="list-style-type: none"> <li>Explain biochemical basis of cancer</li> </ul>	❖ Harper's illustrated biochemistry 32 <sup>nd</sup> edition (Chapter 56 page 681)

### Histology Practicals Skill Laboratory (SKL)

Practical	At The End Of The Practical Student Should Be Able To	Learning Domains	Teaching Strategy	Assessment Tool
Introduction to Microscope	• Identify different types of microscopes.	C1	Skill lab Demo	OSPE
	• Describe functions of different parts of microscope.	C1		
	• Identify different types of lenses.	C1		
	• Focus slides.	P		
Simple epithelium	• Classify epithelium.	C2	Skill lab Demo	OSPE
	• Illustrate different types of simple epithelium	P		
	• Identify types of simple epithelium.	P		
	• Write two points of identification	C1		
Stratified epithelium /Transional Epithelium	• Classify stratified epithelium.	C1	Skill lab Demonstration	OSPE
	• Illustrate different types of stratified epithelium	C1		
	• Discuss functions of stratified epithelium	C2		
	• Enlist sites of specific type of epithelium	C2		
	• Identify type of stratified epithelium under microscope	C1		
	• Write two points of identification	P		
Mammary gland	• Illustrate the different stages of activity of mammary gland	C2	Skill lab Demonstration	OSPE
	• Identify the slides of different stages of mammary gland	P		

### Physiology Practicals Skill Laboratory (SKL)

Topic	Learning Objectives	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to Microscope	• Identification of different parts especially focusing lenses and their uses	C1	Skill Lab	OSPE
	• Focusing technique of different blood slides e.g Neubauer's chamber TLC & DLC slides	P		
Introduction to Wintrobe & Westergen tube	• Identify the wintrobe and westergen tubes	C1	Skill Lab	OSPE
	• Should know the differences between two tubes and uses in different methods	P		
Apparatus identification	• Complete study of Neubauer's slide, calculation of volumes of corner squares and central squares	P	Skill Lab	OSPE

(Introduction to Neubauer's chamber, Red Blood Cell (RBC) pipettes & White Blood Cell (WBC) pipette)	• Important differentiating points between WBC & RBC's pipettes	C1		
	• How to dilute the two pipettes	P		
	• Should know the composition of diluting fluids	C1		
Apparatus identification (Introduction to centrifuge machine)	• Be aware with the electrical connections of centrifuge machine and to control different speeds	P,A	Skill Lab	OSPE

### Biochemistry Practicals Skill Laboratory (SKL)

Topic	At the end of practical students should be able to	Learning domain	Teaching strategy	Assessment Tool
Introduction	• Describe laboratory techniques	C1	Skill Lab	OSPE
	• State precautions while working in the laboratory	C1		
Introduction to glassware	• Describe Pipetting and familiarity with glassware used in the laboratory	C1	Skill Lab	OSPE
Physic chemical principals; Adsorption, Surface Tension & Emulsion	• Illustrate process of adsorption and adsorbents	P	Skill Lab	OSPE
	• Demonstrate mechanism of surface tension and surfactants	P		
	• Demonstrate mechanism of emulsion	P		
Physic chemical principals; tonicity	• Demonstrate effects of solutions of different tonicity on red cells (isotonic, hypotonic and hypertonic)	P	Skill Lab	OSPE

## **SECTION - III**

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- **CBLs**
- **Vertical Integration LGIS**
- **Longitudinal Themes**
  - **Biomedical Ethics & Professionalism**
  - **Family Medicine**
  - **Artificial Intelligence (Innovation)**
  - **Integrated Undergraduate Research Curriculum (IUGRC)**

## Basic and Clinical Sciences (Vertical Integration)

### Case Based Learning (CBL)

Subject	Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain
Anatomy	<ul style="list-style-type: none"> <li>Fracture of clavicle</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
	<ul style="list-style-type: none"> <li>Winging of scapula due to long thoracic nerve injury</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
Physiology	<ul style="list-style-type: none"> <li>Down's syndrome</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
	<ul style="list-style-type: none"> <li>Smoker's cough</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	<ul style="list-style-type: none"> <li>Enzymes</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
	<ul style="list-style-type: none"> <li>Genetics/PCR</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3

## Large Group Interactive Sessions (LGIS)

### Pathology

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tools
Introduction to Pathology	<ul style="list-style-type: none"> <li>Define the following terms:</li> <li>Etiology</li> <li>Pathogenesis</li> <li>Morphology</li> </ul>	C1	LGIS SGD	MCQ
Cellular Responses to Injury	<ul style="list-style-type: none"> <li>Discuss cellular responses to injury for:</li> <li>Reversible injury</li> <li>Adaptation</li> <li>Irreversible injury</li> <li>Cell death</li> </ul>	C2	LGIS SGD	MCQ
	<ul style="list-style-type: none"> <li>Describe, the morphologic changes in cell injury culminating in necrosis and apoptosis</li> </ul>	C2		
Intracellular Accumulations	<ul style="list-style-type: none"> <li>Describe types of intracellular accumulations with clinical examples:</li> <li>Lipids/ fat</li> </ul>	C2	LGIS SGD	MCQ

	<ul style="list-style-type: none"> <li>Protein</li> <li>Glycogen</li> <li>Pigments</li> </ul>			
	<ul style="list-style-type: none"> <li>Explain mechanism of intracellular accumulations.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Enlist causes of fatty change</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe the pathogenesis of fatty liver</li> </ul>	C1		
Pigments	<ul style="list-style-type: none"> <li>Classify pigments</li> </ul>	C2	LGIS SGD	MCQ
	<ul style="list-style-type: none"> <li>Explain the mechanism of pigment production and deposition in various clinical settings</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Describe the morphological features (gross/ microscopic) with deposition of following pigments: Lipofuscin, Melani, Hemosiderin, Bilirubin, Anthracosis</li> </ul>	C1		
Free Radicals/ Reactive Oxygen Species (Ros). Oxidative Stress	1. Define ROS/free radicals	C1	LGIS SGD	MCQ
	2. Enlist oxygen derived free radicals	C1		
	3. Describe mechanism of generation of free radicals	C2		
	4. Describe mechanism of removal of free radicals(antioxidants)	C2		
	5. Describe the pathologic effects of free radicals	C2		
Irreversible Injury. Necrosis	<ul style="list-style-type: none"> <li>Define necrosis</li> </ul>	C1	LGIS SGD	MCQ
	<ul style="list-style-type: none"> <li>Enlist patterns/types with clinical examples</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe morphological changes (gross and microscopic) in necrosis</li> </ul>	C2		
Apoptosis (Irreversible Injury)	<ul style="list-style-type: none"> <li>Define apoptosis</li> </ul>	C1	LGIS SGD	MCQ
	<ul style="list-style-type: none"> <li>Enlist clinical examples of apoptosis in physiologic conditions</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Enlist clinical examples of apoptosis in pathologic conditions</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe mechanism of apoptosis</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Tabulate differences between necrosis and apoptosis</li> </ul>	C1		
Genetic Disorders	<ul style="list-style-type: none"> <li>Classify human genetic disorders</li> </ul>	C1	LGIS SGD PBL	MCQ
	<ul style="list-style-type: none"> <li>Define mutation</li> </ul>	C1		
	Define the following inheritance pattern: <ul style="list-style-type: none"> <li>Autosomal dominant</li> <li>Autosomal recessive</li> <li>X-linked</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe diseases associated with consanguineous marriages</li> </ul>	C2		



## Pharmacology

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to Pharmacology	• Define pharmacology	C1	LGIS	MCQ
	• Discuss main branches of Pharmacology	C2		
	• Define drug according to WHO	C1		
	• Describe drug nomenclature	C1		
	• Cite important drug references	C1		
	• Describe the sources of drug	C2		
Routes of drug administration	• Enlist different routes of drug administration	C1	LGIS	MCQ
	• Discuss the merits and demerits of each route of drug administration	C2		
	• Identify the factors the influence the choice of the route of drug administration	C2		
Absorption of drugs	• Define drug absorption	C1	LGIS	MCQ
	• Identify different sites of drug absorption	C1		
	• Recall transport processes utilized by the drug for absorption across different sites	C1		
	•			
Factors affecting absorption of drugs	• Enlist drug and body related factors affecting drug absorption	C1	LGIS	MCQ
	• Briefly discuss different factors affecting drug absorption	C2		
Distribution of drugs	• Define distribution of drug	C1	LGIS	MCQ
	• Identify different body compartments	C1		
	• Explain distribution of drug through various body compartments	C2		
	• Enlist factors affecting distribution of drugs	C1		

## Community Medicine

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Health for All	• Describe Man and medicine towards health for all	C1	LGIS	MCQS
	• Explain different eras of medicine	C1		
	• Describe different systems of medicine	C1		
Genetics	• Discuss Population Genetics	C1	LGIS PBL	MCQS

## Medicine

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Medicine Evidence based medicine	• Define evidence based Medicine	C1	LGIS	MCQs
	• Discuss its applications.	C2		
	• Discuss components of EBM.	C2		
Bedside teaching	• Explain how to take history of the patient and which steps to follow	C2	LGIS	MCQs
General physical examination	• Explain How to perform GPE	C2	LGIS	MCQs
	• Discuss the importance of various signs	C2		
	• Discuss its correlation with systemic examination	C2		

## Surgery

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
History taking & its importance	• Enlist the components of a detail history	C1	LGIS	MCQs
	• Describe Importance of each component	C2		
Breast surgery	• Describe the extension of breast	C1	LGIS	MCQs
	• Discuss different condition requiring breast surgery	C1		
	• Enlist steps involved in breast surgery	C1		
	• Describe outcomes of breast surgery	C1		

## Obstetrics & Gynaecology

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to Fertilization, Implantation, embryogenesis, congenital abnormalities	<ul style="list-style-type: none"> <li>Understand the process of conception and implantation.</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>Know the importance of embryogenesis</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Identify major structural abnormalities</li> </ul>	C1	LGIS	MCQs
	<ul style="list-style-type: none"> <li>Understand the factors involved in fetal structural abnormalities</li> </ul>	C2		

## Padiatrics

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Medical Genetics & Dysmorphology	Describe the chromosomal abnormality and clinical features of trisomy 21	C2	LGIS	MCQs

## Medical Education

Topic	Learning Objectives At the end of the lecture the student should be able to	Teaching Strategy	Assessment Tool
Orientation of Integrated Modular system	<ul style="list-style-type: none"> <li>Understand the concept of integration</li> <li>Understand the orientation of integrated modular curriculum of RMU</li> <li>Discuss the concept of internal assessment</li> <li>To comprehend the rules of eligibility of professional examination</li> </ul>	LGIS	MCQs
Leadership, mission & vision	<ul style="list-style-type: none"> <li>Define clinical leadership</li> <li>Differentiate between management and leadership</li> <li>Types of leadership style</li> <li>Discuss the mission and vision RMU</li> <li>Define mission vision and strategies</li> </ul>	LGIS	MCQs

Professionalism	<ul style="list-style-type: none"> <li>• Define medical professionalism</li> <li>• Describe attributes of healer and professional</li> <li>• Discuss the social contract of medical profession</li> <li>• List values, skills and behavior for professionalism</li> </ul>	LGIS	MCQs
Lecture on feedback	<ul style="list-style-type: none"> <li>• Receive and provide effective feedback</li> <li>• Describe types of feedback</li> <li>• Discuss principles of feedback</li> <li>• Discuss essential elements of feedback</li> </ul>	LGIS	MCQs
Islam and Medical Science	<ul style="list-style-type: none"> <li>• Discuss role of Islam and importance of Islam in Medical Science</li> </ul>	LGIS	MCQs

### Behavioral Sciences

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction To Behavioral Sciences	<ul style="list-style-type: none"> <li>• To describe Holistic and Traditional Allopathic medicine.</li> </ul>	C1	LGIS	MCQs
Management of stress	<ul style="list-style-type: none"> <li>• Define the types of stress, its causes and management of stress</li> </ul>	C1		

### Biomedical Ethics & Professionalism

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to History of Medical Ethics	<ul style="list-style-type: none"> <li>• To appraise the historical perspective of Hippocratic oath</li> <li>• Understanding the beginnings of contemporary bioethics to address ethical dilemmas</li> </ul>	C2 C2	LGIS	MCQs

## Family Medicine

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to Family Medicine & its application in health care system	<ul style="list-style-type: none"> <li>• Describe presenting complains of patients with body aches</li> </ul>	C3	LGIS-1	MCQs
	<ul style="list-style-type: none"> <li>• Disscus complications of body aches</li> </ul>			
	<ul style="list-style-type: none"> <li>• Descirbe intial treatment of patients with body aches</li> </ul>			
	<ul style="list-style-type: none"> <li>• Know when to refer patient to consultant/ Hospital</li> </ul>			

## Artificial Intelligence (Innovation)

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to Artificial Intelligence	<ul style="list-style-type: none"> <li>• Discuss fractures of upper limb with their clinical significance.</li> <li>• Discuss role of artificial intelligence in interpretation of radiographs</li> </ul>	C2	LGIS	MCQS

## Integrated Undergraduate Research Curriculum (IUGRC)

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
<b>Theoretical Lecture Based Teachings</b>				
Introduction to Community Medicine	Define Community Medicine, public health, preventive medicine	C1		
	Differentiate Community medicine and preventive medicine	C2		
	Elaborate evolution of preventive medicine/public health	C2		
	Discuss role of public health in prevention of diseases	C2		
	Discuss importance of public health	C2		
Introduction to Health Research process and researcher (Research-I)	<ul style="list-style-type: none"> <li>• Define Health Research &amp; Concept of Health research methods.</li> </ul>	C1	LGIS-1	MCQs
	<ul style="list-style-type: none"> <li>• Understand background and value of research in health &amp; human development</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Elaborate Fundamental types and fields of health research covering;                             <ul style="list-style-type: none"> <li>- Basic &amp; Applied Research</li> <li>- Quantitative &amp; Qualitative Research</li> <li>- Collaborative &amp; Multidisciplinary research</li> <li>- Health Research triangle</li> </ul> </li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Conceptualize the drivers of research Including;                             <ul style="list-style-type: none"> <li>- Curiosity</li> <li>- Health needs</li> <li>- Opportunity Profit</li> </ul> </li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Describe meanings of HR &amp; HRM</li> </ul>			
	<ul style="list-style-type: none"> <li>• Appreciate role of HR in healthcare practices and human development</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Differentiate among various types and fields of HR</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Explain different drivers of HR</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Explain meanings of various characteristics of health research process so as to</li> </ul>	C2		
Characteristics of research and health research methods (Research-II)	<ul style="list-style-type: none"> <li>• Differentiate research activity from non-research activity.</li> </ul>	C2	LGIS-2	MCQs
	<ul style="list-style-type: none"> <li>• Elaborate ingredients of researcher</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Appreciate the importance of commands in certain pre-requisite subjects &amp; skills before undertaking a research study.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Define Health Research</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>• Discuss the criteria for selection of a research topic</li> </ul>	C2		

	<ul style="list-style-type: none"> <li>Elaborate the types of variable</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Differentiate between qualitative and quantitative data</li> </ul>	C2		
Basics of Ethics in Health Research ( Research-III)	<ul style="list-style-type: none"> <li>Appreciate value of ethics in conduct of Health Research.</li> </ul>	C2	LGIS-3	MCQs
	<ul style="list-style-type: none"> <li>Explain basic ethical principles of health research.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Interpret the application of data collection ethics</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Explain ethics of research methods</li> </ul>	C2		
Basics of Ethics in Health Research ( Research-IV)	<ul style="list-style-type: none"> <li>Narrate responsibility for ethics in HR.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Explain Nuremburg code and importance of ethics in current research trends.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Elaborate General ethical principles including explanation of 04 basic principles of Beneficence, non-maleficence, respect and justice</li> </ul>	C2		
Five steps of EBM	<ul style="list-style-type: none"> <li>Discuss Five steps of EBM</li> </ul>	C2	LGIS-3	MCQs

## **SECTION - IV**

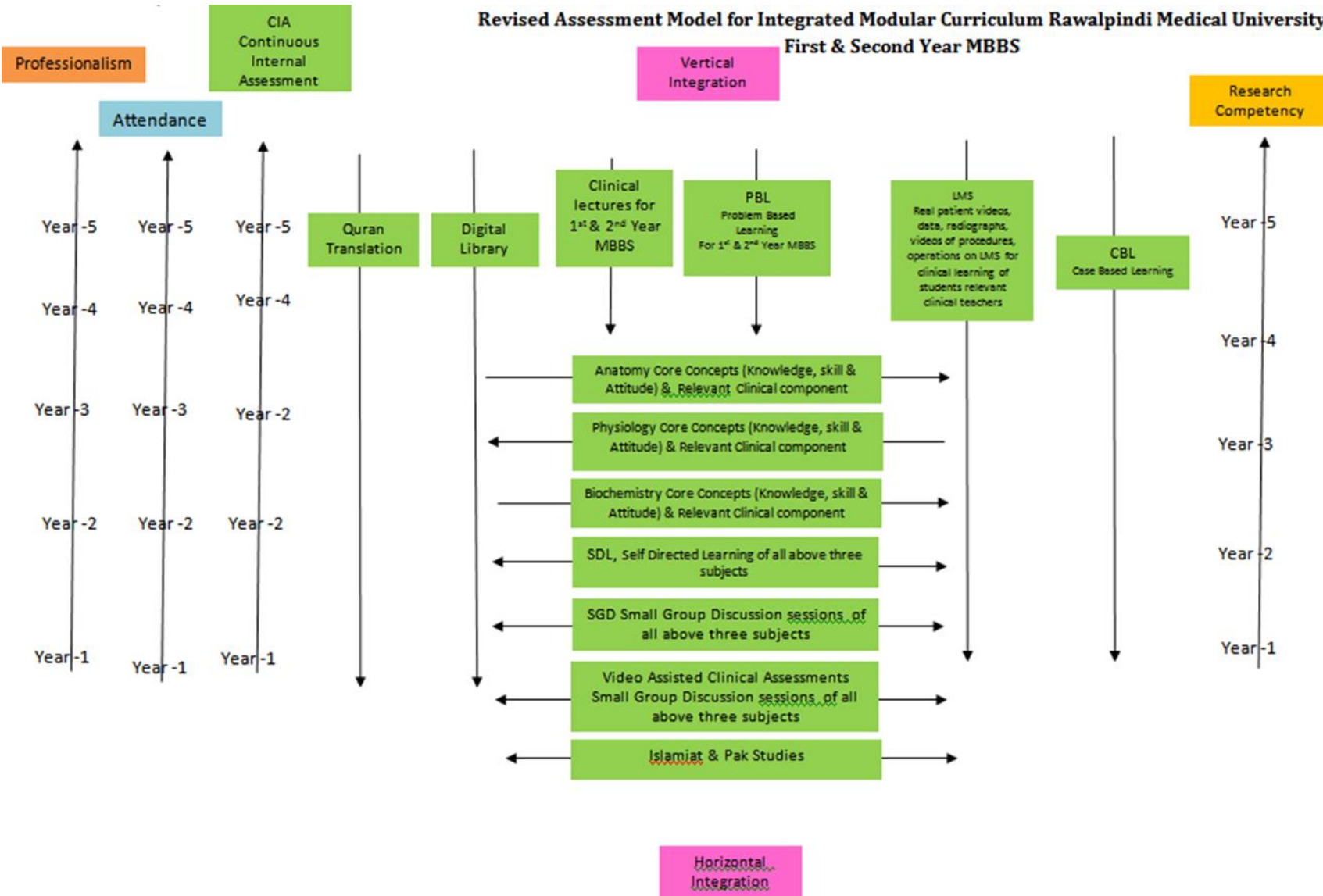
### **Assessment Policies**

#### **Contents**

- **Assessment plan**
- **Types of Assessment:**
- **Modular Examinations**
- **Block Examination**
- **Table 4: Assessment Frequency & Time in Foundation Module**



## Revised Assessment Model for Integrated Modular Curriculum Rawalpindi Medical University First & Second Year MBBS



### Gauge for Continuous Internal Assessment (CIA)

Red Zone	High Alert	Yellow Zone	Green Zone	Excellent	Extra Ordinary
0 - 25%	26 - *50%	51 - 60%	61 - 70%	71 - 80%	81 - 100%

\*50% and above is Passing Marks.

### Gauge for attendance percentage

Red Zone	High Alert	Yellow Zone-1	Yellow Zone-2	Green Zone	Excellent
0 - 25%	26 - 50%	51 - 60%	61 - 74%	*75 - 80%	81 - 100%

90% is eligibitly criteria for appearing in professional examination.

## Assessment plan

University has followed the guidelines of Pakistan Medical and Dental Council for assessment. Assessment is conducted at the mid modular, modular and block levels.

### Types of Assessment:

The assessment is formative and summative.

Formative Assessment	Summative Assessment
Formative assessment is taken at modular (2/3 <sup>rd</sup> of the module is complete) level through MS Teams. Tool for this assessment is best choice questions and all subjects are given the share according to their hour percentage.	Summative assessment is taken at the mid modular (LMS Based), modular and block levels.

### Modular Assessment

Theory Paper	Viva Voce
There is a module examination at the end of first module of each block. The content of the whole teaching of the module are tested in this examination. It consists of paper with objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module. (Annexure I attached)	Structured table viva voce is conducted including the practical content of the module.

### Block Assessment

On completion of a block which consists of two modules, there is a block examination which consists of one theory paper and a structured viva with OSPE.

Theory Paper	Block OSPE
There is one written paper for each subject. The paper consists of objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module.	This covers the practical content of the whole block.

**Table 4-Assessment Frequency & Time In Foundation Module I**

Block	Sr #	Module – 1 Foundation Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block-I	1	Mid Module Examinations LMS based (Anatomy, Physiology & Biochemistry)	Summative	30 Minutes	3 Hour 15 Minutes	45 Minutes	2 Formative	6 Summative
	2	Topics of SDL Examination on MS Team	Formative	30 Minutes				
	3	End Module Examinations (SEQ & MCQs Based)	Summative	2 Hours				
	4	Anatomy Structured and Clinically Oriented Viva	Summative	10 Minutes				
	5	Physiology Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	6	Assessment of Clinical Lectures	Formative	15 Minutes				
	7	Assessment of Bioethics Lectures	Summative	2 Minutes				
	8	Assessment of IUGRC Lectures	Summative	10 Minutes				

## Learning Resources

Subject	Resources
Anatomy	<p><b>A. Gross Anatomy</b></p> <ol style="list-style-type: none"> <li>1. Gray's Anatomy by Prof. Susan Standring 42th edition, Elsevier.</li> <li>2. Clinical Anatomy for Medical Students by Richard S.Snell 10<sup>th</sup> edition.</li> <li>3. Clinically Oriented Anatomy by Keith Moore 9<sup>th</sup> edition.</li> <li>4. Cunningham's Manual of Practical Anatomy by G.J. Romanes, 16th edition, Vol-I, II and III</li> </ol> <p><b>B. Histology</b></p> <ol style="list-style-type: none"> <li>1. B. Young J. W. Health Wheather's Functional Histology 6<sup>th</sup> edition.</li> <li>2. Medical Histology by Prof. Laiq Hussain 7<sup>th</sup> edition.</li> </ol> <p><b>C. Embryology</b></p> <ol style="list-style-type: none"> <li>1. Keith L. Moore. The Developing Human 11<sup>th</sup> edition.</li> <li>2. Langman's Medical Embryology 14<sup>th</sup> edition.</li> </ol>
Physiology	<p><b>A. Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Textbook Of Medical Physiology by Guyton And Hall 14<sup>th</sup> edition.</li> <li>2. Ganong ' S Review of Medical Physiology 26<sup>th</sup> edition.</li> </ol> <p><b>B. Reference Books</b></p> <ol style="list-style-type: none"> <li>1. Human Physiology by Lauralee Sherwood 10<sup>th</sup> edition.</li> <li>2. Berne &amp; Levy Physiology 7<sup>th</sup> edition.</li> <li>3. Best &amp; Taylor Physiological Basis of Medical Practice 13<sup>th</sup> edition.</li> <li>4. Guyton &amp; Hall Physiological Review 3<sup>rd</sup> edition.</li> </ol>
Biochemistry	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Harper's Illustrated Biochemistry 32th edition.</li> <li>2. Lehninger Principle of Biochemistry 8<sup>th</sup> edition.</li> <li>3. Biochemistry by Devlin 7<sup>th</sup> edition.</li> </ol>
Community Medicine	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Community Medicine by Parikh 25<sup>th</sup> edition.</li> <li>2. Community Medicine by M Illyas 8<sup>th</sup> edition.</li> <li>3. Basic Statistics for the Health Sciences by Jan W Kuzma 5<sup>th</sup> edition.</li> </ol>
Pathology/Microbiology	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Robbins &amp; Cotran, Pathologic Basis of Disease, 10<sup>th</sup> edition.</li> <li>2. Rapid Review Pathology, 5<sup>th</sup> edition by Edward F. Goljan MD.</li> <li>3. <a href="http://library.med.utah.edu/WebPath/webpath.html">http://library.med.utah.edu/WebPath/webpath.html</a></li> </ol>
Pharmacology	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Lippincot Illustrated Pharmacology 9<sup>th</sup> edition.</li> </ol>

## **SECTION - V**

### **Time Table**

**Integrated Spiral Clinically Oriented Modular Curriculum for First Year MBBS**

**Foundation Module Time Table**

**First Year MBBS**

**Session 2022 - 2023**

**Batch- 50**

## Foundation Module Team

Module Name : Foundation Module  
 Duration of module : 06 Weeks  
 Coordinator : Dr. Mohtasham Hina  
 Co-coordinator : Dr. Zeneera Saqib  
 Reviewed by : Module Committee

Module Committee			Module Task Force Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Mohtasham Hina (Associate Professor of Anatomy)
2.	Director DME	Prof. Dr. Rai Muhammad Asghar	2.	DME Focal Person	Dr. Sidra Hamid
3.	Convener Curriculum	Prof. Dr. Naeem Akhter	3.	Co-coordinator	Dr. Zeneera Saqib (Demonstrator of Anatomy)
4.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	4.	Co-Coordinator	Dr. Uzma kiayani (Senior Demonstrator of Physiology)
5.	Additional Director DME	Prof. Dr. Ifra Saeed	5.	Co-coordinator	Dr. Shahrukh Khan (Senior Demonstrator of Biochemistry)
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar			
7.	Chairperson Biochemistry	Dr. Aneela Jamil	<b>DME Implementation Team</b>		
8.	Focal Person Anatomy First Year MBBS	Prof Dr. Ayesha Yousaf	1.	Director DME	Prof. Dr. Rai Muhammad Asghar
9.	Focal Person Physiology	Dr. Sidra Hamid	2.	Implementation Incharge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
10.	Focal Person Biochemistry	Dr. Aneela Jamil	3.	Deputy Director DME	Dr Shazia Zaib
11.	Focal Person Pharmacology	Dr. Zunera Hakim	4.	Module planner & Implementation coordinator	Dr. Sidra Hamid
12.	Focal Person Pathology	Dr. Asiya Niazi	5.	Editor	Muhammad Arslan Aslam
13.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
14.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
15.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar			
16.	Focal Person Family Medicine	Dr. Sadia Khan			

### Discipline wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
1	Anatomy	Introduction To General Anatomy	General Embryology <ul style="list-style-type: none"> <li>• Introduction To Human Development</li> <li>• Oogenesis</li> <li>• Spermatogenesis</li> <li>• Female Reproductive Cycles</li> <li>• Ovulation And Fertilization</li> <li>• Cleavage And Blastocyst Formation</li> <li>• Development Of Mammary Gland</li> </ul>	General Histology <ul style="list-style-type: none"> <li>• Types Of Epithelium</li> <li>• Specialization Of Apical Cell Surface</li> <li>• Intercellular Junctions and Adhesions</li> <li>• Glandular Epithelium</li> <li>• Histology Of Mammary Gland</li> </ul>	<ul style="list-style-type: none"> <li>• Anatomicomedical Terminologies I</li> <li>• Anatomicomedical Terminologies II (Anatomical Terms And Axis Of Movements)</li> <li>• Anatomicomedical Terminologies III (Cell and Tissues)</li> <li>• Anatomicomedical Terminologies IV (Skin &amp; Body System)</li> <li>• Clavicle</li> <li>• Scapula</li> <li>• Humerus</li> <li>• Anterior Axioappendicular Muscles</li> <li>• Posterior Axioappendicular Muscles</li> <li>• Axilla</li> <li>• Brachial Plexus</li> <li>• Brachial Plexus Injuries</li> <li>• Breast</li> <li>• Sternoclavicular And Acromioclavicular Joints</li> <li>• Radiograph And Surface Anatomy of Axioappendicular Region</li> </ul>
	<ul style="list-style-type: none"> <li>• Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>• Cell And Cell Organelles, Cell Membrane and Transport Across Cell Membrane, Physicochemical Properties, Enzymes, Cancer, Nucleic Acid Chemistry, Genetics</li> </ul>			
	<ul style="list-style-type: none"> <li>• Physiology</li> </ul>	<ul style="list-style-type: none"> <li>• Functional Organization of The Human Body and Control of the “Internal Environment</li> <li>• The Cell and Its Functions</li> <li>• Genetic Control of Protein Synthesis, Cell Function, And Cell Reproduction</li> <li>• Transport Of Substances Through the Cell Membrane</li> </ul>			
	<ul style="list-style-type: none"> <li>• Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>• The Holy Quran Translation Component</li> </ul>			
	<ul style="list-style-type: none"> <li>• Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to history of medical ethics</li> </ul>			
	<ul style="list-style-type: none"> <li>• Artificial Intelligence</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to Artificial Intelligence</li> </ul>			



Innovation	
<ul style="list-style-type: none"> <li>• Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to Family Medicine &amp; its application in health care system</li> </ul>
<ul style="list-style-type: none"> <li>• Research (IUGRC )</li> </ul>	<ul style="list-style-type: none"> <li>• Research I Introduction of health research process</li> <li>• Research II characteristic of reserch process</li> <li>• Research III Basis of ethics in health research</li> <li>• Research IV Five Steps of EBM</li> </ul>
<ul style="list-style-type: none"> <li>• Behavioral Sciences</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to Behavioral Sciences</li> <li>• Management of stress</li> </ul>
<ul style="list-style-type: none"> <li>• Vertical Integration</li> </ul>	<p>Clinically content relevant to Foundation module</p> <ul style="list-style-type: none"> <li>• Opening ceremony (DME)</li> <li>• Introduction To Different Teaching Strategies, Role Of Team Leader Facilitator And Students SGD/LGIS/TBL/PAL/INTERNET &amp; Literature Group activity (DME)</li> <li>• Leadership Professionalism (DME)</li> <li>• Orientation to integrated modular system (DME)</li> <li>• Lecture on feedback (DME)</li> <li>• Mission and vision (DME)</li> <li>• Introduction to Pharmacology</li> <li>• Routs of drug administration (Pharmacology)</li> <li>• Absorption of drugs (Pharmacology)</li> <li>• Factors affecting drug absorption (Pharmacology)</li> <li>• Distribution of drugs (Pharmacology)</li> <li>• Introduction to Pathology</li> <li>• Cellular response to injury (Pathology)</li> <li>• Intracellular accumulations (Pathology)</li> <li>• Pigments (Pathology)</li> <li>• Free radical and reactive oxygen species (Pathology)</li> <li>• Irreversible cell injury/apoptosis (Pathology)</li> <li>• Genetic disorders (Pathology)</li> <li>• Introduction to Community Medicine (Community Medicine)</li> <li>• Introduction to medicine (Medicine)</li> <li>• History of medicine (Medicine)</li> <li>• Medicine and allied subjects (Medicine)</li> <li>• Chromosomal abressions (Medicine)</li> <li>• History taking and general physical examination (Medicine)</li> </ul>

## Categorization of Modular Content of Anatomy:

Category A*	Category B**		Category C ***			
General Embryology	General Histology	General Anatomy	Demonstrations / SGD	CBL	Practical's	Self-Directed Learning (SDL)
Introduction to human development Oogenesis Spermatogenesis Female reproductive cycles Ovulation and fertilization Cleavage and blastocyst formation development of mammary gland	Types of epithelium Specialization of apical cell surface Intercellular junction and adhesions Glandular epithelium Histology of mammary gland	Introduction to General anatomy	Anatomicomedical terminologies I Anatomicomedical terminologies II (Anatomical terms and axis of movements) Anatomicomedical terminologies III (Cell and tissues) Anatomicomedical terminologies IV (Skin & Body system) Clavicle Scapula Humerus Anterior axioappendicular muscles Posterior axioappendicular muscles Axilla Brachial plexus & injuries Breast Sternoclavicular and acromioclavicular joints Radiograph and surface anatomy of axioappendicular region	Clavicle Brachial plexus injuries	Introduction to microscope, Slide preparation artifact Simple epithelium Stratified epithelium Mammary gland	Clavicle Scapula Anterioraxioappendicular muscles Posterior axioappendicular muscles Axilla brachial plexus Injuries of brachial plexus Breast

**Category A\*:** By Professors

**Category B\*\*:** By Associate & Assistant Professors

**Category C\*\*\*:** By Senior Demonstrators & Demonstrators

### Teaching Staff / Human Resource of Department of Anatomy

Sr. #	Designation Of Teaching Staff / Human Resource	Total Number Of Teaching Staff
1.	Professor of Anatomy department	01
2.	Associate professor of Anatomy department	01
3.	Assistant professor of Anatomy department (AP)	01
4.	Demonstrators of Anatomy department	03

### Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$2 * 13 = 26$ hours
2.	Small Group Discussions (SGD)	$2*12+ 1*2=26$ hours
3.	Case Based Learning (CBL)	$2* 2 = 4$ hours
4.	Practical / Skill Lab	$1.5 * 20 = 30$ hours

### Categorization of Modular Content of Physiology:

Category A*	Category B**	Category C***				
LGIS	LGIS	PBL	CBL	Practical's	SGD	SDL
Introduction To Physiology Department (By Prof Dr. Samia Sarwar)	Concept of body fluids & internal environment (By Dr. Sidra Hamid)		Body Fluid Compartment, Cell Membrane and Cytoskeleton, Down's Syndrome	Introduction to Microscope Introduction to Wintrobe and Westergen tube Apparatus identification (Introduction to Neubauer's chamber, Red Blood Cell (RBC) pipettes & White Blood Cell (WBC) pipette 4. Apparatus identification (Introduction to centrifuge machine)	Functional Organization of Human Body and Cell Physiology Cellular Control Mechanism, Cell Cycle and programmed cell death / apoptosis	Concept of body fluids & internal environment Genetics, Transcription and Translation Receptor and signal transduction Structure of Nucleus, Ribosomes and Cell Division Cellular Control Mechanism, Cell Cycle and programmed cell death / apoptosis
Homeostasis Control System- I (Negative Feedback System, Concept Of Error And Gain) (By Prof Dr. Samia Sarwar)	Intracellular communication and cell junction (By Dr. Sidra Hamid)					
Homeostasis Control System- II (positive feedback, and concept of feed forward, adaptive control and vicious cycle) (By Prof Dr. Samia Sarwar)	Receptor and signal transduction (By Dr. Sidra Hamid)					
Structure of Nucleus, Ribosomes and Cell Division (By Prof Dr. Samia Sarwar)	Active Transport- Ii (Secondary Active Transport) (Dr. Sheena Tariq)					
Cell membrane & classification of cell organelles (By Dr. Shmyla Hamid)						

Cell organelles & related cell function – I (By Dr. Shmyla Hamid)						
Cell organelles & related cell function – II (By Dr. Shmyla Hamid)						
Genetics, Transcription and Translation (By Dr. Shmyla Hamid)						
Active Transport- I (Primary Active Transport) (By Dr. Shmyla Hamid)						

**Category A\*:** By Professors

**Category B\*\*:** By Associate & Assistant Professors

**Category C\*\*\*:** By Senior Demonstrators & Demonstrators

### Teaching Staff / Human Resource of Department of Physiology

Sr. #	Designation Of Teaching Staff / Human Resource	Total Number Of Teaching Staff
1.	Professor of physiology department	01
2.	Associate professor of physiology department	01
3.	Assistant professor of physiology department (AP)	01
4.	Demonstrators of physiology department	07
5.	Residents of physiology department (PGTs)	06

#### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LECTURES)	$2 * 18 = 36$ hours
2.	Small Group Discussions (SGD)/CBL	$1\text{hr } 40\text{ mint} * 20 = 33\text{ hrs.} \& 20\text{ mint} + 1\text{hr} = 34\text{hrs} \& 20\text{ minutes}$
3.	Problem Based Learning (PBL)	---
4.	Practical / Skill Lab	$1\text{hour } 40\text{ minutes} * 20 = 33\text{ hours and } 20\text{ minutes}$
5.	Self-Directed Learning (SDL)	$1\text{hour} * 8 = 8$ hours

### Categorization of Modular Content of Department Of Biochemistry:

Category A*	Category B**	Category C***			
LGIS	LGIS	PBL	CBL	Practical's	SGD
Nucleic Acids	Cell & cell organelles		Enzymes PCR	Introduction to glassware (pipetting)	Cell & Cell Membrane
Nucleic acid Chemistry	Cell membrane			Surface Tension Emulsion	Physicochemical Aspects of cell
Replication	Transport across cell membrane			Adsorption	
Transcription	Physicochemical aspects			Tonicity	
Translation	Water & PH				
Mutation	Cancer				
Recombinant DNA/ PCR	Enzymes				

**Category A\*:** By Hod and Assistant Professor

**Category B\*\*:** By All (Hod, Assistant Professors, Senior Demonstrators)

**Category C\*\*\*:** (By All Demonstrators)

### Teaching Staff / Human Resource of Department of Biochemistry

Sr. #	Designation Of Teaching Staff / Human Resource	Total Number Of Teaching Staff
1	Assistant professor of biochemistry department (AP)	02
2	Demonstrators of biochemistry department	08

### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours (Faculty)	Total Hours (student)
1.	Large Group Interactive Session (LECTURES)	$2 * 11 = 22$ hours	11
2.	Small Group Discussions (SGD)	$1.5 * 6 = 09$ hours	09
3.	Problem Based Learning (PBL)	$2 * 1 = 2$ hours	02
4.	Practical / Skill Lab	$1.5 * 04$	06
5.	Self-Directed Learning (SDL)	$1 * 8 = 8$ hours	08



## Time Table For Foundation Module (First Week) (13-02-2023 To 18-02-2023)

Date/Day	8:30 AM – 11:00 AM	11:00 AM – 11:40AM	11:40 AM – 12:20 PM				12:20-PM – 02:00 PM		
13-02-2023 Monday	Welcome address by VC Introduction to RMU, Allied hospitals, Introduction to Medical Education Department & Integrated Modular System, Introduction to basic & clinical sciences & IT Services	Introduction To Anatomy Department	Introduction To Physiology Department &		Introduction to Biochemistry Department		Anatomy Bio data forms		
HR	Vice Chancellor RMU: Prof. Dr. Muhammad Umar Principle RMC: Prof Dr. Jahangir Sarwar Prof. Dr. Rai Muhammad Asghar: Director Medical Education * Director IT *	Prof. Dr. Ayesha Yousaf (HOD& DEAN)**	Prof. Dr. Samia Sarwar **		Dr. Aneela**		Dr. Zeneera (Even)	Dr. Urooj (Odd)	
14-02-2023 Tuesday	8:00 AM – 9:00 AM	9:00 AM – 10:00 AM	10:00 AM – 11:00 AM		11:00 AM – 12:00 PM		12:20-2:00 PM		
	BEHAVIORAL SCIENCES(LGIS)	PHARMACOLOGY	PATHOLOGY	COMMUNITY MEDICINE (LGIS)	FAMILY MEDICINE	ARTIFICIAL INTELLIGENCE	Physiology & Biochemistry bio data forms		
	Introduction to Behavioral Sciences		Introduction to Pharmacology and Pathology (Teachers will switch at 9:30 am)		Introduction to community medicine & IUGRC		Introduction to family medicine	Introduction to AI	
HR	Prof. Dr. Muhammad Munir (Even)	Dr. Sadia Yasir (Odd)	Dr. Mudasira (Even)	Dr. Omaima (Odd)	Dr. Sana Bilal (Even)	Dr. Khaula Noreen (Odd)	Dr. Sadia Khan	Dr. Fawad	
15-02-2023 Wednesday	8:00 AM- 10:00AM		10:00 AM – 11:00 AM		11:00 AM – 12:00 PM		12:20-2:00 PM		
	DISSECTION / SGD			BEHAVIORAL SCIENCES(LGIS)		PHYSIOLOGY (LGIS)		BIOCHEMISTRY (LGIS)	
	Anatomicomedical terminologies I (positions and planes)			Management of stress		Cell Physiology & homeostasis	Concept of body fluids & Internal environment		
HR	3 Demonstrators 3 Batches of Students			Dr. Sadia (Even)	Dr. Zona (Odd)	Dr. Shmyla Hamid (Even)	Dr. Sidra Hamid (Odd)		
16-02-2023 Thursday	8:00 AM – 10:00 AM	10:00 – 11:00AM	11:00- 12:00PM		12:00 – 01:00PM		1:00-2:00 PM		
	DISSECTION/SGD		DME		PHYSIOLOGY (LGIS)		ANATOMY (LGIS)		
	Anatomicomedical terminologies II (Anatomical terms and axis of movements)		Introduction To Different Teaching Strategies, Role of Team Leader Facilitator and Students SGD/LGIS/TBL/PAL/INTERNET & Literature Group activity		Concept of body fluids & Internal environment	Cell Physiology & homeostasis	Embryology	General Anatomy	
HR	3 Demonstrators 3 Batches of Students		Dr. Sidra Hamid (Even)	Dr. Rizwana Shahid (Odd)	Dr. Sidra Hamid (Even)	Dr. Shmyla (Odd)	Prof. Dr. Ayesha Yousaf (Even)	Ass. Prof. Dr Arslan (Odd)	
17-02-2023 Friday	8:00 AM – 9:00 AM		9:00 AM – 10:00 AM		10:00 AM – 11:00 AM		11:00 AM – 12:00 PM		
	ISLAM & MEDICAL SCIENCE	QURAN TRANSLATION	ANATOMY LGIS		DME		PHARMACOLOGY		
	Islam And Medical Science	Introduction to Quran Translation	General Anatomy	Embryology	Leadership & Professionalism	Orientation to Integrated modular system	Routes of drug administration		
HR	Moulana Abdul Wahid (Even)	Mufti Naeem Sherazi (Odd)	Ass. Prof. Dr Arsalan (Even)	Prof. Dr. Ayesha Yousaf (Odd)	Dr. Arsalan (Even)	Dr Sidra Hamid (Odd)	Dr Omaima (Even)	Dr Zunera (Odd)	
18-02-2023 Saturday	8:00 AM – 9:00 AM	9:00 AM – 10:00 AM	10:00 AM – 11:00 AM		11:00 AM – 12:00 AM		12:00 AM – 1:00 PM		
	DISSECTION/SGD		DME		MEDICINE		BIOCHEMISTRY (LGIS)		
	Anatomicomedical terminologies III (Cell and tissues)		Orientation to Integrated modular system	Leadership & Professionalism	Introduction to medicine		Cell membrane	Cell Organelles-I	
HR	3 Demonstrators 3 Batches of Students		Dr Sidra Hamid (Even)	Dr. Arslaan (Odd)	Dr. Sadaf Zaman (Even)	Dr. Sana Ahmed (Odd)	Dr. Kashif Rauf (Even)	Dr. Shahrukh Khan (Odd)	

BREAK 12:00 – 12:20PM

**Details of Venue & Batches**

Schedule For Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion			
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue
Monday	C	B	E	A	D	A	01-120	Dr. Zeneera Saqib	Lecture Hall No.03 Anatomy Lecture Hall
Tuesday	D	C	A	B	E	B	121-240	Dr Urooj Shah	Lecture Hall No.04 Anatomy Lecture Hall
Wednesday	E	D	B	C	A	C	241-onwards	Dr Ali Raza	Dissection Hall
Thursday	B	A	D	E	C				
Saturday	A	E	C	D	B				

Venue For First Year Batches For PBL & SGD Team-I				Sr. No	Batch	Roll no	Names of Teachers		
Batches	Roll No	Venue					Biochemistry	Physiology	
Batch-A1	(01-35)	Lecture Hall no.05 (Physiology)	Dr. Sheena Tariq	1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq	
Batch-A2	(36-70)	Lecture Hall no.04 (1 <sup>st</sup> Floor Anatomy)	Dr. Uzma Kiani	2.	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani	
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)	Dr. Fahd Anwar	3.	Batch –C	141-210	Dr. Shahrukh Khan	Dr. Fahd Anwar	
Batch-B2	(106-140)	Conference room (Basement)	Dr. Fareed Ullah	4.	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas	
Batch-C1	(141-175)	Lecture Hall NO. 04 (Basement)	Dr. Maryam Abbas (PGT Physiology)	5.	Batch -E	281-onwards	Dr. Faiza Zafar	Dr. Fareed	
Batch-C2	(176-210)	Lecture Hall NO. 05 (Basement)	Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall NO. 03 (First Floor)	Dr. Iqra Ayub (PGT Physiology)	<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>					
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)	Dr. Shahrukh (PBL) Dr. Muhammad Usman (SGD)	<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03		
Batch-E1	(281-315)	Lecture Hall no.01	Dr. Ismail (PGT Physiology)	<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.02	Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Time Table For Foundation Module (Second Week)**  
**(20-02-2023 To 25-02-2023)**

DATE/ DAY	8:00 AM – 9:00 AM	9:00 AM – 10:00 AM	10:00 AM – 11:00 AM	11:00 AM – 12:00 AM	12:20 PM TO 02:00PM	Home Assignment
20-02-2023 <b>Monday</b>	<b>DISSECTION/ SGD</b>		<b>BIOETHICS</b>		<b>PHYSIOLOGY (LGIS)</b>	
	Anatomicomedical terminologies IV (Skin and body systems)		Introduction to History of Medical Ethics	Cell membrane & classification of cell organelles	Intracellular communication and cell junction	
21-02-2023 <b>Tuesday</b>	<b>SGD/CBL</b>		<b>PHYSIOLOGY SSGD</b>		<b>PHYSIOLOGY (LGIS)</b>	
	Clavicle		Concept Of Body Fluid and Internal Environment	Intracellular communication and cell junction	Cell membrane & classification of cell organelles	
22-02-2023 <b>Wednesday</b>	<b>Dissection / SGD</b>		<b>PATHOLOGY (LGIS)</b>		<b>PHARMACOLOGY LGIS</b>	
	Scapula		Cellular response to Injury	Absorption of drugs		
23-02-2023 <b>Thursday</b>	<b>COMMUNITY -MEDICINE</b>		<b>BIOCHEMISTRY LGIS</b>		<b>PATHOLOGY (LGIS)</b>	
	Basics of Ethics in Health Research (Research-III)		Cell Organelle-II	Transport across cell membrane	Intra Cellular accumulation	
24-02-2023 <b>Friday</b>	<b>BIOCHEMISTRY LGIS</b>		<b>ISLAM AND MEDICAL SCIENCE</b>		<b>PHYSIOLOGY (LGIS)</b>	
	Transport across cell membrane	Cell organelle-II	Introduction to Quran translation	Islam And Medical Science	Receptor and signal transduction	Cell organelles & related cell function - I
25-02-2023 <b>Saturday</b>	<b>DISSECTION/ SGD</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>PHARMACOLOGY (LGIS)</b>	
	Humerus		Physico chemical aspects-I	Physico chemical aspects-I	Distribution of drugs	

BREAK 12:00 – 12:20PM

BREAK

Topics For Practical with Venue						Topics For Small Group Discussion& CBLs With Venue				
<ul style="list-style-type: none"> <li>• Introduction to Microscope and Preparation of Slide. Artifacts (Anatomy/Histology-practical) venue-Histology Laboratory (Dr. Ali Raza)</li> <li>• Introduction to glass wares (Pipetting) (Biochemistry practical) venue- Biochemistry lab)</li> <li>• Introduction to Microscope. (Physiology-Practical (Physiology Laboratory)</li> </ul>						<ul style="list-style-type: none"> <li>• Physiology small group discussion-Functional organization of human body and cell physiology venue-Lecture Hall 5</li> <li>• Biochemistry small group discussion – Cell&amp; Cell membrane- Lecture Hall 3</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	01-120	Dr. Zeneera Saqib	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	121-240	Dr Urooj Shah	Lecture Hall No.04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	241-onwards	Dr Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C					
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL & SGD Team-I						Sr.No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	Lecture Hall no.05 (Physiology)		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	Lecture Hall no.04 (1 <sup>st</sup> Floor Anatomy)		Dr. Uzma Kiani		2.	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar		3.	Batch –C	141-210	Dr. Shahrukh Khan	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareed ullah		4.	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas
Batch-C1	(141-175)	Lecture Hall NO. 04 (Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards	Dr. Faiza Zafar	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall NO. 05 (Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall NO. 03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh (PBL) Dr. Muhammad Usman (SGD)		<b>Odd Roll Numbers</b>		New Lecture Hall Complex Lecture Theater # 03		
Batch-E1	(281-315)	Lecture Hall no.01		Dr. Ismail (PGT Physiology)		<b>Even Roll Number</b>		New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.02		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						
Venues for Large Group Interactive Session (LGIS) and SDL										

## Time Table For Foundation Module (Third Week) (27-02-2023 To-04-03-2023)

DATE/DAY	8:00 AM – 9:00 AM	9:00 AM – 10:00 AM	10:00 AM – 11:00 AM	11:00 AM – 12:00 PM	12:20 PM – 02:00 PM	Home Assignment	
27-02-2023 Monday	<b>DISSECTION / SGD</b>		<b>MEDICINE</b>		<b>BIOCHEMISTRY LGIS</b>		
	Anterior axioappendicular muscles		History of Medicine		Physico chemical aspects-I	Physico chemical aspects-I	
Dr. Saleha Imran (Odd)			Dr. Ayesha Habib (Even)	Dr. Nayab (Even)	Dr. Almas (Odd)		
28-02-2023 Tuesday	<b>DISSECTION / SGD</b>		<b>(ANATOMY LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		
	Posterior axioappendicular muscles		Histology	Embryology	Cell organelles & cell function - II	Homeostasis Control System- I (Negative Feedback System, Concept of Error and Gain)	
			Types of epithelium	Gametogenesis (Oogenesis)			
Associate. Prof			Prof. Dr. Ayesha	Dr. Shmyla Hamid	Prof. Dr. Samia Sarwar /Dr. Uzma		
01-03-2023 Wednesday	<b>BIOCHEMISTRY (LGIS)</b>		<b>PATHOLOGY LGIS</b>		<b>ANATOMY LGIS</b>		
	Physico chemical aspects-II	Physico chemical aspects-II	Pigments		Embryology	Histology	
	Dr. Almas (Even)	Dr. Nayab (Odd)	Dr. Abid (Even)	Dr Ayesha (Odd)	Prof. Dr. Ayesha (Even)	Ass. Prof. Dr Mohtasham (Odd)	
02-03-2023 Thursday	<b>PEADS</b>		<b>COMMUNITY MEDICINE</b>		<b>BIOCHEMISTRY</b>		
	Medical genetic & dysmorphology		Basics of Ethics in Health Research (Research -IV)		Physico chemical aspects-II	Physico chemical aspects-II	
					Genetics, transcription & translation	Homeostasis Control System-II (positive feedback, and concept of feed forward, adaptive control and vicious cycle)	
Dr. Safdar Ijaz (Even)	Dr. Maria Shamsheer (Odd)	Dr Uzma Hayat (Even)	Dr Rizwana (Odd)	Dr. Almas (Odd)	Dr. Nayab (Even)	Dr. Shmyla Hamid (Even)	Prof. Dr. Samia Sarwar /Dr. Uzma (Odd)
03-03-2023 Friday	<b>MEDICINE</b>		<b>DME</b>		<b>BIOCHEMISTRY</b>		
	Medicine And Allied Subjects		Lecture on Feedback	Lecture on Mission & Vision	pH & Water	Nucleic acid chemistry	
Homeostasis Control System-II (positive feedback, and concept of feed forward, adaptive control and vicious cycle)			Genetics, transcription & translation				
Dr. Umer Daraz (Even)	Dr. Iqra Ashraf (Odd)	Dr. Sidra Hamid (Even)	Dr. Arsalan (Odd)	Dr. Shahrukh (Even)	Dr. Anoosh (Odd)	Prof. Dr. Samia Sarwar /Dr. Uzma (Even)	Dr. Shmyla Hamid (Odd)
04-03-2023 Saturday	<b>Dissection</b>		<b>Anatomy LGIS</b>		<b>BIOCHEMISTRY (LGIS)</b>		
	Dissection / Spotting		Embryology	Embryology	Nucleic acid chemistry	pH & Water	
			Gametogenesis	Gametogenesis	Cell membrane ion channels, transport across cell membrane	Structure of nucleus, ribosomes and cell division	
Prof. Dr. Ayesha (Odd)			Associate. Prof Dr. Mohtashim	Dr. Shahrukh (Odd)			Dr. Anoosh (Even)

BREAK 12:00PM TO 12:20PM

12:00pm – 12:30pm

Online LMS Assessment Will be Conducted in Evening (Date and time will be shared with separate notification)

Topics For Practical with Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>Simple Epithelium (Anatomy/Histology-practical) venue-Histology Laboratory (Dr. Zeneera)</li> <li>Physiochemical aspects of cell - surface tension and Emulsion (Biochemistry practical) venue- Biochemistry Lab)</li> <li>Introduction to Wintrobe &amp; Westergen tube (Physiology-Practical (Physiology Laboratory))</li> </ul>						<ul style="list-style-type: none"> <li>Physiology CBL –Body fluid compartment, cell membrane &amp; cytoskeletal-venue-Lecture Hall 5 (First Floor)</li> <li>Biochemistry Small Group Discussion - Physico chemical aspects of cell membrane - Lecture Hall 3 (First Floor)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	01-120	Dr. Zeneera Saqib	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	121-240	Dr Urooj Shah	Lecture Hall No.04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	241-onwards	Dr Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C					
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	Lecture Hall no.05 (Physiology)		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	Lecture Hall no.04 (1 <sup>st</sup> Floor Anatomy)		Dr. Uzma Kiani		2.	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar		3.	Batch –C	141-210	Dr. Shahrukh Khan	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareed Ullah		4.	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas
Batch-C1	(141-175)	Lecture Hall NO. 04 (Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards	Dr. Faiza Zafar	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall NO. 05 (Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall NO. 03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh (PBL) Dr. Muhammad Usman (SGD)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03	
Batch-E1	(281-315)	Lecture Hall no.01		Dr. Ismail (PGT Physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02	
Batch-E2	(315 onwards)	Lecture Hall no.02		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						
Venues for Large Group Interactive Session (LGIS) and SDL										

## Time Table For Foundation Module (Fourth Week) (06-03-2023 To 11-03-2023)

DATE / DAY	8:00 AM – 9:00 AM	9:00 AM – 10:00 AM	10:00 AM – 11:00 AM	11:00 AM – 12:00 PM	12:20 PM – 02:00 PM	Home Assignment				
06-03-2023 Monday	<b>BIOCHEMISTRY (LGIS)</b>		<b>ANATOMY (LGIS)</b>		<b>PATHOLOGY SGD</b>		<b>PHYSIOLOGY(LGIS)</b>		<b>Practical &amp;CBL</b> Topics & Venue mentioned at the end	SDL Physiology Genetics, transcription & translation
	Cancer	PH & Water-II	Histology	Embryology	Free Radicals/ Reactive Oxygen Species (ROS).		Structure of nucleus, ribosomes and cell division	Cell membrane ion channels, transport across cell membrane		
	Dr. Almas (Even)	Dr. Shahrukh (Odd)	Ass. Prof. Dr Mohtashim (Even)	Prof. Dr. Ayesha (Odd)	Dr. Abid (Even)	Dr Ayesha (Odd)	Dr. Uzma (Even)	Dr. Shmyla Hamid (Odd)		
07-03-2023 Tuesday	<b>BIOCHEMISTRY (LGIS)</b>		<b>ANATOMY(LGIS)</b>		<b>DME</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>Practical &amp;CBL</b> Topics & Venue mentioned at the end	SDL Physiology Structure of nucleus ribosome's & cell division
	PH & Water-II	Cancer	Embryology	Histology	Mission and vision lecture	Lecture on Feedback	Nucleic acid II	Intro and classification of enzymes		
	Dr. Shahrukh (Even)	Dr. Almas (Odd)	Prof. Dr. Ayesha (Even)	Ass. Prof. Dr Mohtashim (Odd)	Dr. Arsalan (Even)	Dr. Sidra Hamid (Odd)	Dr. Anoosh (Even)	Dr. Uzma Zafar (Odd)		
08-03-2023 Wednesday	<b>DISSECTION / SGD</b>				<b>PATHOLOGY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>Practical &amp;CBL</b> Topics & Venue mentioned at the end	SDL Biochemistry Nucleic Acid Chemistry Online SDL Evaluation will be conducted from 12 to 12.30 noon
	Axilla				Irreversible injury / Necrosis		Transport across cell membrane, Osmosis	Cellular control mechanism, cell cycle programmed cell death/ apoptosis		
			Dr. Abid (Even)	Dr Ayesha (Odd)	Dr. Shmyla Hamid (Even)	Dr. Uzma (Odd)				
09-03-2023 Thursday	<b>ANATOMY LGIS</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>SURGERY</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>Practical &amp;CBL</b> Topics & Venue mentioned at the end	SDL Biochemistry Cancer
	Histology	Embryology	Intro. & classification of Enzymes	Nucleic acid-II	Breast surgery		Cellular control mechanism, cell cycle programmed cell death/ apoptosis	Transport across cell membrane, Osmosis		
	Intercellular junctions and adhesions	Ovulation and fertilization	Dr. Uzma Zafar (Even)	Dr. Anoosh (Odd)	Dr. Ali Kamran (Even)	Dr. Samra Riaz (Odd)	Dr. Uzma (Even)	Dr. Shmyla Hamid (Odd)		
	Ass. Prof. Dr. Mohtashim (Even)	Prof. Dr. Ayesha (Odd)								
10-03-2023 Friday	<b>PATHOLOGY LGIS.</b>		<b>ANATOMY (LGIS)</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		SDL Anatomy Axilla	
	Irreversible Injury Apoptosis		Embryology	Histology	Properties/factors of Enzymes	Replication	Active Transport I	Active Transport II		
			Ovulation and fertilization	Intra cellular junctions & adhesions						
	Dr. Abid (Even)	Dr Ayesha (Odd)	Prof. Dr Ayesha (Even)	Ass. Prof. Dr Muhtashim (Odd)	Dr. Uzma Zafar (Even)	Dr. Anoosh (Odd)	Dr. Shmyla Hamid (Even)	Dr. Sheena (Odd)		
11-03-2023 Saturday	<b>DISSECTION / SGD</b>				<b>BIOCHEMISTRY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>Practical &amp;CBL</b> Topics & Venue mentioned at the end	SDL Anatomy Brachial plexus
	Brachial plexus				Replication	Properties/factors of Enzymes	Active Transport II	Active Transport I		
					Dr. Anoosh (Even)	Dr. Uzma Zafar (Odd)	Dr. Sheena (Even)	Dr. Shmyla Hamid (Odd)		

Online SDL Evaluation Will be Conducted on 8<sup>th</sup> March,2023

Topics For Practical with Venue						Topics For Small Group Discussion& CBLs With Venue				
<ul style="list-style-type: none"> <li>Stratified epithelium &amp; transitional epithelium (Anatomy/Histology-practical) venue- Histology Laboratory (Dr. Urooj)</li> <li>Physiochemical aspects of cell- Adsorption (Biochemistry practical) venue- Biochemistry laboratory)</li> <li>Apparatus identification (Introduction to Neubauer's chamber, Red Blood Cell (RBC) pipettes&amp; White Blood Cell (WBC) pipette (Physiology-Practical (Physiology Laboratory)</li> </ul>						<ul style="list-style-type: none"> <li>Physiology CBL Down's syndrome – (venue-Lecture Hall 5)</li> <li>Biochemistry CBL – Enzymes-Lecture Hall 3</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	01-120	Dr. Zeneera Saqib	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	121-240	Dr Urooj Shah	Lecture Hall No.04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	241-onwards	Dr Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C					
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	Lecture Hall no.05 (Physiology)		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	Lecture Hall no.04 (1 <sup>st</sup> Floor Anatomy)		Dr. Uzma Kiani		2.	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar		3.	Batch – C	141-210	Dr. Shahrukh Khan	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareed ullah		4.	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas
Batch-C1	(141-175)	Lecture Hall N0. 04 (Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards	Dr. Faiza Zafar	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall NO. 05 (Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall NO. 03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)					<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>	
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh (PBL) Dr. Muhammad Usman (SGD)		<b>Odd Roll Numbers</b>		New Lecture Hall Complex Lecture Theater # 03		
Batch-E1	(281-315)	Lecture Hall no.01		Dr. Ismail (PGT Physiology)		<b>Even Roll Number</b>		New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.02		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						



**Time Table For Foundation Module (Fifth Week)**  
**(13-03-2023 To 18-03-2023)**


DATE / DAY	8:00 AM – 9:00 AM	9:00 AM – 10:00 AM	10:00 AM – 11:00 AM	11:00 AM – 12:00 PM	12:20 PM – 02:00 PM	Home Assignment
13-03-2023 Monday	<b>DISSECTION / CBL</b>		<b>MEDICINE(LGIS)</b>		<b>ANATOMY (LGIS)</b>	
	Brachial plexus injuries		Chromosomal Abrassions		Embryology	Histology
Dr. Madiha Nazr (Odd)			Dr. Mudassir (Even)	Cleavage and formation of blastocyst	Glands	
14-03-2023 Tuesday	<b>DISSECTION</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>GYNAE &amp; OBS</b>	
	Breast		Transcription	MM Equation	Introduction to fertilization . implantation. Embryogenesis and congenital anomalies	
Dr. Aneela (Even)			Dr. Uzma Zafar (Odd)	Dr. Nighat Naheed (Even)	Dr. Sobia Nawaz (Odd)	
15-03-2023 Wednesday	<b>DISSECTION / SGD</b>	<b>PATHOLOGY(LGIS)</b>	<b>BIOCHEMISTRY (LGIS)</b>		<b>BIOCHEMISTRY (LGIS)</b>	
	Dissection/spotting	Genetic disorder	MM Equation	Transcription	Recombinant DNA/ PCR	Mutation
			Dr. Uzma Zafar (Even)	Dr. Aneela (Odd)	Dr. Kashif Rauf (Even)	Dr. Aneela Jamil (Odd)
Dr. Abid (Even)	Dr. Ayesha (Odd)					
16-03-2023 Thursday	<b>DISSECTION / SGD</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>ANATOMY (LGIS)</b>	
	Sternoclavicular and acromioclavicular joints		Translation	Regulation of Enzyme Activity	Histology	Embryology
Dr. Aneela (Even)			Dr. Uzma Zafar (Odd)	Glands	Cleavage and formation of blastocyst	
17-03-2023 Friday	<b>DISSECTION / SGD</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>MEDICINE(LGIS)</b>	
	Radiograph/Surface anatomy of axioapendicular region		Regulation of Enzyme Activity	Translation	History Taking and General Physical Examination	
Dr. Uzma Zafar (Even)			Dr. Aneela (Odd)	Dr. Imran Saeed (Odd)	Dr. Saima Mir (Even)	
18-03-2023 Saturday	Dissection/Spotting		<b>ANATOMY (LGIS)</b>		<b>BIOCHEMISTRY (LGIS)</b>	
			Histology & Development of Mammary Gland	Histology & development of Mammary Gland	Mutation	Recombinant DNA/ PCR
Ass. Prof. Dr Mohtasham (Even)	Prof. Dr. Ayesha (Odd)	Dr. Aneela Jamil (Even)	Dr. Kashif Rauf (Odd)			
Online Clinical Evaluation will be conducted from 12 to 12,15 noon on 16 <sup>th</sup> March,2023						

BREAK 12:00 PM TO 12:20 PM

BREAK

Topics For Practical with Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>Mammary Gland (Anatomy/Histology-practical) Venue-Histology Laboratory (Dr. Ali Raza)</li> <li>Tonicity (Biochemistry practical) Venue- Biochemistry laboratory</li> <li>Apparatus identification (Introduction to centrifuge machine) (Physiology-Practical) Venue-Physiology Laboratory</li> </ul>						<ul style="list-style-type: none"> <li>Physiology SGD – Cellular control mechanism, cell cycle, programmed cell death, Apoptosis</li> <li>Biochemistry CBL – Genetics (PCR) - Lecture Hall 3</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	01-120	Dr. Zeneera Saqib	Lecture Hall No.03 Anatomy Lecture Hall	
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Wednesday	E	D	B	C	A	C	241-onwards	Dr Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C					
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	Lecture Hall no.05 (Physiology)		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	Lecture Hall no.04 (1 <sup>st</sup> Floor Anatomy)		Dr. Uzma Kiani		2.	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar		3.	Batch – C	141-210	Dr. Shahrukh Khan	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareed ullah		4.	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas
Batch-C1	(141-175)	Lecture Hall NO. 04 (Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards	Dr. Faiza Zafar	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall NO. 05 (Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall NO. 03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh (PBL) Dr. Muhammad Usman (SGD)		<b>Odd Roll Numbers</b>		New Lecture Hall Complex Lecture Theater # 03		
Batch-E1	(281-315)	Lecture Hall no.01		Dr. Ismail (PGT Physiology)		<b>Even Roll Number</b>		New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.02		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						
Venues for Large Group Interactive Session (LGIS) and SDL										

**Time Table For Foundation Module (Sixth Week)**  
**(20-03-2023 To 25-03-2023)**

20-03-2023 Monday	Anatomy Viva Voce (Roll no :1-180 students) & Physiology Viva Voce (Roll no :181 to 322 students)
21-03-2023 Tuesday	Physiology Viva Voce (Roll no :1-180 students) & Anatomy Viva Voce (Roll no :181 to 322 students)
22-03-2023 Wednesday	Anatomy Theory Paper & MOCK OSPE
23-03-2023 Thursday	Pakistan Day 
24-03-2023 Friday	Physiology theory Paper& Mock Video Assisted Quiz
25-03-2023 Saturday	Biochemistry Theory paper& Allied

Note: Timetable Subject to Change According To The Current Circumstances

(Logistic details of Assessments will be notified separately)

## SECTION VI

**Table of Specification (TOS) For Foundation Module Examination for First Year MBBS**

Sr. #	Discipline	No. of MCQs (%)	No. of MCQs according to cognitive domain			No. of SEQs (%)		No. of SEQs according to cognitive domain			Viva voce	Total Marks
			C1	C2	C3	No. of items	Marks	C1	C2	C3		
1.	Anatomy	25	15	5	5	5	25	1	2	2	50	100
2.	Physiology	20	12	6	2	4	20	1	2	1	40	90
3.	Biochemistry	20	10	9	1	3	15	0.5	1.5	1		35
4.	Medical education	5										5
5.	Bioethics & Professionalism	1										1
6.	Research, Artificial Intelligence & Innovation	10										10
7.	Pharmacology	2										2
8.	Pathology	3										3
9.	Medicine	2										2
10.	Surgery	1										1
11.	Obs & Gynaecology	1										1
<b>Grand Total</b>											<b>250</b>	

## **Annexure I**

**(Sample MCQ & SEQ papers)**

**RAWALPINDI MEDICAL UNIVERSITY**  
**ANATOMY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs FOUNDATION MODULE EXAM**

1. In a CT scan, a frame is taken longitudinally through the sagittal suture. This plane is also called as
  - a. Median Plane
  - b. Para Saggital plane
  - c. Coronal Plane
  - d. Frontal plane
  - e. Transverse plane
3. After a road traffic accident, a patient presented in ER with pain Upper limb. Radiologist reported the fracture of medial epicondyle of humerus. The nerve prone to injury at this level of humerus is:
  - a. Axillary nerve
  - b. Ulnar nerve
  - c. Median nerve
  - d. Radial nerve
  - e. Scapular nerve
5. Most of lymph of breast drains to:
  - a. Pectoral lymph nodes.
  - b. Internal thoracic lymph nodes.
  - c. Apical lymph nodes.
  - d. Central lymph nodes.
  - e. Subscapular lymph node.
2. During assessment of motor system of the upper limb, the doctor supinates the upper limb. During this movement there is a
  - a. Decrease in the angle at the elbow joint
  - b. Increase in the angle at the elbow joint
  - c. Rotation of the forearm and hand laterally from the midprone position
  - d. Rotation of the forearm and hand medially from the midprone position
  - e. Movement such as palm of the hand faces posteriorly
4. During clinical examination of a 52 years old female, a swelling was found under the skin of chest coinciding with the lateral border of teres major. The group of lymph nodes most likely involved is
  - a. Anterior axillary
  - b. Posterior axillary
  - c. Apical
  - d. Central
  - e. Infraclavicular

**RAWALPINDI MEDICAL UNIVERSITY**  
**ANATOMY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS SEQs FOUNDATION MODULE EXAM**

**Note: Attempt all questions. All questions carry equal marks. Draw diagram where necessary**

1. During a difficult labour baby's upper limb was excessively pulled. Later on he developed right sided muscular weakness in forearm and a claw hand.
  - a. Name the condition he is suffering from? (1)
  - b. Give relations of brachial plexus with special reference to axillary artery. (2)
  - c. Enumerate nerves arising from roots and trunks of brachial plexus. (2)
  
2. A female patient of 42 years of age presented to hospital with painless swelling of left breast along that was firm and adherent to chest wall. On examination, oedematous skin was also present around the swelling.
  - a. Name the condition she may be suffering from (1)
  - b. Give anatomical reason why breast tissue is fixed to underlying chest wall(2)
  - c. Discuss lymphatic drainage of breast

**RAWALPINDI MEDICAL UNIVERSITY**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs FOUNDATION MODULE EXAM**

1. Peroxisomes contain:
  - a. Lipase
  - b. Oxidase
  - c. Hydrolase
  - d. ATPase
  - e. Transferase
3. Enzymes necessary for oxidative phosphorylation are present mainly in which part of mitochondria?
  - a. Cristae
  - b. Mitochondrial matrix
  - c. Outer membrane
  - d. Inner membrane
  - e. Outer chamber
5. The sequence of three DNA bases in a gene is called:
  - a. DNA polymer
  - b. Codon
  - c. Anticodon
  - d. Genetic code
  - e. Okazaki fragment
2. Gain of the feedback system is calculated by:
  - a. Gain= correction error
  - b. Gain error/ correction
  - c. Gain correction/error
  - d. Gain-correction-error
  - e. Gain-correction/error 100
4. Following part of cilia has ATPase activity:
  - a. Axoneme
  - b. Tubulin
  - c. Flagellum
  - d. Basal body
  - e. Dynein arm



**RAWALPINDI MEDICAL UNIVERSITY**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS SEQs FOUNDATION MODULE EXAM**

- Q.1 a. Define active transport and name its types (1,1)
- b. Enumerate the functions of Golgi apparatus (3)
- Q.2 A 40 years old male presented in medical emergency with complaints of severe headache, confusions and fatigue. On examination his blood pressure was 180/110?
- a. Define homeostasis? Name the type of feedback mechanism that controls blood pressure? (2)
- b. Write down the functions of glycocalyx? (3)

**RAWALPINDI MEDICAL UNIVERSITY**  
**BIOCHEMISTRY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs FOUNDATION MODULE EXAM**

1. Serum enzyme begins to raise in 4-8 hours of acute Myocardial Infarction is:
  - a. CKMB
  - b. LDH
  - c. AST
  - d. ALT
  - e. Gama GT
2. Fluidity of cell membrane is maintained by
  - a. Water
  - b. Triglycerides
  - c. Cholesterol
  - d. Integral protein
  - e. Peripheral protein
3. The nitrogen base in inosine monophosphate is:
  - a. Ionone
  - b. Inulin
  - c. Hypoxanthine
  - d. Xanthine
  - e. Inosine
4. Transfer RNA transfers:
  - a. Information from DNA to ribosomes
  - b. Information from mRNA to cytosol
  - c. Amino acid from cytosol to ribosomes
  - d. Proteins from cytosol to ribosomes
  - e. Protein form ribosome to Golgi apparatus

SEQ

- Q1. a. Describe different mechanisms of enzyme catalysis. 2.5  
b. Explain Base Excision Repair of DNA. 2.5

**RAWALPINDI MEDICAL UNIVERSITY**  
**BIOETHICS DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs FOUNDATION MODULE EXAM**

1. ----Includes rules of conduct that may be used to regulate our activities concerning the biological world.
  - a. Bio-piracy
  - b. Biosafety
  - c. Bioethics
  - d. Bio-patents
  - e. Bio-logistic
2. The right of patients having self-decision is called.
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
3. Following is not code of ethics.
  - a. Integrity
  - b. Objectivity
  - c. Confidentiality
  - d. Behaviour
  - e. Autonomy
4. -----in the context of medical ethics, if it's fair and balanced
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
5. -----Principle requiring that physicians provide, positive benefits
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity




Department of Medical Education (DME)

## Musculoskeletal -I Module

**Study Guide**  
**First Year MBBS 2022 - 2023**



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**Document Approval**

<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>
Additional Director Medical Education, Asst. Director Medical Education,	Curriculum Committee	Vice Chancellor



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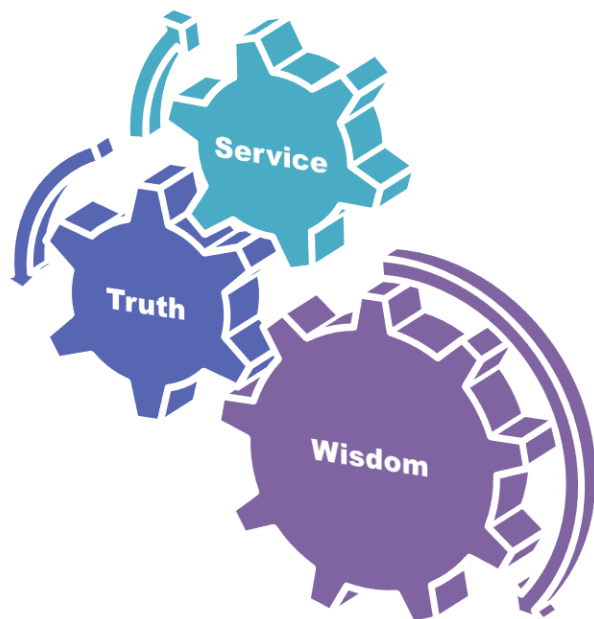


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## RMU Motto



## University Moto, Vision, Values & Goals

### Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

### Vision and Values

Highly recognized and accredited centre of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

### Goals of the Undergraduate Integrated Modular Curriculum

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the Health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of knowledge to help you attain personal and professional growth & excellence.

**First Year MBBS 2023**

**Study Guide**

**MSK-I Module**

## Discipline Wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
I	<ul style="list-style-type: none"> <li>Anatomy</li> </ul>	Skeletal System <ul style="list-style-type: none"> <li>Bones</li> <li>Joints</li> </ul>	General Embryology Second Week of Human Development till Placenta & Fetal Membranes	General Histology <ul style="list-style-type: none"> <li>Connective Tissue</li> <li>Cartilage</li> <li>Bone</li> </ul>	Shoulder joint till Hand
	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>Minerals, Vitamins, Introduction &amp; Classification of Amino Acids</li> </ul>			
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>NMJ, Introduction Concept of Motor Unit. Neuromuscular Transmission, Synthesis &amp; Fate of Acetylcholine</li> <li>Drugs Acting On NMJ, Myasthenia Gravis, Lambert Eaton Syndrome</li> <li>Structure Of Neurons. Classification Of Neurons &amp; Nerve Fibers</li> <li>Nernst Potential, RMP</li> <li>Recording &amp; Propagation of Action Potential &amp; Factors Effecting Nerve Conduction &amp; Hyperpolarized State</li> <li>Stimulus &amp; Response &amp; Types of Stimuli, Stages of Action Potential</li> </ul>			
	<ul style="list-style-type: none"> <li>Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>Islamic concept of Bioethics</li> </ul>			
	<ul style="list-style-type: none"> <li>Research Club Activity</li> </ul>	<ul style="list-style-type: none"> <li>Comprehend their role in under “theme and scheme”</li> </ul>			
	<ul style="list-style-type: none"> <li>Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>Approach to a patient with Body Pains</li> </ul>			
	<ul style="list-style-type: none"> <li>Artificial Intelligence/Radiology</li> </ul>	<ul style="list-style-type: none"> <li>Interpretation of upper limb Radiograph &amp; use of AI</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>The Holy Quran Translation Component</li> </ul>			
<ul style="list-style-type: none"> <li>Vertical Integration</li> </ul>	Clinically content relevant to musculoskeletal-I module <ul style="list-style-type: none"> <li>Shoulder Dislocation (Surgery)</li> <li>Tennis elbow, Fracture of olecranon, Radius and Ulna (Surgery)</li> <li>Osteoporosis (Medicine)</li> <li>Osteomalacia, Rickets &amp; Polyarthritis (Medicine)</li> <li>Accidents (Community Medicine)</li> </ul>				

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## MSK-I Module Team

Module Name : MSK-I Module  
 Duration of module : 05 Weeks  
 Coordinator : Dr. Maria Tasleem  
 Co-coordinator : Dr. Urooj Shah  
 Reviewed by : Module Committee

Module Committee			Module Task Force Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Maria Tasleem (Assistant Professor of Anatomy)
2.	Director DME	Prof. Dr. Rai Muhammad Asghar	2.	DME Focal Person	Dr. Sidra Hamid
3.	Convener Curriculum	Prof. Dr. Naeem Akhter	3.	Co-coordinator	Dr. Urooj Shah (Demonstrator of Anatomy)
4.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	4.	Co-Coordinator	Dr. Fahd Anwar (Senior Demonstrator of Physiology)
5.	Additional Director DME	Prof. Dr. Ifra Saeed	5.	Co-coordinator	Dr. Faiza Zafar (Senior Demonstrator of Biochemistry)
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar	<b>DME Implementation Team</b>		
7.	Chairperson Biochemistry	Dr. Aneela Jamil			
8.	Focal Person Anatomy First Year MBBS	Prof. Dr. Ayesha Yousaf	1.	Director DME	Prof. Dr. Rai Muhammad Asghar
9.	Focal Person Physiology	Dr. Sidra Hamid	2.	Implementation Incharge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
10.	Focal Person Biochemistry	Dr. Aneela Jamil	3.	Deputy Director DME	Dr. Shazia Zaib
11.	Focal Person Pharmacology	Dr. Zunera Hakim	4.	Module planner & Implementation coordinator	Dr. Sidra Hamid
12.	Focal Person Pathology	Dr. Asiya Niazi	5.	Editor	Muhammad Arslan Aslam
13.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
14.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
15.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar			



## Module II – MSK-I Module

**Rationale:** This module deals with locomotor system. This module describes the structural organization, functions, and congenital anomalies of musculoskeletal system. It explains the mechanism of neuromuscular transmission, its biochemical basis and the importance of Ca<sup>++</sup> in the body. It depicts structure and function of joints in upper and lower limb. It elaborates identification of common fractures of long bones on radiograph.

### Module Outcomes

At the end of this module the student should be able to:

#### Knowledge

- Explain the development & structure of musculoskeletal system.
- Explain the physiological and biochemical factors affecting Neuro Muscular transmission.
- Apply the knowledge of the basic sciences to understand common fractures.
- Appreciate concepts & importance of

**Artificial Intelligence**

**Family Medicine**

**Biomedical Ethics**

**Research.**

#### Skills

- Dissect limbs to demonstrate regional Anatomy and relationships of various structures to each other.
- Identify histological features of connective tissue and muscles under microscope.
- Perform practicals on estimation of calcium and protein chemistry.

#### Attitude

- Demonstrate **a professional attitude, team building spirit, good communication skills** and cadaveric handling.

This module will run in 5 weeks duration. Instructional strategies are given in the time table and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

## SECTION - I

### Terms & Abbreviations

#### Contents

- Domains of Learning
- Teaching and Learning
- Methodologies/Strategies
  - Large Group Interactive Session (LGIS)
  - Small Group Discussion (SGD)
  - Self-Directed Learning (SDL)
  - Case Based Learning (CBL)
  - Problem- Based Learning (PBL)
  - Skill Labs/Practicals (SKL)

#### Tables & Figures

- Table1. Domains of learning according to Blooms Taxonomy
- Figure 1. Prof Umar's Model of Integrated Lecture
- Table2. Standardization of teaching content in Small Group Discussions
- Table 3. Steps of taking Small Group Discussions
- Figure 2. PBL 7 Jumps Model

**Table1. Domains Of Learning According to Blooms Taxonomy**

Sr. #	Abbreviation	Domains of learning
1.	C	<b>Cognitive Domain:</b> knowledge and mental skills.
	• C1	Remembering
	• C2	Understanding
	• C3	Applying
	• C4	Analyzing
	• C5	Evaluating
	• C6	Creating
2.	P	<b>Psychomotor Domain:</b> motor skills.
	• P1	Imitation
	• P2	Manipulation
	• P3	Precision
	• P4	Articulation
	• P5	Naturalization
3.	A	<b>Affective Domain:</b> feelings, values, dispositions, attitudes, etc
	• A1	Receive
	• A2	Respond
	• A3	Value
	• A4	Organize
	• A5	Internalize

## Teaching and Learning Methodologies / Strategies

### Large Group Interactive Session (LGIS)

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will be followed for delivery of all LGIS. The lecturer will introduce a topic or common clinical condition and explain the underlying phenomena through questions, pictures, videos of patients, interviews and exercises, etc. Students are actively involved in the learning process.

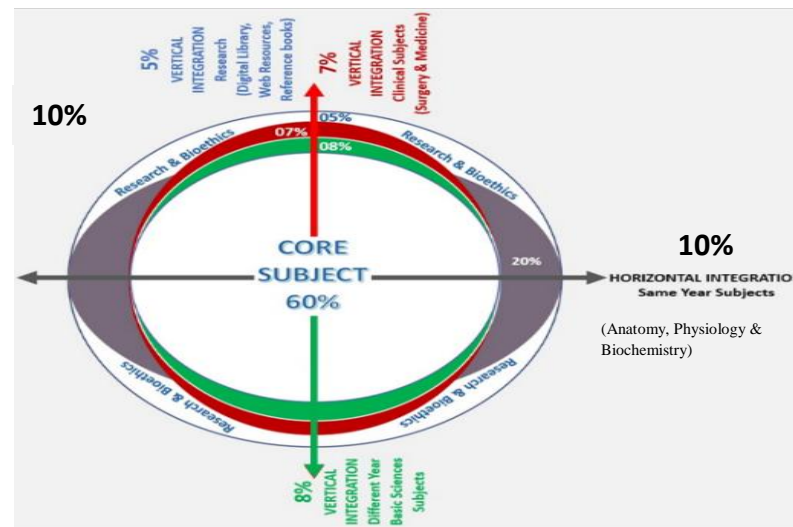


Figure 1. Prof Umar's Model of Integrated Lecture

## Small Group Discussion (SGD)

This format helps students to clarify concepts acquire skills and attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics or power point presentations. Students exchange opinions and apply knowledge gained from lectures, SGDs and self study. The facilitator role is to ask probing questions, summarize and help to clarify the concepts.

**Table 2. Standardization of teaching content in Small Group Discussions**

S. No	Topics	Approximate %
1	Title Of SGD	
2	Learning Objectives from Study Guides	
3	Horizontal Integration	5%+5%=10%
4	Core Concepts of the topic	60%
5	Vertical Integration	20%
6	Related Advance Research points	3%
7	Related Ethical points	2%

**Table 3. Steps of Implementaion of Small Group Discussions**

Step 1	Sharing of Learning objectives by using students Study guides	First 5 minutes
Step 2	Asking students pre-planned questions from previous teaching session to develop co-relation (these questions will be standardized)	5minutes
Step 3	Students divided into groups of three and allocation of learning objectives	5minutes
Step 4	ACTIVITY: Students will discuss the learning objectives among themselves	15 minutes
Step 5	Each group of students will present its learning objectives	20 min
Step 6	Discussion of learning content in the main group	30min
Step 7	Clarification of concept by the facilitator by asking structured questions from learning content	15 min
Step 8	Questions on core concepts	
Step 9	Questions on horizontal integration	
Step 10	Questions on vertical integration	
Step 11	Questions on related research article	
Step 12	Questions on related ethics content	
Step 13	Students Assessment on online MS teams (5 MCQs)	5 min
Step 14	Summarization of main points by the facilitator	5 min
Step 15	Students feedback on the SGD and entry into log book	5 min
Step 16	Ending remarks	

### Self Directed Learning (SDL)

- Self- directed learning is a process where students take primary charge of planning, continuing, and evaluating their learning experiences.
- Time Home assignment
- Learning objectives will be defined
- Learning resources will be given to students = Textbook (page no), web site
- Assessment:
  - i Will be online on LMS (Mid module/ end of Module)
  - ii.OSPE station

### Case Based Learning (CBL)

- It's a learner centered model which engages students in discussion of specific scenarios that typically resemble real world examples.
- Case scenario will be given to the students
- Will engage students in discussion of specific scenarios that resemble or typically are real-world examples.
- Learning objectives will be given to the students and will be based on
  - i. To provide students with a relevant opportunity to see theory in practice
  - ii. Require students to analyze data in order to reach a conclusion.
  - iii. Develop analytic, communicative, and collaborative skills along with content knowledge.

### Problem Based Learning (PBL)

- Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.
- This problem is what drives the motivation and the learning.

The 7- Jump-Format of PBL (Masstricht Medical School)	
Step 7	Synthese & Report
Step 6	Collect Information from outside
Step 5	Generate learning Issues
Step 4	Discuss and Organise Ideas
Step 3	Brainstorming to Identify Explanations
Step 2	Define the Problem
Step 1	Clarify the Terms and Concepts of the Problem Scenario
	Problem- Scenario

**Figure 2. PBL 7 Jumps Model**

## Practical Sessions/Skill Lab (SKL)

Practical Session/ Skill Lab (SKL)	
Demonstration/ power point presentation 4-5 slide	10-15 minutes
Practical work	25-30 minutes
Write/ draw and get it checked by teacher	20-25 minutes
05 mcqs at the end of the practical	10 minutes
At the end of module practical copy will be signed by head of department	
At the end of block the practical copy will be signed by	
Head of Department	
Dean	
Medical education department	
QEC	



## SECTION – II

### Learning Objectives, Teaching Strategies & Assessments

#### Contents

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry

## Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

### Anatomy Large Group Interactive Session (LGIS)

Topic	Learning Objectives At the end of session students should be able to	C/P/A	Teaching Strategy	Assessment Tool
<b>Embryology</b>				
Second week of Human Development (Formation of Bilaminar Embryonic Disc)	• Describe formation of Amniotic Cavity, embryonic disc and Umbilical vesicle	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Discuss development of chorionic sac	C1		
	• Outline the process of implantation	C1		
	• Describe changes in Gravid Endometrium	C1		
	• Understand the Bio-physiological aspects of gravid endometrium	C2		
	• Discuss clinical aspects of implantation	C3		
	• Able to read relevant research article	C3		
Gastrulation (Formation of three germ layers Establishment of Body Axis and Fate Map 3 <sup>rd</sup> week)	• Discuss process of gastrulation with special reference to primitive streak	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Describe the fate of primitive streak	C1		
	• Discuss establishment of body axis	C1		
	• Draw fate map and discuss its importance in future development	C1		
	• Understand the Biophysiological aspects of gastrulation	C2		
	• Describe congenital abnormalities associated with gastrulation	C3		
Notochord Formation (3 <sup>rd</sup> week)	• Define notochord	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Delineate different stages of notochord formation	C1		
	• Discuss the importance of notochord in development of central nervous system	C2		
	• Describe role of notochord in development of axial Skeleton	C1		
	• Describe the fate of notochord	C1		
	• Correlate clinical aspects of notochord formation	C3		
	• Able to read relevant research article	C3		

Neurulation (3 <sup>rd</sup> week)	• Define neurulation	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Describe formation of neural plate and neural tube	C1		
	• Discuss neural crest formation	C2		
	• Enlist derivatives of neural crest cells	C1		
	• Understand the bio-physiological aspects of Neurulation	C2		
	• Discuss neural tube defects	C3		
	• Discuss different types of spina bifida	C3		
	• Discuss the importance of folic acid in the prevention of spina bifida	C2		
Development and Differentiation of Somites	• Enumerate three germ layers and their derivatives	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Describe different divisions of mesoderm	C1		
	• Describe development of somites and their differentiation	C1		
	• Explain different stages of somite development	C1		
	• Understand the Biophysiological aspects of Somite differentiation	C2		
	• Correlate clinical aspects of somite differentiation	C3		
	• Able to read relevant research article	C3		
	• Know to use Digital Library	C3		
Early Development of Cardiovascular System & highlights of 4th- 8th week	• Describe early development of cardiovascular system and chorionic villi	C1	• LGIS	SAQs MCQs VIVA
	• Discuss development of intraembryonic coelom	C1		
	• Define angiogenesis and vasculogenesis.	C1		
	• Correlate clinical aspects of angiogenesis	C3		
	• Summarize the main developmental events and changes in external form of the embryo during the 4th to 8th weeks	C1		
Folding of Embryo	• Enlist different phases of embryonic development	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Describe folding of the embryo in median plane	C1		
	• Describe folding of the embryo in horizontal plane	C1		
	• Discuss results of folding	C1		
	• Discuss Omphalocele and Gastroschisis	C3		
Fetal period	• Describe different criteria for fetal age estimation	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Discuss the trimesters of pregnancy with their importance	C1		
	• Describe highlights of fetal period	C1		
	• Differentiate between embryonic and fetal period	C1		
	• Tabulate growth in length and weight during fetal period	C1		
	• Enumerate and discuss factors influencing fetal growth	C3		
	• Define the term perinatology	C1		
	• Enlist and briefly describe procedures for assessing fetal well-being	C3		

	<ul style="list-style-type: none"> <li>Correlate clinical aspects of fetal period</li> </ul>	C3	• LGIS	VIVA VOCE
	<ul style="list-style-type: none"> <li>Able to read relevant research article</li> </ul>	C3		
Placenta	<ul style="list-style-type: none"> <li>Discuss Implantation and establishment of the embryo within the uterus</li> </ul>	C1	• LGIS	SAQs MCQs VIVA VOCE
	<ul style="list-style-type: none"> <li>Describe the differentiation of the uterine lining into decidua</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe the development of a placenta</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe fetal – maternal circulation</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Discuss the bio-physiological aspects of placenta</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Discuss the clinical conditions associated with placenta</li> </ul>	C3		
Fetal Membranes and Multiple Pregnancies	<ul style="list-style-type: none"> <li>Enlist membranes developing during pregnancy</li> </ul>	C1	• LGIS	SAQs MCQs VIVA VOCE
	<ul style="list-style-type: none"> <li>Discuss origin, composition, location, function and fate of yolk sac</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Explain origin, composition, location, function and fate of Amnion</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe formation of umbilical cord and its structure</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Define Allantois along with its importance and function</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Correlate clinical aspects of fetal membranes</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Able to read relevant research article</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Discuss different types of twins</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe the arrangement of fetal membranes in monozygotic and dizygotic twins</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Discuss the clinical conditions of twin pregnancy</li> </ul>	C3		
<b>Histology</b>				
Connective tissue I Cells of connective tissue Embryonic connective tissue / mucoid Connective Tissue	<ul style="list-style-type: none"> <li>Define connective tissue</li> </ul>	C1	• LGIS	SAQs MCQs VIVA VOCE
	<ul style="list-style-type: none"> <li>Classify connective tissue</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Enlist and explain types of cells in CT</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Enumerate sites and describe the function of each type of cell of connective tissue</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Understand the Biophysiological aspects of connective tissue</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Draw and label histological structure of mucoid CT.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Describe fibers in mucoid CT</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Correlate clinical aspects of CT</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Able to read relevant research articles</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Know to use Digital Library</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>Enumerate examples and location of reticular, connective tissue</li> </ul>	C1		
Connective tissue II Loose aerolar	<ul style="list-style-type: none"> <li>Illustrate histological structure of loose and reticular connective tissue.</li> </ul>	C2		

connective tissue & its types Reticular CT	• Correlate clinical aspects of loose and reticular CT	C3	• LGIS	SAQs MCQs VIVA VOCE
	• Able to read relevant research article	C3		
	• Know to use Digital Library	C3		
Connective tissue III Adipose CT Dense regular and irregular connective	• Enumerate examples and location of adipose and dense CT.	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Draw, describe and label histological structure of all types of connective tissue.	C1		
	• Differentiate between dense regular and irregular connective tissue microscopically	C1		
	• Correlate clinical aspects of loose and reticular CT	C3		
	• Able to read relevant research article	C3		
	• Know to use Digital Library	C3		
Cartilage	• Classify cartilage	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Enlist sites of hyaline, fibro and elastic cartilage	C1		
	• Appreciate microscopic structure of Hyaline, Elastic and Fibrocartilage	C1		
	• Differentiate between three cartilages	C1		
	• Describe the structure of perichondrium	C1		
	• Describe the arrangement of layers in articular cartilage	C1		
	• Understand the Biophysiological aspects of cartilage	C2		
	• Correlate clinical aspects of three types of cartilage	C3		
	• Able to read relevant research article	C3		
• Know to use Digital Library	C3			
Bone-I	• Describe structure and functions of bone cells	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Discuss periosteum and endosteum	C1		
	• Discuss types of bones	C1		
	• Describe the histological features of spongy and compact bone	C1		
	• Describe structure of osteon.	C2		
	• Understand the Biophysiological aspects of bone	C1		
	• Correlate clinical aspects of bone	C3		
	• Able to read relevant research article	C3		
Bone-II	• Describe osteogenesis	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Discuss bone growth, remodeling and repair	C1		
	• Describe histological changes in bones in osteoporosis, rickets, osteomalacia, osteopetrosis and bone tumors	C3		

**General Anatomy**

Bone-I	• Describe the functions of bone and skeleton	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Identify general features of bone	C1		
	• Differentiate between maceration and decalcification of bones	C1		
	• Correlate clinical aspects of bone	C3		
	• Able to read relevant research article	C3		
Bone-II	• Classify bones based on different criteria	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Describe the growing end hypothesis	C1		
	• Describe blood supply of bones	C1		
	• Appreciate role of bones in estimation of sex, age and stature.	C2		
Joints-I	• Define joints	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Classify fibrous joints with examples	C1		
	• Classify cartilaginous joints with examples	C1		
	• Classify synovial joints with examples	C1		
	• Understand the Bio-physiological aspects of joints	C2		
Joints-II	• Describe structure of synovial joint	C1	• LGIS	SAQs MCQs VIVA VOCE
	• Classify synovial joints	C1		
	• Explain movements around synovial joints	C1		
	• Enlist Degenerative joint diseases	C3		
	• Describe the involvement of anatomical structure of the articular cartilage in Degenerative joint disease	C3		

## Physiology Large Group Interactive Session (LGIS)

Topic	Learning Objectives At the end of session students should be able to	C/P/A	Teaching Strategy	Assessment Tool
Structure of Neuron	<ul style="list-style-type: none"> <li>Describe different parts of neuron</li> </ul>	C1	LGIS SDL	SAQs MCQs VIVA VOCE
Classification of Neurons and nerve fibres, NGF	<ul style="list-style-type: none"> <li>Describe the classification of neurons and nerve fibres</li> </ul>	C1	LGIS SDL	SAQs MCQs VIVA VOCE
	<ul style="list-style-type: none"> <li>Describe NGF; given their roles</li> </ul>	C1		
Stimulus and Response & Types of Stimuli	<ul style="list-style-type: none"> <li>Define stimulus</li> </ul>	C1	LGIS	SAQs MCQs VIVA VOCE
	<ul style="list-style-type: none"> <li>Describe various types of stimuli and response</li> </ul>	C1		
Concept of degeneration and regeneration	<ul style="list-style-type: none"> <li>Explain degeneration and regeneration of nerve fibres</li> </ul>	C2	LGIS	SAQs MCQs VIVA VOCE
Properties of nerve fibres	<ul style="list-style-type: none"> <li>Discuss the properties of nerve fibres</li> </ul>	C2	LGIS	SAQs MCQs VIVA VOCE
Graded Potential, Comparison with action potential	<ul style="list-style-type: none"> <li>Define graded Potential with examples</li> </ul>	C1	LGIS	SAQs MCQs VIVA VOCE
	<ul style="list-style-type: none"> <li>Compare between graded potential and action potential</li> </ul>	C2		
Nernst Potential RMP	<ul style="list-style-type: none"> <li>Understand the concept of Nernst potential and equilibrium potential for different ions</li> </ul>	C2	LGIS SDL	SAQs MCQs VIVA VOCE
	<ul style="list-style-type: none"> <li>Define resting membrane potential of nerves.</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Explain the factors which determine the level of RMP</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Differences between electrical and chemical synapse</li> </ul>	C2		
RMP: & Measurement & effect of Electrolytes,	<ul style="list-style-type: none"> <li>Describe the terms polarized and hyperpolarized</li> </ul>	C1	LGIS	SAQs MCQs VIVA
	<ul style="list-style-type: none"> <li>Describe the role of various ions for these states</li> </ul>	C1		

				VOCE
Stages of Action Potential I&II	• Define and draw action potential	C1	LGIS	SAQs MCQs VIVA VOCE
	• Describe different phases of action potential	C1		
Recording of Action Potential Propagation of Action Potential & Factors effecting nerve conduction Polarization and hyperpolarization state	• Briefly describe the method of recording resting membrane potential and action potential	C1	LGIS	SAQs MCQs VIVA VOCE
	• Describe the mechanism of propagation of action potential	C1		
	• Describe various factor that effect nerve conduction	C1		
Refractory Period, Different types of Action Potentials	• Define refractory period and discuss its types	C1	LGIS SDL	SAQs MCQs VIVA VOCE
	• Describe various types of action potential	C1		
Synapse and synaptic transmission	• Describe synapse and its types	C1	LGIS	SAQs MCQs VIVA VOCE
EPSP, IPSP, Properties of chemical synapse	• Discuss in detail various properties of chemical synapse	C2	LGIS	SAQs MCQs VIVA VOCE
Properties of Chemical synaptic	• Discuss in detail various properties of chemical synapse	C2	LGIS	SAQs MCQs VIVA VOCE
NMJ , Synthesis and release of Ach Excitation-Contraction coupling	• Describe the physiologic anatomy of neuromuscular junction.	C1	LGIS SDL	SAQs MCQs VIVA VOCE
	• Recall Synthesis and release of Ach	C1		
	• Describe the mechanism of transmission of impulses from nerve endings to skeletal muscle fibers	C1		
	• Describe briefly the biochemistry of acetyl choline	C1		
Drugs acting on	• Enlist drugs that enhance and block transmission at neuromuscular junction	C1	LGIS SDL	SAQs MCQs



NMJ,Excitation- Contraction coupling	<ul style="list-style-type: none"> <li>Describe mechanism of excitation contraction coupling</li> </ul>	C1		VIVA VOCE
Myasthenia Gravis, Lambert Eaton Syndrome	<ul style="list-style-type: none"> <li>Describe the salient features of myasthenia gravis and Lambert Eaton syndrome</li> </ul>	C1	LGIS	SAQs MCQs VIVA VOCE

### Biochemistry Large Group Interactive Session (LGIS)

Topic	Learning Objectives At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
<b>Minerals &amp; Vitamins</b>				
Minerals & Vitamins Introduction Calcium	<ul style="list-style-type: none"> <li>State Daily Requirements of Calcium in different conditions: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 63</li> </ul>	C1	LGIS	MCQs, SAQs & Viva
	<ul style="list-style-type: none"> <li>Classify Minerals: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2, Chapter#6, Page 56</li> <li>Discuss Types &amp; Sources of Calcium: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 63</li> </ul>	C2		
Biochemical Role Of Calcium & Phosphate	<ul style="list-style-type: none"> <li>Discuss causes of Hypercalcemia &amp; Hypocalcemia: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 69, 70</li> </ul>	C2	LGIS	MCQs, SAQs & Viva
	<ul style="list-style-type: none"> <li>Describe effects of Hypercalcemia &amp; Hypocalcemia: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 69, 70</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>State Daily Requirements of Phosphate: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 70,78</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Discuss Biochemical functions of Phosphate: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 72</li> </ul>	C2		

Fluoride, Magnesium, Sulphur	<ul style="list-style-type: none"> <li>Elaborate Biochemical functions of Fluoride, Sulphur &amp; Magnesium: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 76, 77</li> <li>Enlist Sources of Fluoride, Sulphur &amp; Magnesium: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 76, 77</li> <li>Describe Deficiency Effects: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 76, 77</li> </ul>	C2		
		C1	LGIS	MCQs, SAQs & Viva
Iodine, Copper, Zinc, Selenium, Manganese	<ul style="list-style-type: none"> <li>Recall sources &amp; daily requirements: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 73, 74,75,78</li> <li>Discuss their biochemical functions: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 73,74,75,78</li> <li>Describe Deficiency Effects: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 73,74,75,78</li> </ul>	C1		
		C2	LGIS	MCQs, SAQs & Viva
Vitamins & Their Classification	<ul style="list-style-type: none"> <li>Classify Fat &amp; Water Soluble Vitamins: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#1 , Page 1</li> <li>Enlist Sources of Vitamin A &amp; E: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 3, 17</li> <li>Describe Biochemical functions of Vitamin A &amp; E: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 4, Page 19</li> <li>Describe Deficiency Effects of Vitamin A &amp; E: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 6, Page 7, Page 18</li> <li>Explain Toxic Effects of Vitamin A: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 6 &amp; 7</li> </ul>	C2		
		C1	LGIS	MCQs, SAQs & Viva
		C2		
		C2		
		C2		

Vitamin D	<ul style="list-style-type: none"> <li>• Enlist Sources of Vit.D: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 10</li> <li>• Explain Steps of activation of Vit.D in the body: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page11</li> <li>• Describe Biochemical functions of Vit.D: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 13</li> <li>• Explain Deficiency effects of Vit.D: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 14,15,16</li> <li>• Explain Toxic effects of Vit.D: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 ,Page 17</li> </ul>	C1  C2  C2  C2	LGIS	MCQs, SAQs & Viva
Vitamin C	<ul style="list-style-type: none"> <li>• Enlist Sources of Vit.C: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 , Page 24</li> <li>• Describe Biochemical functions of Vit.C: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2,Chapter#3 , Page 25</li> <li>• Explain Deficiency effects of Vit.C: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 , Page 26</li> <li>• Explain Toxic effects of Vit.C: Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 ,Page 26, 27</li> </ul>	C1  C2  C2  C2	LGIS	MCQs, SAQs & Viva
Niacin & Thiamine	<ul style="list-style-type: none"> <li>• Enlist Sources : Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 , Page 28,29,33,34</li> <li>• Describe Biochemical functions : Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2,Chapter#3 , Page 28,29,33,34</li> <li>• Explain Deficiency effects : Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 , Page 28,29,33,34</li> </ul>	C1  C2  C2	LGIS	MCQs, SAQs & Viva

Classification & Structure Of Amino Acids	<ul style="list-style-type: none"><li>Classification &amp; Structure Of Amino Acids &amp; Isomerism of Amino Acids Reference Book: Lippincott's Illustrated reviews of Biochemistry 8th Edition Chapter#1, Page 1-5</li></ul>	C2	LGIS	MCQs, SAQs & Viva
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### Anatomy Small Group Discussion (SGDs)

Topic	Learning Objectives At the end of Session students should be able to	C/P/A	Teaching Strategy	Assessment Tool
Shoulder Joint	• Classify the joint (according to type, shape and movement)	C1	SGD, Skill Lab	MCQs SEQs VIVA VOCE OSPE
	• Discuss the attachments of capsule and ligament	C1		
	• Enlist the intra-articular structure (tendon of biceps brachii)	C1		
	• Describe attachment of glenoidal labrum with its significance in relation to synovial membrane	C1		
	• Discuss the neurovascular supply	C1		
	• Discuss factors indispensable for stability of joint	C1		
	• Discuss the movements at shoulder joint	C1		
	• Enlist related bursae.	C1		
Flexor compartment & Neurovascular organization of the arm	• Explain the related clinicals ( shoulder dislocation, rotator cuff injuries, Glenoid Labrum tears, Frozen shoulder)	C3	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Tabulate muscles of flexor compartment with their origin, insertion, nerve supply and actions	C1		
	• Describe Neurovascular organization of arm, • Explain the related clinicals ( biceps tendinitis, dislocation of tendon of biceps brachii)	C1 C3		
Extensor compartment of the arm	• Tabulate Muscles of extensor compartment with origin insertion, nerve supply and actions	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Describe the neurovascular organization	C1		
	• Discuss consequences of injury to radial nerve (wrist drop), venipuncture in cubital fossa)	C3		
	• Read relevant research article	C3		
	• Use Digital Library	C3		
Ulna	• Determine the side	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Demonstrate anatomical position	P		
	• Discuss general features, attachments and articulations	C1		
	• Describe ossification	C1		
	• Elaborate interosseous membrane and its importance	C1		
	• Correlate the clinical aspects	C3		

Radius	• Determine the side	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Demonstrate its anatomical position	P		
	• Discuss general features, attachments and articulations	C1		
	• Describe its ossification	C1		
	• Describe the interosseous membrane and its importance	C1		
	• Correlate the clinical aspects	C3		
Flexor compartment of the forearm	• Tabulate muscles of flexor compartment with their origin, insertion, nerve supply and actions	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Describe clinical conditions associated with flexor compartment	C3		
Extensor compartment of the forearm	• Tabulate muscles of extensor compartment with origin, insertion, nerve supply and actions	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Describe clinical conditions associated with extensor compartment of forearm ( Tennis elbow)	C3		
Neurovascular organization of forearm	• Describe nerves and vessels of forearm (formation, commencement, course, branches and relations)	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Describe associated clinical conditions (Median nerve injury, pronator syndrome, cubital tunnel syndrome)	C3		
	• Read relevant research article	C3		
	• Use Digital Library	C3		
Elbow joint	• Describe the type of joint with its articular surfaces	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Discuss the capsule, synovial membrane and ligaments of the joints	C1		
	• Enumerate the related bursae,	C1		
	• Describe axis and plane of movements	C1		
	• Enumerate muscles producing movements at elbow joint.	C1		
	• Describe the associated clinical conditions (Elbow joint dislocation and student's elbow)	C3		
Proximal and distal radioulnar joints	• Describe type of radioulnar joints, articular surfaces, capsular attachments, synovial membrane and ligaments.	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Describe movements of supination and pronation with special reference to axes	C1		
	• Enumerate the muscles producing these movements	C1		
	• Correlate clinical aspects of joint	C3		

Hand	• Understand the arrangement of carpal bones	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Identify the salient features of carpal bone.	C1		
	• Discuss the special blood supply of scaphoid bone.	C3		
	• Describe the mid carpal joint.	C1		
	• Discuss the 1st carpometacarpal joint including the type of the joint capsule synovial membrane and ligaments with axis of the movement and the muscles producing the movements	C1		
	• Read relevant research article	C3		
	• Use Digital Library	C3		
Wrist joint	• Describe the type of joint with its articular surfaces	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Discuss the capsule, synovial membrane and ligaments of the joint	C1		
	• Enumerate the related bursae	C1		
	• Describe axis and plane of movements	C1		
	• Enumerate muscles producing movements at joint	C1		
	• Discuss wrist fractures & Dislocations	C3		
Anastomosis around wrist joint	• Discuss the blood vessels involved in the formation of anastomosis around the wrist joint	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Explain the importance of anastomosis.	C1		
Dorsum of Hand, Flexor retinaculum Extensor retinaculum	• Describe the muscles of dorsum of hand	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Discuss the Dorsal digital expansion	C1		
	• Describe the attachment of flexor retinaculum with structures related to it.	C1		
	• Describe the Guyon's canal.	C1		
	• Describe the formation of the carpal tunnel and its applied anatomy.	C3		
	• Describe the attachment of extensor retinaculum and its various compartments with structures passing through it.	C1		
	• Discuss the De Quervain's disease.	C3		
Palm of hand-I Muscles & Neurovascular organization	• Tabulate the muscles forming the thenar and hypothenar eminence.	C1	SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Discuss Lumbricals, Palmar and dorsal interossei with their attachments and actions.	C1		
	• Discuss the formation of superficial and deep arterial arches	C1		
	• Discuss the clinicals associated with palm	C3		
Palm of hand-II Fascial	• Discuss the formation and attachments of palmar aponeurosis.	C1	SKILL LAB	MCQs
	• Describe the formation of palmar spaces and its divisions	C1		
	• Describe the thenar and mid palmar spaces.	C1		
	• Define pulp spaces	C1		

spaces of hand Grip	• Relate anatomy of pulp space with its common clinical conditions	C3		SEQs VIVA VOCE OSPE
	• Describe dorsal subcutaneous spaces.	C1		
	• Demonstrate surgical incisions.	C3		
	• Describe different types of grips	C1		
	• Read relevant research article	C3		
• Use Digital Library	C3			
Radiology & Surface Anatomy of upper limb	<ul style="list-style-type: none"> <li>• Demonstrate the surface anatomy of <ul style="list-style-type: none"> <li>○ Subcalvian artery,</li> <li>○ Subclavian vein,</li> <li>○ Axillary artery,</li> <li>○ Brachial artery,</li> <li>○ Median nerve,</li> <li>○ Radial artery,</li> <li>○ Ulnar artery,</li> <li>○ Radial nerve, ulnar nerve and</li> <li>○ Superficial and deep palmar arches</li> </ul> </li> <li>• Demonstrate major landmarks of upper limb on radiographs</li> </ul>	P	SKILL LAB	MCQs SEQs VIVA VOCE OSPE

### Physiology Small Group Discussion (SGDs)

Topic	Learning Objectives At the end of Session students should be able to	C/P/A	Teaching Strategy	Assessment Tool
Discussion regarding previous module	<ul style="list-style-type: none"> <li>• Discuss difficulties regarding questions, MCQs of Foundation Module</li> </ul>	C2	SGD	MCQs SAQs Viva Voce OSPE
RMP, measurement & effects, of electrolyte on RMP	• Define resting membrane potential of nerves.	C1	SGD	MCQs SAQs Viva Voce OSPE
	• Explain the factors which determine the level of RMP	C2		
Drugs acting on NMJ excitation contraction coupling	• Drugs acting on NMJ	C1	SGD	MCQs SEQs SAQs Viva Voce OSPE
	• Excitation contraction coupling	C1		
Synapse and synaptic transmission &	• Describe synapse and its types	C1		MCQs SAQs
	• Differences between electrical and chemical synapse			



EBSIP,IPSP properties of chemical synapse		C2	SGD	Viva Voce OSPE
Nernst potential	• Concept of Nernst potential	C1	SGD	MCQs SAQs Viva Voce OSPE
	• Equilibrium potential for different ions	C2		
Neuro muscular junction(NMJ)	• Transmission Across NMJ	C1	SGD	MCQs SAQs Viva Voce OSPE
	• Diseases of NMJ	C2		
Nerve growth factor (NGF)	• Describe NGF	C1	SGD	MCQs SAQs Viva Voce OSPE
	• Give their role	C1		
	• Explain De-generation and Re-Generation of nerve fibers	C2		

### Biochemistry Small Group Discussion (SGDs)

Topic	Learning Objectives	Learning Domain	Teaching Strategy	Assessment Tools
Minerals & Vitamins Introduction Vitamin A & Vitamin E	• Define Minerals • Define Vitamins	C1	SGD	MCQ SAQ VIVA
	• Introduction & Classification of Minerals • Discuss sources, functions and clinical significance of vitamin A, vitamin E.	C1 C2		
Vitamin C & Vitamin D Minerals	• Discuss sources, functions and clinical significance of vitamin C, vitamin D.	C2	SGD	MCQ SAQ VIVA
	• Discuss Sources, Functions And Clinical Significance Calcium, Phosphate, Iodine, Fluoride, Copper, Zinc, Selenium, Magnesium, Sulphur And Cobalt.	C2		

## Topic, Learning Objectives & Resources

### Anatomy Self Directed Learning (SDL)

Topic	Learning Objectives At the end of Session students should be able to	Learning Resources
Shoulder Joint	• Classify the joint (according to type, shape and movement)	<ul style="list-style-type: none"> <li>• Clinical Oriented Anatomy by Keith L. Moore.8<sup>TH</sup> Edition. (Chapter 3, Page 266- 271,284-285).</li> </ul>
	• Discuss the attachments of capsule and ligament	
	• Enlist the intra-articular structure (tendon of biceps brachii)	
	• Describe attachment of glenoidal labrum with its significance in relation to synovial membrane	
	• Discuss the neurovascular supply	
	• Discuss factors indispensable for stability of joint	
	• Discuss the movements at shoulder joint	
	• Enlist related bursae.	
	• Explain the related clinicals ( shoulder dislocation, rotator cuff injuries, Glenoid Labrum tears, Frozen shoulder)	
Flexor compartment & Neurovascular organization of the arm	• Tabulate muscles of flexor compartment with their origin, insertion, nerve supply and actions	<ul style="list-style-type: none"> <li>• Clinical Oriented Anatomy by Keith L. Moore.8<sup>TH</sup> Edition. (Chapter 3, Page201-211,211-214).</li> </ul>
	• Describe Neurovascular organization of arm,	
	• Explain the related clinicals ( biceps tendinitis, dislocation of tendon of biceps brachii)	
Extensor compartment of the arm	• Tabulate Muscles of extensor compartment with origin insertion, nerve supply and actions	<ul style="list-style-type: none"> <li>• Clinical Oriented Anatomy by Keith L. Moore.8<sup>TH</sup> Edition. (Chapter 3, Page201-211,211-214).</li> </ul>
	• Describe the neurovascular organization	
	• Discuss consequences of injury to radial nerve (wrist drop), venipuncture in cubital fossa)	
	• Read relevant research article	
	• Use Digital Library	
Ulna	• Determine the side	<ul style="list-style-type: none"> <li>• Clinical Oriented Anatomy by Keith L. Moore.8<sup>TH</sup> Edition. (Chapter 3, Page147).</li> </ul>
	• Demonstrate anatomical position	
	• Discuss general features, attachments and articulations	
	• Describe ossification	
	• Elaborate interosseous membrane and its importance	
• Correlate the clinical aspects		

Radius	• Determine the side	• Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. (Chapter 3, Page148).
	• Demonstrate its anatomical position	
	• Discuss general features, attachments and articulations	
	• Describe its ossification	
	• Describe the interosseous membrane and its importance	
	• Correlate the clinical aspects	
Flexor compartment of the forearm	• Tabulate muscles of flexor compartment with their origin, insertion, nerve supply and actions	• Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. (Chapter 3, Page215-234,236,240).
	• Describe clinical conditions associated with flexor compartment	
Extensor compartment of the forearm	• Tabulate muscles of extensor compartment with origin, insertion, nerve supply and actions	• Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. (Chapter 3, Page215-234,236,240).
	• Describe clinical conditions associated with extensor compartment of forearm ( Tennis elbow)	
Neurovascular organization of forearm	• Describe nerves and vessels of forearm (formation, commencement, course, branches and relations)	• Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. (Chapter 3, Page215-234,236,240).
	• Describe associated clinical conditions (Median nerve injury, pronator syndrome, cubital tunnel syndrome)	
	• Read relevant research article	
	• Use Digital Library	
Elbow joint	• Describe the type of joint with its articular surfaces	• Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition (Chapter 3, Page271-274).
	• Discuss the capsule, synovial membrane and ligaments of the joints	
	• Enumerate the related bursae,	
	• Describe axis and plane of movements	
	• Enumerate muscles producing movements at elbow joint.	
	• Describe the associated clinical conditions (Elbow joint dislocation and student's elbow)	
Proximal and distal radioulnar joints	• Describe type of radioulnar joints, articular surfaces, capsular attachments, synovial membrane and ligaments.	• Clinical Oriented Anatomy by Keith L. Moore.8 <sup>TH</sup> Edition. (Chapter 3, Page274-277).
	• Describe movements of supination and pronation with special reference to axes	
	• Enumerate the muscles producing these movements	
	• Correlate clinical aspects of joint	
Hand	• Understand the arrangement of carpal bones	• Clinical Oriented Anatomy by
	• Identify the salient features of carpal bone.	
	• Discuss the special blood supply of scaphoid bone.	

	<ul style="list-style-type: none"> <li>• Describe the mid carpal joint.</li> <li>• Discuss the 1st carpometacarpal joint including the type of the joint capsule synovial membrane and ligaments with axis of the movement and the muscles producing the movements</li> <li>• Read relevant research article</li> <li>• Use Digital Library</li> </ul>	Keith L. Moore.8TH Edition. Chapter 3, Page148-151,278-283).
Wrist joint	<ul style="list-style-type: none"> <li>• Describe the type of joint with its articular surfaces</li> <li>• Discuss the capsule, synovial membrane and ligaments of the joint</li> <li>• Enumerate the related bursae</li> <li>• Describe axis and plane of movements</li> <li>• Enumerate muscles producing movements at joint</li> <li>• Discuss wrist fractures &amp; Dislocations</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page278).</li> </ul>
Anastomosis around wrist joint	<ul style="list-style-type: none"> <li>• Discuss the blood vessels involved in the formation of anastomosis around the wrist joint</li> <li>• Explain the importance of anastomosis.</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page278).</li> </ul>
Dorsum of Hand, Flexor retinaculum Extensor retinaculum	<ul style="list-style-type: none"> <li>• Describe the muscles of dorsum of hand</li> <li>• Discuss the Dorsal digital expansion</li> <li>• Describe the attachment of flexor retinaculum with structures related to it.</li> <li>• Describe the Guyon's canal.</li> <li>• Describe the formation of the carpal tunnel and its applied anatomy.</li> <li>• Describe the attachment of extensor retinaculum and its various compartments with structures passing through it.</li> <li>• Discuss the De Quervain's disease.</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page159,224-226).</li> </ul>
Palm of hand-I Muscles & Neurovascular organization	<ul style="list-style-type: none"> <li>• Tabulate the muscles forming the thenar and hypothenar eminence.</li> <li>• Discuss Lumbricals, Palmar and dorsal interossei with their attachments and actions.</li> <li>• Discuss the formation of superficial and deep arterial arches</li> <li>• Discuss the clinicals associated with palm</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page243-256).</li> </ul>
Palm of hand-II Fascial spaces of hand Grip	<ul style="list-style-type: none"> <li>• Discuss the formation and attachments of palmar aponeurosis.</li> <li>• Describe the formation of palmar spaces and its divisions</li> <li>• Describe the thenar and mid palmar spaces.</li> <li>• Define pulp spaces</li> <li>• Relate anatomy of pulp space with its common clinical conditions</li> <li>• Describe dorsal subcutaneous spaces.</li> <li>• Demonstrate surgical incisions.</li> <li>• Describe different types of grips</li> <li>• Read relevant research article</li> <li>• Use Digital Library</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page241-243,258-262).</li> </ul>

## Physiology Self Directed Learning (SDL)

Topics	Learning Objective	References
Structure of neurons Classification of neurons & nerve fibers	<ul style="list-style-type: none"> <li>• Structure of neurons</li> <li>• Myelinated and unmyelinated nerve fibers.</li> <li>• Neuroglia</li> <li>• Difference between neurons and glial cells</li> </ul>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition physiology Excitable Tissue; Nerve (Chapter04 ,Page 85-90)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Introduction to Physiology. (Unit 2,Chapter 05 Membrane Physiology Page 74)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 01. Physiology ofBody Fluids. (Chapter 03,Page 37)</li> </ul>
Nernst potential, RMP	<ul style="list-style-type: none"> <li>• Basic physics of membrane potential, Nernst equation,</li> <li>• Goldman Equation</li> <li>• Origin of RMP in different cell types.</li> </ul>	<ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Chapter no. 05 Mmembrane dynamicsPage no. 188)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition Membrane Potential and actionpotential. (Unit 2, Chapter 05 Page 63)</li> <li>• Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition, Excitable Tissue; Nerve (Chapter 04,Page 90)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 01. Propertie andfunction of cell membrane. (Chapter 02,Page 31, 41-43)</li> </ul>
Properties of nerve fibers	<ul style="list-style-type: none"> <li>• Rhythmicity of Excitable tissues,</li> <li>• Characteristics of signal transmission,</li> <li>• Types of refractoy period</li> <li>• Concept of excitation</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Membrane Potential and actionpotential (Unit 2, Chapter 05,Page 73-76)</li> <li>• Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition, Overview of cell physiology in medicalphysiology. Excitable Tissue; Nerve (Chapter 04,Page 94)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 01. Propertie andfunction of cell membrane. (Chapter 03,Page 41, 55)</li> </ul>
Measurement of RMP & effect of electrolytes on RMP	<ul style="list-style-type: none"> <li>• Measurement of RMP</li> <li>• Effect of electrolytes on RMP</li> <li>• Role of Na/K pump</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Membrane Potential and actionpotential (Unit 2, Chapter 05 ,Page 65,67-70)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Chapter no. 05 Membrane dynamicsPage no. 188-194)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup>Edition. cellular Physiology (Chapter 01. Page 18)</li> </ul>
Concept of degeneration & regeneration	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Axonal Degeneration</li> <li>• Wallerian Degeneration</li> </ul>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition, overview of cell physiology in medical physiology (chapter 6, page 133)</li> <li>• A &amp; P Anatomy and physiology Tortora, Chapter 12 Nervous tissue And Homeostasis Page 447</li> <li>• Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition, overview of cell physiology in medical physiology (Chapter 4, page 97)</li> </ul>

Stimulus & response & types of stimuli, Stages of action potential	<ul style="list-style-type: none"> <li>• Neuron action potential,</li> <li>• Stages of Propagation of AP</li> <li>• Conduction Rates</li> <li>• ALL-OR-NONE Principle</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Introduction to Physiology. (Unit 2, Chapter 05 Membrane Potential and action potential Page 71)</li> <li>• Ganong’s Review of Medical Physiology.25TH Edition, Excitable Tissue; Nerve (Chapter 04,Page 93)</li> <li>• Physiology by Linda S. Costanzo 6thEdition. cellular Physiology (Chapter 01. Page 25)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor’s.13th Edition. Section 01. Properties and function of cell membrane. (Chapter 03,Page 45,47-51)</li> </ul>
A, Refractory period, types of action potential. Graded potential comparison with action potential B. Recording & propagation of action potential & factors effecting nerve conduction & hyperpolarized state	<ul style="list-style-type: none"> <li>• Threshold Potential</li> <li>• Action potential</li> <li>• Types of Action Potential</li> <li>• Propagation of Action Potential</li> <li>• Hyperpolarization</li> <li>• Factors effecting Action potential</li> </ul>	<ul style="list-style-type: none"> <li>• A.</li> <li>• Ganong’s Review of Medical Physiology.25TH Edition, General principles and Energy production in Medical Physiology (chapter 04, Page 90, 93)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Introduction to Physiology. (Chapter 5, page 67).</li> <li>• Ganong’s Review of Medical Physiology.25TH Edition, General principles and Energy production in Medical Physiology (chapter 8, page 273)</li> <li>• B.</li> <li>• Ganong’s Review of Medical Physiology.25TH Editions, Overview of Cellular Physiology in Medical Physiology (chapter 08, Page 276, 278, 281)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Introduction to Physiology. (Section 1, chapter 04. , page 71,72.73,74)</li> <li>• Ganong’s Review of Medical Physiology.25TH Editions, Overview of Cellular Physiology in Medical Physiology (chapter 04, page 93)</li> </ul>

### Biochemistry Self Directed Learning (SDL)

Topics	Learning Objective	References
Minerals & Vitamins		
Minerals Introduction & Calcium	<ul style="list-style-type: none"> <li>• State Daily Requirements of Calcium in different conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 63</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2, Chapter#6, Page 56</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 63</li> </ul>
	<ul style="list-style-type: none"> <li>• Classify Minerals Discuss Types</li> <li>• Sources of Calcium</li> </ul>	

Biochemical Role Of Calcium & Phosphate	<ul style="list-style-type: none"> <li>• Discuss causes of Hypercalcemia</li> <li>• Discuss causes of Hypocalcemia</li> <li>• Describe effects of Hypercalcemia &amp; Hypocalcemia</li> <li>• State Daily Requirements of Phosphate</li> <li>• Discuss Biochemical functions of Phosphate</li> </ul>	<ul style="list-style-type: none"> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 69, 70</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 69, 70</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 70,78</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 72</li> </ul>
Fluoride, Magnesium, Sulphur	<ul style="list-style-type: none"> <li>• Elaborate Biochemical functions of Fluoride, Sulphur &amp; Magnesium</li> <li>• Enlist Sources of Fluoride, Sulphur.</li> <li>• Magnesium Describe Deficiency Effects</li> </ul>	<ul style="list-style-type: none"> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 76, 77</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 76, 77</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 76, 77</li> </ul>
Iodine, Copper, Zinc, Selenium, Manganese	<ul style="list-style-type: none"> <li>• Recall sources &amp; daily requirements</li> <li>• Discuss their biochemical functions</li> <li>• Describe Deficiency Effects</li> </ul>	<ul style="list-style-type: none"> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 73, 74,75,78</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 73,74,75,78</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#6 , Page 73,74,75,78</li> </ul>
Vitamins & Their Classification	<ul style="list-style-type: none"> <li>• Classify Fat- &amp; Water-Soluble Vitamins</li> <li>• Enlist Sources of Vitamin A &amp; E</li> <li>• Describe Biochemical functions of Vitamin A &amp; E</li> <li>• Describe Deficiency Effects of Vitamin A &amp; E</li> <li>• Explain Toxic Effects of Vitamin A</li> </ul>	<ul style="list-style-type: none"> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#1 , Page 1</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 3, 17</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 4, Page 19</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 6, Page 7, Page 18</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 6 &amp; 7</li> </ul>
Vitamin D	<ul style="list-style-type: none"> <li>• Enlist Sources of Vit.D</li> <li>• Explain Steps of activation of Vit.D in the body</li> <li>• Describe Biochemical functions of Vit.D</li> <li>• Explain Deficiency effects of Vit.D</li> </ul>	<ul style="list-style-type: none"> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 10</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page11</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 ,</li> </ul>

	<ul style="list-style-type: none"> <li>• Explain Toxic effects of Vit.D</li> </ul>	<p>Page 13</p> <ul style="list-style-type: none"> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 , Page 14,15,16</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#2 ,Page 17</li> </ul>
Vitamin C	<ul style="list-style-type: none"> <li>• Enlist Sources of Vit.C</li> <li>• Describe Biochemical functions of Vit.C</li> <li>• Explain Deficiency effects of Vit.C</li> <li>• Explain Toxic effects of Vit.C</li> </ul>	<ul style="list-style-type: none"> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 , Page 24</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2,Chapter#3 , Page 25</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 , Page 26</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 ,Page 26, 27</li> </ul>
Niacin & Thiamine	<ul style="list-style-type: none"> <li>• Enlist Sources</li> <li>• Describe Biochemical functions</li> <li>• Explain Deficiency effects</li> </ul>	<ul style="list-style-type: none"> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 , Page 28,29,33,34</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2,Chapter#3 , Page 28,29,33,34</li> <li>• Essentials of Medical Biochemistry Book By Mushtaq Ahmed Edition 9th Volume#2 ,Chapter#3 , Page 28,29,33,34</li> </ul>
Classification & Structure Of Amino Acids	<ul style="list-style-type: none"> <li>• Classification &amp; Structure Of Amino Acids &amp; Isomerism of Amino Acids</li> </ul>	<ul style="list-style-type: none"> <li>• Reference Book: Lippincott's Illustrated reviews of Biochemistry 8th Edition Chapter#1, Page 1-5</li> </ul>



### Histology Practicals Skill Laboratory (SKL)

Topic	At The End Of The Practical The Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tools
<u>Connective Tissue-I</u> <ul style="list-style-type: none"> <li>• Embryonic connective tissue / mucoid Connective Tissue</li> <li>• Loose areolar connective tissue</li> <li>• Reticular Connective Tissue</li> <li>• Adipose Connective Tissue</li> </ul>	• Identify mucoid connective tissue under microscope	P	Skill Lab	OSPE MCQs
	• Illustrate histological structure of mucoid connective tissue	C2		
	• Write two points of identification	C1		
	• Identify reticular and adipose connective tissue under microscope	C2		
	• Illustrate histological structure of reticular and adipose connective tissue	C2		
	• Write two points of identification	C1		
• Focus the slide	P			
<u>Connective Tissue-II</u> <ul style="list-style-type: none"> <li>• Dense regular connective tissue</li> <li>• Dense irregular connective tissue</li> </ul>	• Identify dense regular and irregular connective tissue under microscope	P	Skill Lab	OSPE MCQs
	• Illustrate histological structure of dense regular and irregular connective tissue	C2		
	• Write two points of identification	C1		
	• Differentiate between dense regular and irregular connective tissue microscopically	C2		
	• Focus the slide	P		
<u>CARTILAGE</u> <ul style="list-style-type: none"> <li>• Hyaline cartilage</li> <li>• Elastic cartilage</li> <li>• Fibrocartilage</li> </ul>	• Identify all three types of cartilages under microscope	P	Skill Lab	OSPE MCQs
	• Illustrate microscopic structure of all three cartilages	C2		
	• Discuss the structure of perichondrium	C1		
	• Write two points of identification	C1		
	• Enlist sites of hyaline, fibro and elastic cartilage	C1		
	• Focus the slide	P		
<u>BONE</u> <ul style="list-style-type: none"> <li>• Compact Bone</li> <li>• Spongy Bone</li> </ul>	• Identify compact and spongy bone under microscope	P	Skill Lab	OSPE MCQs
	• Illustrate microscopic structure of compact bone and spongy bone	C2		
	• Write two points of identification	C1		
	• Focus the slide	P		

### Physiology Practicals Skill Laboratory (SKL)

Topic	At the end of practical students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Estimation of hemoglobin Practical I	<ul style="list-style-type: none"> <li>• Apparatus identification</li> <li>• Detail procedure</li> <li>• Precautions</li> <li>• Aseptic measures taken during blood sampling</li> </ul>	P, A	Skill lab	OSPE
Estimation of hematocrit Practical I	<ul style="list-style-type: none"> <li>• Hct definition</li> <li>• How to measure</li> <li>• Precautions</li> </ul>	P, A	Skill lab	OSPE
ESR Practical I	<ul style="list-style-type: none"> <li>• Procedure</li> <li>• Precautions</li> <li>• Clinical importance of ESR, normal values</li> </ul>	P, A	Skill lab	OSPE
Preparation of DLC	<ul style="list-style-type: none"> <li>• Preparation of slide – practice</li> <li>• How to make blood film</li> <li>• How to stain it after preparation</li> <li>• Help of teaching aid identification of cells</li> </ul>	P, A	Skill lab	OSPE

### Biochemistry Practicals Skill Laboratory (SKL)

Topic	At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Color test for detection of amino acids	• Biuret test	P	Skill Lab	OSPE
	• Ninhydein Test			
Color test for detection of amino acids	• Xanthoprotic Test	P	Skill Lab	OSPE
	• Million- Nasse's Test			
	• Tryptophan by Aldehyde Test			
Color test for detection of amino acids	• Arginine by Sakaguchi's Test	P	Skill Lab	OSPE
	• Cystein by lead sulphide Test			
Quantitative Analysis	<ul style="list-style-type: none"> <li>• Serum calcium</li> <li>• Serum Ascorbic Acid</li> </ul>	P	Skill Lab	OSPE

## **SECTION - III**

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- **CBLs**
- **Vertical Integration LGIS**
- **Longitudinal Themes**
  - **Biomedical Ethics & Professionalism**
  - **Family Medicine**
  - **Artificial Intelligence (Innovation)**
  - **Integrated Undergraduate Research Curriculum (IUGRC)**

## Basic And Clinical Sciences (Vertical Integration)

### Case Based Learning (CBL)

Subject	Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain
Anatomy	• Shoulder Dislocation	Apply basic knowledge of subject to study clinical case.	C1
	• Wrist Drop	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• Parasthesia	Apply basic knowledge of subject to study clinical case.	C3
	• Insecticide poisoning	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• Night Blindness	Apply basic knowledge of subject to study clinical case.	C3
	• Rickets	Apply basic knowledge of subject to study clinical case.	C3

## Large Group Interactive Sessions (LGIS)

### Family Medicine

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Approach to a Patient with body aches	• Describe presenting complains of patients with body aches	C3	LGIS-1	MCQs
	• Disscus complications of body aches			
	• Descirbe intial treatment of patients with body aches			
	• Know when to refer patient to consultant/ Hospital			

### Community Medicine

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Accidents	At the end of session students will be able to 1. Categorize different types of accidents	C2		
	2. Describe risk factors involved in accidents	C2		

	3. Participate in activities/programs for prevention and control of accidents	C2	LGIS	MCQs
	4. Describe steps involved in prevention of different types of accidents.	C2		

### Medicine

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Osteoporosis	• Enlist causes Osteoporosis	C2	LGIS	MCQs
	• Discuss changes in bones in Osteoporosis	C2		
	• Describe clinical features	C2		
	• Enlist investigation	C3		
	• Discuss management	C2		
Polyarthritis	• Differentiate different causes of polyarthritis on basis of clinical features	C2	LGIS	MCQs
	• Discuss the diagnostic criteria of rheumatoid arthritis	C2		
	• Discuss the diagnostic criteria of SLE	C2		
	• Plan investigations of a patient with polyarthritis to find out aetiology	C3		
	• Discuss general and specific management of a patient with polyarthritis	C2		
Osteomalacia /rickets	• Enlist causes of rickets	C1	LGIS	MCQs
	• Discuss changes in bones in osteomalacia	C2		
	• Describe clinical features of osteomalacia & rickets	C2		
	• Enlist investigations for of osteomalacia & rickets	C1		
	• Discuss management of osteomalacia & rickets	C2		

### Surgery

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Shoulder	• Discuss the possible sites of shoulder dislocation	C2	LGIS	MCQs
	• Discuss the consequences of dislocation	C2		

dislocation	<ul style="list-style-type: none"> <li>• Management concepts</li> </ul>	C2		
Tennis elbow, fracture of olecranon, radius and ulna	<ul style="list-style-type: none"> <li>• Describe:</li> <li>• Tennis elbow</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>• Discuss fractures of radius and ulna</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Describe the common sites of fracture</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Management concepts</li> </ul>	C2		

### Biomedical Ethics & Professionalism

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Islamic concepts of Bioethics	<ul style="list-style-type: none"> <li>• Conceptualize the Islamic teachings of medical ethics</li> <li>• Outline the main points in oath of Muslim doctor</li> <li>• Correlate the 4 principles of medical ethics with principles of Islamic medical ethics</li> </ul>	C2 C2	LGIS	MCQs

### Radiology/Artificial Intelligence (Innovation)

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Fractures of upper limb	<ul style="list-style-type: none"> <li>• Discuss fractures of upper limb with their clinical significance.</li> <li>• Discuss role of artificial intelligence in interpretation of radiographs</li> </ul>	C2	LGIS	MCQS

### Integrated Undergraduate Research Curriculum (IUGRC)

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Practical based teachings				
Practical Session -I	<ul style="list-style-type: none"> <li>• Comprehend their role in under “theme and scheme” of IUGRC-1st Year Practical component</li> </ul>		LGIS	MCQS
	<ul style="list-style-type: none"> <li>• Understand the techniques used to access, retrieve, and review and source of Scientific literature on the given topics (on selected topics for “updated evidence in Health” (UEIH) for poster development.</li> </ul>			
	<ul style="list-style-type: none"> <li>• Make search string and perform literature search using Boolean operators</li> </ul>			
	<ul style="list-style-type: none"> <li>• Access scientific databases and carry out an effective literature review using a number of sources or databases (PubMed)</li> </ul>			

(Club Activity)	• Access HEC Digital library / PERN network use			
	• Understand EBM Cycle & its 5 steps			
	• How to configure & present a scientific poster / element of a scientific poster			
	• How to write References of the information cited			
	• Learn overall posters' work reporting guidelines			

## **SECTION - IV**

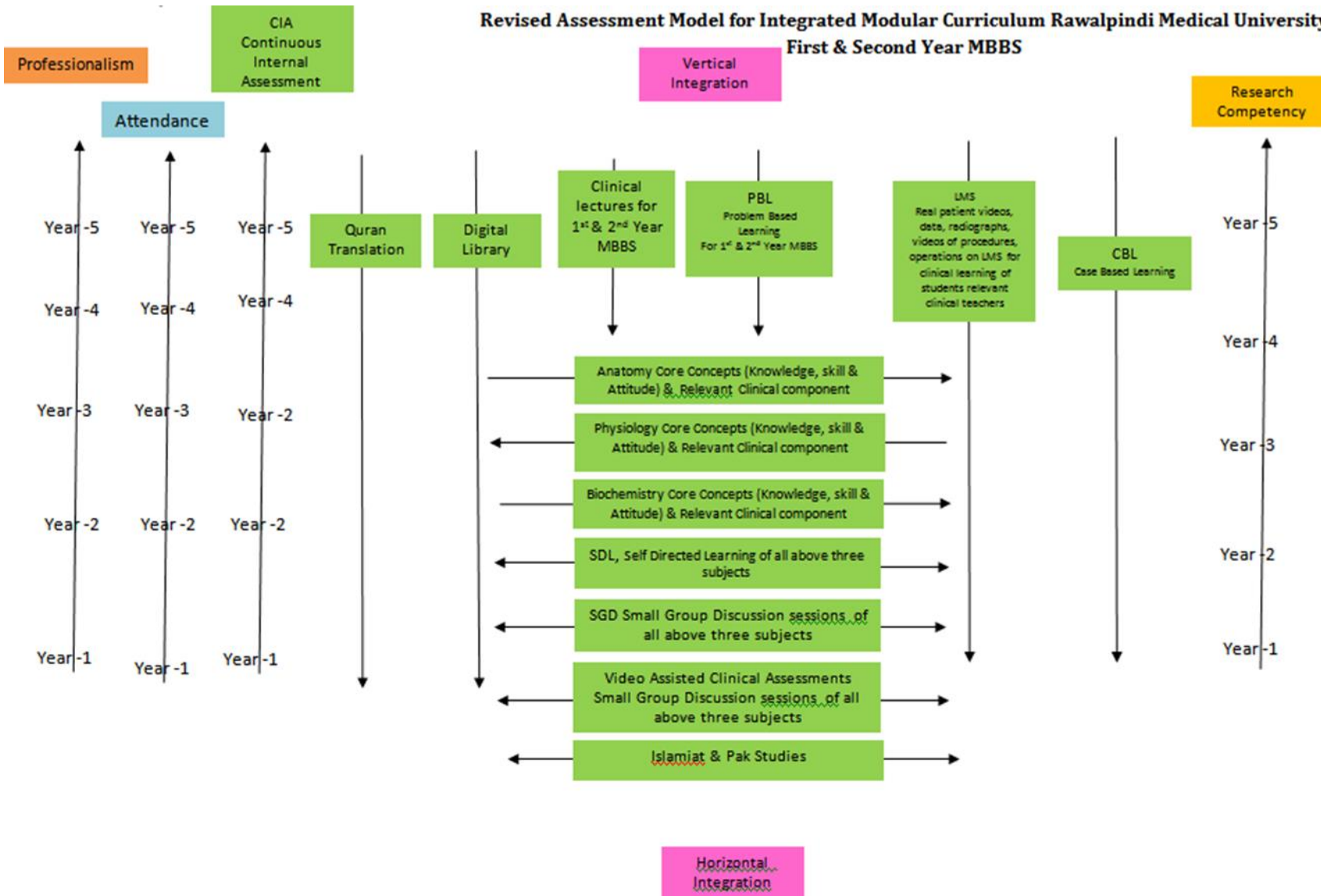
### **Assessment Policies**

#### **Contents**

- **Assessment plan**
- **Types of Assessment:**
- **Modular Examinations**
- **Block Examination**
- **Table 4: Assessment Frequency & Time in MSK-I Module**



## Revised Assessment Model for Integrated Modular Curriculum Rawalpindi Medical University First & Second Year MBBS



### Gauge for Continuous Internal Assessment (CIA)

Red Zone	High Alert	Yellow Zone	Green Zone	Excellent	Extra Ordinary
0 - 25%	26 - *50%	51 - 60%	61 - 70%	71 - 80%	81 - 100%

\*50% and above is Passing Marks.

### Gauge for attendance percentage

Red Zone	High Alert	Yellow Zone-1	Yellow Zone-2	Green Zone	Excellent
0 - 25%	26 - 50%	51 - 60%	61 - 74%	*75 - 80%	81 - 100%

90% is eligibitly criteria for appearing in professional examination.

## Assessment plan

University has followed the guidelines of Pakistan Medical and Dental Council for assessment. Assessment is conducted at the mid modular, modular and block levels.

### Types of Assessment:

The assessment is formative and summative.

Formative Assessment	Summative Assessment
Formative assessment is taken at modular (2/3 <sup>rd</sup> of the module is complete) level through MS Teams. Tool for this assessment is best choice questions and all subjects are given the share according to their hour percentage.	Summative assessment is taken at the mid modular (LMS Based), modular and block levels.

### Modular Assessment

Theory Paper	Viva Voce
There is a module examination at the end of first module of each block. The content of the whole teaching of the module are tested in this examination.  It consists of paper with objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module. (Annexure I attached)	Structured table viva voce is conducted including the practical content of the module.

### Block Assessment

On completion of a block which consists of two modules, there is a block examination which consists of one theory paper and a structured viva with OSPE.

Theory Paper	Block OSPE
There is one written paper for each subject. The paper consists of objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module.	This covers the practical content of the whole block.

**Table 4-Assessment Frequency & Time In MSK-I Module II**

Block	Sr #	Module – 1 MSK-I Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block-I	1	Mid Module Examinations LMS based (Anatomy, Physiology & Biochemistry)	Summative	30 Minutes	3 Hour 15 Minutes	45 Minutes	2 Formative	6 Summative
	2	Topics of SDL Examination on MS Team	Formative	30 Minutes				
	3	End Module Examinations (SEQ & MCQs Based)	Summative	2 Hours				
	4	Anatomy Structured and Clinically Oriented Viva	Summative	10 Minutes				
	5	Physiology Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	6	Assessment of Clinical Lectures	Formative	15 Minutes				
	7	Assessment of Bioethics Lectures	Summative	2 Minutes				
	8	Assessment of IUGRC Lectures	Summative	10 Minutes				

## Learning Resources

Subject	Resources
Anatomy	<p><b>A. Gross Anatomy</b></p> <ol style="list-style-type: none"> <li>1. Gray's Anatomy by Prof. Susan Standring 42th edition, Elsevier.</li> <li>2. Clinical Anatomy for Medical Students by Richard S.Snell 10<sup>th</sup> edition.</li> <li>3. Clinically Oriented Anatomy by Keith Moore 9<sup>th</sup> edition.</li> <li>4. Cunningham's Manual of Practical Anatomy by G.J. Romanes, 16th edition, Vol-I, II and III</li> </ol> <p><b>B. Histology</b></p> <ol style="list-style-type: none"> <li>1. B. Young J. W. Health Wheather's Functional Histology 6<sup>th</sup> edition.</li> <li>2. Medical Histology by Prof. Laiq Hussain 7<sup>th</sup> edition.</li> </ol> <p><b>C. Embryology</b></p> <ol style="list-style-type: none"> <li>1. Keith L. Moore. The Developing Human 11<sup>th</sup> edition.</li> <li>2. Langman's Medical Embryology 14<sup>th</sup> edition.</li> </ol>
Physiology	<p><b>A. Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Textbook Of Medical Physiology by Guyton And Hall 14<sup>th</sup> edition.</li> <li>2. Ganong ' S Review of Medical Physiology 26<sup>th</sup> edition.</li> </ol> <p><b>B. Reference Books</b></p> <ol style="list-style-type: none"> <li>1. Human Physiology by Lauralee Sherwood 10<sup>th</sup> edition.</li> <li>2. Berne &amp; Levy Physiology 7<sup>th</sup> edition.</li> <li>3. Best &amp; Taylor Physiological Basis of Medical Practice 13<sup>th</sup> edition.</li> <li>4. Guyton &amp; Hall Physiological Review 3<sup>rd</sup> edition.</li> </ol>
Biochemistry	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Harper's Illustrated Biochemistry 32th edition.</li> <li>2. Lehninger Principle of Biochemistry 8<sup>th</sup> edition.</li> <li>3. Biochemistry by Devlin 7<sup>th</sup> edition.</li> </ol>
Community Medicine	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Community Medicine by Parikh 25<sup>th</sup> edition.</li> <li>2. Community Medicine by M Illyas 8<sup>th</sup> edition.</li> <li>3. Basic Statistics for the Health Sciences by Jan W Kuzma 5<sup>th</sup> edition.</li> </ol>
Pathology/Microbiology	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Robbins &amp; Cotran, Pathologic Basis of Disease, 10<sup>th</sup> edition.</li> <li>2. Rapid Review Pathology, 5<sup>th</sup> edition by Edward F. Goljan MD.</li> <li>3. <a href="http://library.med.utah.edu/WebPath/webpath.html">http://library.med.utah.edu/WebPath/webpath.html</a></li> </ol>
Pharmacology	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Lippincot Illustrated Pharmacology 9<sup>th</sup> edition.</li> </ol>

## **SECTION – V**

### **Time Table**

**Integrated Clinically Oriented Modular Curriculum for First Year MBBS**

**Msk- I Module Time Table**

**First Year MBBS**

**Session 2022-2023**

**Batch- 50**

## MSK-I Module Team

Module Name : MSK-I Module  
 Duration of module : 05 Weeks  
 Coordinator : Dr. Maria Tasleem  
 Co-coordinator : Dr. Urooj Shah  
 Reviewed by : Module Committee

Module Committee			Module Task Force Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Maria Tasleem (Assistant Professor of Anatomy)
2.	Director DME	Prof. Dr. Rai Muhammad Asghar	2.	DME Focal Person	Dr. Sidra Hamid
3.	Convener Curriculum	Prof. Dr. Naeem Akhter	3.	Co-coordinator	Dr. Urooj Shah (Demonstrator of Anatomy)
4.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	4.	Co-Coordinator	Dr. Fahd Anwar (Senior Demonstrator of Physiology)
5.	Additional Director DME	Prof. Dr. Ifra Saeed	5.	Co-coordinator	Dr. Faiza Zafar (Senior Demonstrator of Biochemistry)
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar	<b>DME Implementation Team</b>		
7.	Chairperson Biochemistry	Dr. Aneela Jamil			
8.	Focal Person Anatomy First Year MBBS	Prof. Dr. Ayesha Yousaf	1.	Director DME	Prof. Dr. Rai Muhammad Asghar
9.	Focal Person Physiology	Dr. Sidra Hamid	2.	Implementation Incharge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
10.	Focal Person Biochemistry	Dr. Aneela Jamil	3.	Deputy Director DME	Dr. Shazia Zaib
11.	Focal Person Pharmacology	Dr. Zunera Hakim	4.	Module planner & Implementation coordinator	Dr. Sidra Hamid
12.	Focal Person Pathology	Dr. Asiya Niazi	5.	Editor	Muhammad Arslan Aslam
13.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
14.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
15.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar			

## Discipline Wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
I	<ul style="list-style-type: none"> <li>Anatomy</li> </ul>	Skeletal System <ul style="list-style-type: none"> <li>Bones</li> <li>Joints</li> </ul>	General Embryology Second Week of Human Development till Placenta & Fetal Membranes	General Histology <ul style="list-style-type: none"> <li>Connective Tissue</li> <li>Cartilage</li> <li>Bone</li> </ul>	Shoulder joint till Hand
	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>Minerals, Vitamins, Introduction &amp; Classification of Amino Acids</li> </ul>			
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>NMJ, Introduction Concept of Motor Unit. Neuromuscular Transmission, Synthesis &amp; Fate of Acetylcholine</li> <li>Drugs Acting On NMJ, Myasthenia Gravis, Lambert Eaton Syndrome</li> <li>Structure Of Neurons. Classification Of Neurons &amp; Nerve Fibers</li> <li>Nernst Potential, RMP</li> <li>Recording &amp; Propagation of Action Potential &amp; Factors Effecting Nerve Conduction &amp; Hyperpolarized State</li> <li>Stimulus &amp; Response &amp; Types of Stimuli, Stages of Action Potential</li> </ul>			
	<ul style="list-style-type: none"> <li>Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>Islamic concept of Bioethics</li> </ul>			
	<ul style="list-style-type: none"> <li>Research Club Activity</li> </ul>	<ul style="list-style-type: none"> <li>Comprehend their role in under “theme and scheme”</li> </ul>			
	<ul style="list-style-type: none"> <li>Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>Approach to a patient with Body Pains</li> </ul>			
	<ul style="list-style-type: none"> <li>Artificial Intelligence/Radiology</li> </ul>	<ul style="list-style-type: none"> <li>Interpretation of upper limb Radiograph &amp; use of AI</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>The Holy Quran Translation Component</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical Integration</li> </ul>	Clinically content relevant to musculoskeletal-I module <ul style="list-style-type: none"> <li>Shoulder Dislocation (Surgery)</li> <li>Tennis elbow, Fracture of olecranon, Radius and Ulna (Surgery)</li> <li>Osteoporosis (Medicine)</li> <li>Osteomalacia, Rickets &amp; Polyarthritis (Medicine)</li> <li>Accidents (Community Medicine)</li> </ul>			



### Categorization of Modular Content of Anatomy:

Category A*	Category B**	Category C			
General Embryology	General Histology	Demonstrations / SGD	CBL	Practical's	(SDL)
<ul style="list-style-type: none"> <li>• Second week of Human Development</li> <li>• Gastrulation (3rd week)</li> <li>• Notochord Formation (3rd week)</li> <li>• Neurulation &amp; differentiation of Somites (3rd week)</li> <li>• Early development of CVS &amp; highlights of 4th-8th week</li> <li>• Folding of Embryo</li> <li>• Fetal period</li> <li>• Placenta</li> <li>• Fetal Membranes &amp; Multiple pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>• Connective Tissue I</li> <li>• Connective Tissue II</li> <li>• Connective Tissue III</li> <li>• Cartilage</li> <li>• Bone</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Gross Anatomy:</b></li> <li>• Shoulder joint</li> <li>• -Flexor Compartment &amp; Neurovascular organization of Arm</li> <li>• Extensor compartment &amp; Neurovascular organization of Arm</li> <li>• Bones of Forearm</li> <li>• Flexor compartment of forearm</li> <li>• Extensor compartment of forearm</li> <li>• Neurovascular organization of Forearm</li> <li>• Elbow joint</li> <li>• Proximal &amp; Distal radioulnar joints</li> <li>• Bones of Hand</li> <li>• Wrist joint</li> <li>• Dorsum of Hand, Flexor &amp; Extensor retinaculum</li> <li>• Palm of Hand &amp; Facial spaces</li> <li>• Neurovascular organization of Hand</li> <li>• Surface Marking</li> </ul>	<ul style="list-style-type: none"> <li>• Shoulder Dislocation</li> <li>• Wrist Drop</li> </ul>	<ul style="list-style-type: none"> <li>• Histology of connective Tissue I</li> <li>• Connective tissue II</li> <li>• Cartilage</li> <li>• Bone</li> </ul>	<ul style="list-style-type: none"> <li>• Shoulder joint</li> <li>• Flexor and Extensor compartment of arm</li> <li>• Flexor &amp; Extensor compartment of forearm</li> <li>• Elbow joint</li> <li>• Bones of Hand</li> <li>• Wrist joint</li> <li>• Neurovascular organization of Hand</li> </ul>

**Category A\*:** By Professors

**Category B\*\*:** By Associate & Assistant Professors

**Category C\*\*\*:** By Senior Demonstrators & Demonstrators

### Teaching Staff / Human Resource of Department of Anatomy

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of Anatomy department	01
2.	Associate professor of Anatomy department	01
3.	Assistant professor of Anatomy department (AP)	01
4.	Demonstrators of Anatomy department	03

#### Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$2 * 17 = 34$ hours
2.	Small Group Discussions (SGD)	$1.5 * 15 = 22.5$ hours
3.	Case Based Learning (CBL)	$1.5 * 2 = 3$ hours
4.	Practical / Skill Lab	$1.5 * 20 = 30$ hours

#### Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$1 * 17 = 17$ hours
2.	Small Group Discussions (SGD)	$1.5 * 15 = 22.5$ hours
3.	Case Based Learning (CBL)	$1.5 * 2 = 3$ hours
4.	Practical / Skill Lab	$1.5 * 4 = 6$ hours
5.	Self-Directed Learning (SDL)	$1 * 7 = 7$ hours

### Categorization of Modular Content of Physiology:

Category A*	Category B**	Category C***				
LGIS	LGIS	PBL	CBL	Practical's	SGD	SDL
NMJ, Introduction concept of motor unit. Neuromuscular transmission, synthesis & fate of acetylcholine (Prof. Dr. Samia Sarwar/Dr Aneela )	Structure of neurons. Classification of neurons & nerve fibers (By Dr Sheena Tariq)		1. Paresthesia, Paresis 2. Insecticide poisoning	1. Determination of Hemoglobin concentration 2. Determination of Hematocrit (HCT) 3. Determination of Erythrocyte Sedimentation Rate (ESR) 4. Determination of Differential leukocyte Count (DLC)	1. Nernst potential 2. NMJ, Transmission across NMJ, Diseases of NMJ	1. Structure of neurons. Classification of neurons & nerve fibers 2. Nernst potential, RMP 3. Properties of nerve fibers 4. Measuret of RMP & effect of electrolytes on RMP 5. Concept of degeneration & regeneration 6. Stimulus & response & types of stimuli, Stages of action potential 7. A Refractory period, types of action potential. Graded potential comparison with action potential B. Recording & propagation of action potential & factors effecting nerve conduction & hyperpolarized state <b>SDL: (On Campus)</b> 1. Nernst potential, RMP Action Potential
Drugs acting on NMJ, Myasthenia Gravis, Lambart Eaton Syndrome (Prof. Dr. Samia	Nernst potential, RMP (By Dr Shazia)					

Sarwar/ Dr Aneela)						
	Properties of nerve fibers (By Dr Kamil )					
	Measurement of RMP & effect of electrolytes on RMP (By Dr. Shazia)					
	Concept of degeneration & regeneration (By Dr Kamil )					
	Stimulus & response & types of stimuli, Stages of action potential (By Dr Fareed)					
	Refractory period, types of action potential. Graded potential comparison with action potential (By Dr Shazia)					
	Recording & propagation of action potential & factors effecting nerve conduction & hyperpolarized state (By Dr Fareed)					

Category A\*: By Professors

Category B\*\*: By Associate & Assistant Professors

Category C\*\*\*: By Senior Demonstrators & Demonstrators

### Teaching Staff / Human Resource of Department of Physiology

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of physiology department	01
2.	Associate professor of physiology department	01
3.	Assistant professor of physiology department (AP)	01 (DME)
4.	Demonstrators of physiology department	07
5.	Residents of physiology department (PGTs)	06

### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LECTURES)	10X 2 = 20 Hours
2.	Small Group Discussions (SGD)/ Case based learning (CBL)	18x 2 hours = 36hours + 2hours (4th week) +1 hour (1ST week) =39 hours
3.	Problem Based Learning (PBL)	---
4.	Practical / Skill Lab	18x 2 hours= 36hours + 2 hours (4th week) = 38 hours
5.	Self-Directed Learning (SDL)	7 x 1 hour = 7 hours (Off Campus) 4 x 1 hour = 4 hours (On Campus) (Third week)

### Categorization of Modular Content of Department Of Biochemistry:

Category A*	Category B**	Category C***			
LGIS	LGIS	PBL	CBL	Practical's	SGD
Minerals: Introduction & Classification. Calcium & Phosphate Minerals: Fluoride, Magnesium, Sulphur Minerals: Copper, Zinc, Selenium, Iodine, Manganese Classification & Structure of Amino Acids & Isomerism	Vitamins: Introduction & Classification. Vitamin A & Vitamin E Vitamin D Vitamin C Niacin & Thiamine		<ul style="list-style-type: none"> <li>• Night Blindness</li> <li>• Rickets</li> </ul>	<ul style="list-style-type: none"> <li>• 7 Colour Tests for Proteins</li> <li>• Serum Calcium &amp; Ascorbic Acid</li> </ul>	Introduction & Classification of Minerals & Vitamins. •Vitamin A, Vitamin E  Vitamin C & Vitamin D •Minerals: Calcium, Phosphate, Magnesium, Sulphur, Zinc, Iodine

**Category A\*:** By HOD and Assistant Professor

**Category B\*\*:** By All (HOD, Assistant Professors, Senior Demonstrators)

**Category C\*\*\*:** By All Demonstrators

### Teaching Staff / Human Resource of Department of Biochemistry

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1	Assistant professor of biochemistry department (AP)	02
2	Demonstrators of biochemistry department	08

#### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours (Faculty)	Total Hours (student)
1.	Large Group Interactive Session (LECTURES)	$5 * 1 = 5$ hours	5
2.	Small Group Discussions (SGD)	$1.5 * 5 = 7.5$ hours	7.5
3.	Problem Based Learning (PBL)	$2 * 1 = 2$ hours	02
4.	Practical / Skill Lab	$1.5 * 05$	7.5
5.	Self-Directed Learning (SDL)	$1 * 8 = 8$ hours	08

**Musculoskeletal Module –I First Week**  
( 27-03-2023 To 01-04-2023)

Day & Date	08:00AM – 08:45AM	08:45AM – 09:30AM	09:30AM – 10:30AM	10:30AM – 11:30AM	11:30PM – 01:00PM	Home Assignment			
<b>Monday</b> 27-03-2023	<b>BIOCHEMISTRY (LGIS)</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY(LGIS)</b>				
	Mineral introduction/ classification/ calcium & Phosphate	Definition & classification of vitamins, Vitamin A, Vitamin E	Embryology	Histology	Structure of neurons Classification of neurons and nerve fibers	Nernst Potential& RMP			
	Dr. Uzma (Even)	Dr. Almas (Odd)	Ibadaat	Second Week of Human Development			Connective tissue - I		
Dr. Fahd Anwar		Prof. Dr. Ayesha (Even)	Ass. Prof. Dr.Mohtasham (Odd)	Dr. Sheena (Even)	Dr. Shazia (Odd)	Practical & Tutorial Venue & topic mentioned at the end SDL Physiology Structure of Neurons & Classification of Neurons			
<b>Tuesday</b> 28-03-2023	<b>CBL(DISSECTION)</b>		<b>SURGERY</b>		<b>PHYSIOLOGY(LGIS)</b>				
	Shoulder joint		Shoulder Dislocation		Nerve Potential RMP	Structure of neurons Classification of neurons and nerve fibers			
			Dr Rana Adnan (Even)	Dr . Muhammad Hassan (odd)	Dr. Shazia (Even)	Dr. Sheena (Odd)	Practical & Tutorial Venue & topic mentioned at the end SDL Physiology Structure of Neurons & Classification of Neurons		
<b>Wednesday</b> 29-03-2023	<b>SGD / DISSECTION</b>		<b>ANATOMY (LGIS)</b>		<b>BIOETHICS</b>				
	Flexor compartment & Neurovascular organization of arm		Histology	Embryology	Islamic concept of Bioethics				
			Connective tissue-I	Second Week of Human Development	Dr. Kashif Rauf				
Ass. Prof. Dr. Mohtasham (Even)		Prof. Dr. Ayesha (Odd)				Practical & Tutorial Venue & topic mentioned at the end SDL Biochemistry Definition & classification of vitamins, Vitamin A, Vitamin E			
<b>Thursday</b> 30-03-2023	<b>CBL / DISSECTION</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY(LGIS)</b>				
	Extensor compartment & Neurovascular organization of arm (Wrist Drop)		General Anatomy	Histology	Properties of nerve Fibers	Measurement & effect of electrolytes on RMP			
			Bone-I	Connective tissue-II					
Dr. Arslan (Even)		Dr. Maria (Odd)		Dr. Kamil (Even)	Dr. Shazia (Odd)	Practical & Tutorial Venue & topic mentioned at the end SDL Biochemistry Mineral introduction/ classification/ calcium & Phosphate			
<b>Friday</b> 31-03-2023	<b>MEDICINE</b>		<b>FAMILY MEDICINE</b>		<b>BIOCHEMISTRY (LGIS)</b>				
	Osteoporosis		Approach to a patient with Body Pains		Definition & classification of vitamins, Vitamin A, Vitamin E	Mineral introduction/ classification/ calcium & Phosphate			
			Histology	Embryology					
Dr Saima Mir (Even)		Dr Javaria Malik (odd)	Dr Sadia (Even)	Dr. Sidra Hamid (Odd)	Connective Tissue - II	Gastrulation (3 <sup>rd</sup> week)	Dr. Almas (Even)	Dr. Uzma (Odd)	SDL Anatomy Shoulder joint
<b>Saturday</b> 01-04-2023	<b>DISSECTION</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY</b>				
	DISSECTION & SPOTTING		Embryology	General anatomy	Measurement & effect of electrolytes on RMP	Properties of nerve Fibers			
			Gastrulation (3 <sup>rd</sup> week)	Bone-I					
Prof. Dr. Ayesha (Even)		Ass. Prof. Dr. Arslan (Odd)		Dr. Shazia (Even)	Dr. Sheena (Odd)	Practical & Tutorial Venue & topic mentioned at the end SDL Anatomy Flexor and Extensor compartments of arm			



Topics For Practical with Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>Connective Tissue I (Anatomy/Histology-practical)</li> <li>Biuret Test, Ninhydrin Test (Biochemistry practical)</li> <li>Determination of Hemoglobin concentration (Physiology-Practical)</li> </ul>						<ul style="list-style-type: none"> <li>Physiology SGD: Nernst potential (Physiology Lecture Hall 05)</li> <li>Biochemistry SGD: Mineral introduction/ classification/ calcium &amp; Introduction &amp; classification of vitamins, Vitamin A &amp; Vitamin E (Anatomy Lecture Hall 03)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	01-120	Dr. Zeneera	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	121-240	Dr. Urooj Shah	Lecture Hall No. 04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	241- onwards	Dr. Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C					
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue						Biochemistry	Physiology	
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq	1.	A	01-70	Dr. Faiza Zafar	Dr. Sheena Tariq	
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani	2.	B	71-140	Dr. Almas Ijaz	Dr. Uzma Kiani	
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar	3.	C	141-210	Dr. Rahat Afzal	Dr. Fahd Anwar	
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah	4.	D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish	
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)		Dr. Maryam Abbas (PGT Physiology)	5.	E	281-onwards	Dr. Romessa	Dr. Fareed	
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)	<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>					
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Romessa (PBL) Dr. Shazia Noreen (SGD)						
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)	<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Musculoskeletal Module –I Second Week**  
**03-04-2023 to 08-04-2023**

Day & Date	08:00AM – 09:30AM	09:30AM – 10:30AM	10:30AM – 11:30PM	11:30PM – 01:00PM	Home Assignment		
<b>Monday</b> 03-04-2023	<b>SGD / DISSECTION</b>	<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY(LGIS)</b>			
	Bones of forearm Ulna & Radius	General Anatomy	Embryology	Concept of Degeneration and regeneration	Stimulus & Response & Type of stimuli. Stages of action potential		
		Bone-II	Notochord formation & Differentiation of Somites (3 <sup>rd</sup> week)				
Ass. Prof. Dr. Arslan (Even)	Prof. Dr. Ayesha (Odd)	Dr. Kamil (Even)	Dr. Fareed (Odd)	<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Physiology Resting Membrane Potential		
<b>Tuesday</b> 04-04-2023	<b>SGD / DISSECTION</b>	<b>ANATOMY (LGIS)</b>				<b>PHYSIOLOGY(LGIS)</b>	
	Flexor compartment of forearm	Embryology	General Anatomy			Stimulus & Response & Type of stimuli. Stages of action potential	Concept of Degeneration and regeneration
		Notochord formation & Differentiation of Somites (3 <sup>rd</sup> Week)	Bone-II				
Prof. Dr. Ayesha (Even)		Ass. Prof. Dr. Arslan (Odd)	Dr. Fareed (Even)	Dr. Kamil (Odd)	<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Physiology Action Potential	
<b>Wednesday</b> 05-04-2023	<b>SGD / DISSECTION</b>	<b>ANATOMY (LGIS)</b>		<b>PBL SESSION -I</b>			
	Extensor compartment of forearm	Histology	Embryology	Muscle Weakness PBL Team			
		Connective Tissue-III	Neurulation (3 <sup>rd</sup> week)				
Ass. Prof. Dr. Mohtasham (Even)		Prof. Dr. Ayesha (Odd)			<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Biochemistry Biochemical role of vitamin D	
<b>Thursday</b> 06-04-2023	<b>SGD / DISSECTION</b>	<b>ANATOMY (LGIS)</b>		<b>BIOCHEMISTRY LGIS</b>			
	Neurovascular organization of forearm	Embryology	Histology	Fluoride, Magnesium & Sulphur Copper, Zinc, Selenium, Iodine, Manganese			Vitamine D
		Neurulation (3 <sup>rd</sup> week)	Connective Tissue-III				
Prof. Dr. Ayesha (Even)		Ass. Prof. Dr. Mohtasham(Odd)	Dr. Uzma (Even)	Dr. Almas (Odd)	<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Biochemistry Fluoride, Magnesium & Sulphur Copper, Zinc, Selenium, Iodine, Manganese	
<b>Friday</b> 07-04-2023	<b>SGD / DISSECTION</b>	<b>ANATOMY (LGIS)</b>		<b>PBL SESSION -II</b>			
	Elbow joint & Anastomosis around elbow joint	Embryology	Histology	Muscle Weakness PBL Team			
		Early development of CVS & Highlights of 4 <sup>th</sup> -8 <sup>th</sup> week	Cartilage				
Prof. Dr. Ayesha (Even)		Ass. Prof. Dr. Mohtasham (Odd)			SDL Anatomy Flexor & Extensor compartments of forearm		
<b>Saturday</b> 08-04-2023	<b>SGD / DISSECTION</b>	<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY(LGIS)</b>			
	Proximal & Distal Radioulnar joints	Histology	Embryology	Refractory period, types of action potential. Graded potential comparison with action potential			Recording & propagation of action potential & factors effecting nerve conduction & hyperpolarized state
		Cartilage	Early development of CVS & Highlights of 4 <sup>th</sup> -8 <sup>th</sup> week				
Ass. Prof. Dr. Mohtasham (Even)		Prof. Dr. Ayesha (Odd)	Dr Shazia (Even)	Dr. Fareed (Odd)	<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Anatomy Elbow joint <b>Online LMS Assessment will be conducted in evening</b>	

Topics For Practical with Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>Connective Tissue II (Anatomy/Histology-practical)</li> <li>Xanthoproteic Test, Millon-Nasse's Test (Biochemistry practical)</li> <li>Determination of Hematocrit (HCT)(Physiology-Practical)</li> </ul>						<ul style="list-style-type: none"> <li>Physiology CBL: Parasthesias, paraesis (Physiology Lecture Hall 05)</li> <li>Biochemistry CBL: Night Blindness (Anatomy Lecture Hall 03)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	01-120	Dr. Zeneera	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	121-240	Dr. Urooj Shah	Lecture Hall No. 04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	241- onwards	Dr. Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C					
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue						Biochemistry	Physiology	
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq	1.	A	01-70	Dr. Faiza Zafar	Dr. Sheena Tariq	
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani	2.	B	71-140	Dr. Almas Ijaz	Dr. Uzma Kiani	
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar	3.	C	141-210	Dr. Rahat Afzal	Dr. Fahd Anwar	
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah	4.	D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish	
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)	5.	E	281-onwards	Dr. Romessa	Dr. Fareed	
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)	<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>					
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Romessa (PBL) Dr. Shazia Noreen (SGD)						
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)	<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Musculoskeletal Module –I Third Week**  
**10-04-2023 to 13-04-2023**

Day & Date	08:00AM TO 08:45AM	08:45AM TO 09:30AM	09:30AM TO 10:30AM	10:30AM TO 11:30PM	11:30 to 01:00pm	Home Assignment				
<b>Monday</b> 10-04-2023	<b>MEDICINE (LGIS)</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY(LGIS)</b>		<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Physiology NMJ <b>Online SDL Evaluation</b>
	Osteomalacia, rickets&Polyarthritis		Vitamin D	Fluoride, Magnesium & Sulphur Copper, Zinc, Selenium, Iodine, Manganese	Embryology	Histology	Recording & propagation of action potential & factors effecting nerve conduction & Hyperpolarizedstate	Refractory period,types of action potential. Graded potential comparison with action potential		
	Dr. Umer Daraz (Even)	Dr Iqra Ashraf (Odd)	Dr. Almas (Even)	Dr. Uzma (Odd)	Prof. Dr. Ayesha (Even)	Ass. Prof.Dr. Mohtasham (Odd)	Dr. Fareed (Even)	Dr Shazia (Odd)		
<b>Tuesday</b> 11-04-2023	<b>SGD / DISSECTION</b>			<b>ANATOMY (LGIS)</b>		<b>COMMUNITY MEDICINE</b>	<b>PHYSIOLOGY(LGIS)</b>		<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Physiology Concept of Degeneration and regeneration
	Bones of Hand			Histology	Embryology	Accidents	NMJ, Introduction concept of motor unit. Neuromuscular transmission, synthesis & fate of acetylcholine			
				Bone	Folding Of Embryo		Prof. Dr. Samia Sarwar/ Dr Aneela (Odd)			
			Ass. Prof.Dr. Mohtasham (Even)	Prof. Dr. Ayesha (Odd)	Dr. Maimoona (Even)	Prof. Dr. Samia Sarwar/ Dr Aneela (Odd)				
<b>Wednesday</b> 12-04-2023	<b>SGD / DISSECTION</b>			<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY(LGIS)</b>	<b>COMMUNITY MEDICINE</b>		<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Biochemistry Deficiency manifestation of thiamine <b>(Online Clinical content Evaluation)</b>
	Wrist joint			General Anatomy	Embryology	Accidents	NMJ, Introduction concept of motor unit. Neuromuscular transmission, synthesis & fate of acetylcholine			
				Joints I	Fetal period		Dr Abdul Quddos (Odd)			
			Ass. Prof. Dr. Arsalan (Even)	Prof. Dr. Ayesha (Odd)	Prof. Dr. Samia Sarwar/ Dr Aneela (Even)	Dr Abdul Quddos (Odd)				
<b>Thursday</b> 13-04-2023	<b>SGD / DISSECTION</b>			<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY(LGIS)</b>		Practical & CBL Venue & topic mentioned at the end	SDL Biochemistry Deficiency manifestation of Vitamin A&D	
	Dorsum of Hand, Flexor & Extensor Retinacula			Embryology	General Anatomy	SDL: Nernst Potential & RMP & Action Potential				Drugs acting on NMJ, MyastheniaGravis, Lambart Eaton Syndrome
				Fetal period	Joints I	Dr Shazia (Even)				Prof. Dr. Samia Sarwar /Dr Aneela (Odd)
			Prof. Dr. Ayesha (Even)	Ass. Prof. Dr. Arsalan (Odd)	Dr Shazia (Even)		Prof. Dr. Samia Sarwar /Dr Aneela (Odd)			
<b>Friday</b> 14-04-2023	<b>Eid &amp; Spring Holidays</b>									
<b>Saturday</b> 15-04-2023	<b>Eid &amp; Spring Holidays</b>									

Topics For Practical With Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>● Cartilage (Anatomy/Histology-practical)</li> <li>● Tryptophan by Aldehyde Test, Arginine by Sakaguchi's Test (Biochemistry practical)</li> <li>● Determination of Erythrocyte Sedimentation Rate (ESR)(Physiology-Practical)</li> </ul>						<ul style="list-style-type: none"> <li>● Physiology CBL: Insecticide poisoning (Physiology Lecture Hall 05)</li> <li>● Biochemistry SGD: Minerals: Zinc, Selenium, Copper, Iodine, Phosphate, magnesium, sulphur (Anatomy Lecture Hall 03)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	01-120	Dr. Zeneera	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	121-240	Dr. Urooj Shah	Lecture Hall No. 04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	241-onwards	Dr. Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C					
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue						Biochemistry	Physiology	
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq	1.	A	01-70	Dr. Faiza Zafar	Dr. Sheena Tariq	
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. UzmaKiani	2.	B	71-140	Dr. Almas Ijaz	Dr. UzmaKiani	
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar	3.	C	141-210	Dr. Rahat Afzal	Dr. Fahd Anwar	
Batch-B2	(106-140)	Conference room(Basement)		Dr. Fareedullah	4.	D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. NayabZonish	
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)	5.	E	281-onwards	Dr. Romessa	Dr. Fareed	
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. IqraAyub (PGT Physiology)	<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>					
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Roamessa (PBL) Dr. Shazia Noreen (SGD)						
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)	<b>Even Roll Number</b>		New Lecture Hall Complex Lecture Theater # 02			
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Musculoskeletal Module –I Fourth Week  
24-04-2023 to 29-04-2023**

Day & Date	08:00AM TO 09:00AM	09:00am to 10:00am	10:00am to 11:00am	11:00am to 12:00pm	12:20-02:00 pm	Home Assignment			
<b>Monday</b> 24-04-2023	<b>Eid Holiday</b>								
<b>Tuesday</b> 25-04-2023	<b>Eid Holiday</b>								
<b>Wednesday</b> 26-04-2023	<b>BIOCHEMISTRY (LGIS)</b>		<b>SGD/ DISSECTION</b>		<b>ANATOMY LGIS</b>		<b>Practical &amp; CBL</b> Venue & topic mentioned at the end <b>Saturday Batch (15-4-23)</b>	<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Anatomy Wrist joint
	Vitamin C, Niacin & Thiamine	Classification & Structure of Amino Acids Isomerism	Palm of Hand & Facial spaces		Embryology	General Anatomy			
	Dr. Almas (even)	Dr. Rahat (Odd)			Placenta	Joints II			
<b>Thursday</b> 27-04-2023	<b>SGD / DISSECTION</b>		<b>ANATOMY LGIS</b>		<b>PHYSIOLOGY LGIS</b>		<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL Biochemistry Niacin and Thiamin & Classification and structure of Amino acid	
	Neurovascular Organization of Hand		General Anatomy	Embryology	Drugs acting on NMJ, Myasthenia Gravis, Lambert Eaton Syndrome	SDL: Nernst Potential & RMP & Action Potential			
			Joints II	Placenta	Ass. Prof. Dr. Arsalan (Even)	Prof. Dr. Ayesha (Odd)			Prof. Dr. Samia Sarwar / Dr Aneela (Even)
<b>Friday</b> 28-04-2023	<b>BIOCHEMISTRY (LGIS)</b>		<b>ARTIFICIAL INTELLIGENCE/RADIOLOGY(LGIS)</b>		<b>ANATOMY LGIS</b>		<b>Practical &amp; CBL</b> Venue & topic mentioned at the end <b>Monday Batch (24-4-23)</b>	SDL Anatomy Neurovascular organization of Hand	
	Classification & Structure of Amino Acids Isomerism	Vitamin C, Niacin & Thiamine	Interpretation of upper limb Radiograph & use of AI		Embryology	Embryology			
	Dr. Rahat (Even)	Dr. Almas (Odd)			Fetalmembranes & multiple pregnancy	Fetal membranes & multiple pregnancy			
<b>Saturday</b> 29-04-2023	<b>SGD / DISSECTION</b>		<b>Practical &amp; CBL</b>		<b>SURGERY LGIS</b>		<b>Practical &amp; CBL</b> Venue & topic mentioned at the end	SDL physiology	
	Cutaneous innervation & Dermatomes of upper limb , Force & weight transmission & Surface Marking		Venue & topic mentioned at the end <b>Tuesday Batch (25-4-23)</b>		Tennis elbow, Fracture of Olecranon, radius, ulna				
					Dr. Junaid Khan	Dr. Rana Adnan			

**BREAK 12:00 –12:20PM**

Topics For Practical With Venue						Topics For Small Group Discussion& CBLs With Venue				
<ul style="list-style-type: none"> <li>● Bone (Anatomy/Histology-practical)</li> <li>● Serum Calcium &amp; Ascorbic Acid Estimation (Biochemistry practical)</li> <li>● Determination of Differential leukocyte Count (DLC)(Physiology-Practical)</li> </ul>						<ul style="list-style-type: none"> <li>● Physiology: NMJ, Transmission across NMJ, Diseases of NMJ (Physiology Lecture Hall 05)</li> <li>● Biochemistry CBL: Rickets (Anatomy Lecture Hall 03)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	01-120	Dr. Zeneera	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	121-240	Dr. Urooj Shah	Lecture Hall No. 04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	241-onwards	Dr. Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C					
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL &SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue						Biochemistry	Physiology	
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq	1.	A	01-70	Dr. Faiza Zafar	Dr. Sheena Tariq	
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. UzmaKiani	2.	B	71-140	Dr. Almas Ijaz	Dr. UzmaKiani	
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar	3.	C	141-210	Dr. Rahat Afzal	Dr. Fahd Anwar	
Batch-B2	(106-140)	Conference room(Basement)		Dr. Fareedullah	4.	D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. NayabZonish	
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)	5.	E	281-onwards	Dr. Romessa	Dr. Fareed	
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. IqraAyub (PGT Physiology)	<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>					
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Romessa (PBL) Dr. Shazia Noreen (SGD)						
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)	<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Spring Vacation**

**01 May 2023 To 06 May, 2023**



**Musculoskeletal Module –I Fifth Week**  
**08-05-2023 to 13-05-2023**

<b>Date &amp; Day</b>	<b>8:00 AM – 9:00 AM</b>	<b>11:00AM – 12:00 PM</b>
<b>Monday</b> 08-05-2023	Anatomy /Physiology Viva Voce	
<b>Tuesday</b> 09-05-2023	Anatomy /Physiology Viva Voce	
<b>Wednesday</b> 10-05-2023	Anatomy Theory Paper & Gross OSPE	
<b>Thursday</b> 11-05-2023	Physiology Theory Paper & Video Assisted Quiz	
<b>Friday</b> 12-05-2023	Biochemistry Theory Paper & Allieds	
<b>Saturday</b> 13-05-2023	Integrated OSPE	

(Logistics Details of assessments will be notified separately)

## SECTION VI

**Table of Specification (TOS) For MSK-I Module Examination for First Year MBBS**

Sr. #	Discipline	No. of MCQs (%)	No. of MCQs according to cognitive domain			No. of SEQs (%)		No. of SEQs according to cognitive domain			Viva voce	Integrated OSPE	Total Marks
			C1	C2	C3	No. of items	Marks	C1	C2	C3			
1.	Anatomy	20	10	5	5	4	20	1	2	1	60	45 (15 Stations)	145
2.	Physiology	30	18	9	3	4	20	1	2	1	50		118
3.	Biochemistry	10	5	4	1	3	15	-	1	-	10	10	37
Total Marks												300	
<b>Table of Specification for Clinical Subjects</b>													
1.	Bioethics & Professionalism	2										2	
2.	Research	2										2	
3.	Family Medicine	2										2	
5.	Medicine	5										5	
6.	Surgery	5										5	
7.	Community Medicine	2										2	
8.	Radiology & Artificial Intelligence (Innovation)	2										2	
Total											20		

## Table of Specification For Integrated OSPE

### Anatomy

Sr. # / Station No	Topics	Knowledge	Skill	Attitude	Marks
<b>Block 1- Upper Limb</b>					
1	Bones and Joints	30%	50%	20%	3
2	Pectoral Region & Breast				3
3	Axillary Region				3
4	Bones and Joints of Arm, Forearm				3
5	Muscles and Neurovascular of Anterior Compartment of Arm				3
6	Muscles and Neurovascular of Posterior Compartment of Arm				3
7	Muscles and Neurovascular of Anterior Compartment of Forearm				3
8	Muscles and Neurovascular of Posterior Compartment of Forearm				3
9	Muscles and Neurovascuature of Hand				3
10	Radiology of Upper Limb				3
<b>Total</b>					<b>30</b>

Sr. # / Station No	Topics	Knowledge	Skill	Attitude	Marks
<b>Block 1- Foundation and MSK-I</b>					
1	Development of Fertilisation to Eighth Week	30%	50%	20%	3
2	Development of Placenta, foetal membranes, Multiple pregnancy and estimation of fetal age.				3
3	Microscopic anatomy of Epithelia				3
4	Microscopic anatomy of Connective Tissue				3
5	Practical Copy				3
<b>Total</b>					<b>15</b>

## Physiology

Block – I (Foundation & MSK-I)						
1.	Introduction to compound microscope	30%	50%	20%	1 A	1.5
2.	Apparatus identification (Introduction to Neubauer's chamber, Red Blood Cell (RBC) pipettes & White Blood Cell (WBC) pipette)				1 B	1.5
3.	Introduction to Wintrobe & Westergren tube				2 A	1.5
4.	Determination of Hematocrit (HCT)				2 B	1.5
5.	Apparatus identification (Introduction to centrifuge machine)				3	3
6.	Determination of Hemoglobin concentration				4	3
7.	Determination of Erythrocyte Sedimentation Rate (ESR)				5	3
8.	Practical note book / sketch copy				6	3

## Biochemistry

Sr. No	Block	Topic	Knowledge	Skill	Attitude	Station No.	Marks
1.	Block – I	Adsorption	100%			1A	1
2.	(Foundation &	Surface tension				1B	1
3.	MSK-I)	Tonicity	100%			2A	1
4.		Introduction to glassware				2B	1
5.		Calcium estimation	100%			3	2
6.		Ascorbic estimation					
7.		Casein detection by isoelectric pH					
8.		Color test for amino acids (observed)		90%	10%	4	2
9.		Practical note book		80%	20%	5	2
						<b>Total</b>	<b>10</b>

## **Annexure I**

**(Sample MCQ, SEQ, OSPE & Video Assisted Quiz Papers)**

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**ANATOMY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs MSK-I MODULE EXAM**

1. A patient complains of pain in shoulder joint especially during overhead abduction due to rotator cuff injury. The subscapularis is a muscle of the rotator cuff that inserts on,
  - a. Greater tubercle of the humerus
  - b. Lesser tubercle of the humerus
  - c. Coracoid process of the scapula
  - d. Acromion process of the scapula
  - e. Head of humerus
2. A patient presents to the emergency department with a dislocated shoulder. The nerve that could be damaged is,
  - a. Axillary nerve
  - b. Radial nerve
  - c. Median nerve
  - d. Ulnar nerve
3. A patient presents to the emergency department with a humeral shaft fracture. The structures that could be damaged are,
  - a. Axillary nerve and posterior circumflex humeral artery
  - b. Radial nerve and profunda brachii artery
  - c. Median nerve and brachial artery
  - d. Ulnar nerve and ulnar collateral artery
  - e. Musculocutaneous nerve and brachial artery
4. A patient presents to the clinic with a complaint of numbness and tingling on the medial side of the left hand. The nerve involved is,
  - a. Median nerve
  - b. Ulnar nerve
  - c. Radial nerve
  - d. Axillary nerve
5. A phlebotomist performs venepuncture on the vein traveling on the medial side of forearm. This vein is,
  - a. Cephalic vein
  - b. Brachial vein
  - c. Axillary vein
  - d. Basilic vein
  - e. Median antebrachial vein

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**ANATOMY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS SEQs MSK-I MODULE EXAM**

Note: Attempt all questions. All questions carry equal marks. Draw diagram where necessary

Q1- A 12-year-old male football player presented to the emergency department with a painful right elbow after a tackle during a game. He reported that he landed on his right arm and felt a sudden, sharp pain in his elbow. He was diagnosed with a fracture of the medial epicondyle of the humerus.

i. Which nerve and artery is affected in this case? (1)

ii. Enlist the muscles supplied by this nerve. (1)

iii. What would be the position of hand in this case? (1)

b. A 45-year-old female office worker presented to the clinic with complaints of numbness and tingling in her right hand, particularly in the thumb, index, and middle finger. On physical examination, there is mild swelling and tenderness over the volar aspect of the right wrist. Tinel's sign was positive, with tingling and numbness elicited upon percussion over the median nerve at the wrist.

i. What is the name of this condition? (1)

ii. Enlist the muscles affected in this case? (1)

Q2- A 55-year-old female presented with pain in her wrist and forearm. Examination revealed tenderness over the anatomical snuffbox.

a) What are its boundaries and contents? (2.5)

b) Trace the course, relations, and branches of the radial artery. (2.5)

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs MSK-I MODULE EXAM**

1. Plateau in action potential is caused by prolonged opening of:
  - a. Voltage gated K channels
  - b. Chloride channels
  - c. Slow Ca<sup>2+</sup> sodium channels
  - d. K leak Channels
  - e. Voltage gated Ca<sup>2+</sup> Channels
  
2. Propagation of action potential is ensured because of the following property of action potential:
  - a. Adaptation
  - b. Summation
  - c. All and none law
  - d. Saltatory conduction
  - e. Absolute refractory period
  
3. The resting potential of a myelinated fiber is primarily dependent on the concentration gradient of:
  - a. Ca
  - b. Cl
  - c. HCO<sub>3</sub><sup>-</sup>
  - d. K
  - e. Na
  
4. Drug that stimulates the muscle fibre by Acetylcholine like action is:
  - a. Neostigmine
  - b. Nicotine
  - c. Physostigmine
  - d. D-tubocurarine
  - e. Diisopropylflourophosphate
  
5. A 35-year-old lady presented with sudden onset of extreme muscle weakness. She could not talk or see. After administration of a drug called neostigmine, her symptoms improved because the drug:
  - a. Activates acetylcholine esterase permanently
  - b. Activates acetylcholine temporarily
  - c. Inhibits acetylcholine permanently:
  - d. Inhibits acetylcholine esterase temporarily
  - e. Releases acetylcholine at the nerve terminus



**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS SEQs MSK-I MODULE EXAM**

Q2. A 35-year-old lady presented in emergency department with sudden onset of shortness of breath, dropping of eyelids and slurring of speech. Her serum auto-antibody titer was much raised. These antibodies were directed against ligand- gated-channels at the neuromuscular junction. The symptoms reversed after the administration of a drug prescribed by the duty doctor.

- a. Name the drug. Give its mechanism of action. (1)
- b. Name the disorder she is suffering from. (1)
- c. What is the pathophysiological basis of this disorder? (3)

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**BIOCHEMISTRY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs MSK-I MODULE EXAM**

1. Pick up element that prevents the development of dental caries?
  - a. Calcium
  - b. Phosphorus
  - c. Sodium
  - d. Fluorine
  - e. Lithium
2. Which of these vitamins can be used in high doses to treat hypercholesterolemia?
  - a. Riboflavin
  - b. Niacin
  - c. Pyridoxine
  - d. Folic acid
  - e. Thiamine
3. Calcium has the following role in the body:
  - a. Formation of organic bone matrix
  - b. Antioxidant
  - c. Second messenger
  - d. Synthesis of rhodopsin
  - e. Role in red cell formation
4. Following vitamin has role in blood clotting:
  - a. Riboflavin
  - b. Vitamin C
  - c. Pyridoxine
  - d. Folic acid
  - e. Vitamin K

**SEQ**

- |   |    |
|---|----|
| Q. a. Write down the biological functions of vitamin D. | 03 |
| b. What is the role of vitamin A in visual cycle?       | 02 |

**RAWALPINDI MEDICAL UNIVERSITY, RAWALPINDI**  
**DEPARTMENT OF ANATOMY**  
**1st Year MBBS Integrated OSPE Block-I**

**Station No. 1**      Time Allowed: 1 Min 30secs

Histology sketch copy will be assessed for

- a. omplete index (1)
- b. CComplete and signed diagrams (1)
- c. 2 ID points mentioned with each diagram (1)

**Station No. 2** Time Allowed: 1 Min 30secs

- a. Identify slide A (1)
- b. Identify slide B (1)
- c. What are common locations of slide B in human body (1)

**RAWALPINDI MEDICAL UNIVERSITY, RAWALPINDI**  
**DEPARTMENT OF BIOCHEMISTRY**  
**1st Year MBBS Integrated OSPE Block-I**

**Station No. 1**

Time Allowed: 2 Mins

**Observed station**

Perform Hay's sulfur test 03

**Station No. 2**

Time Allowed: 2 Mins

**Observed station**

Perform Biuret test 03

**RAWALPINDI MEDICAL UNIVERSITY**  
**BIOETHICS DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs MSK-I MODULE EXAM**

1. ----Includes rules of conduct that may be used to regulate our activities concerning the biological world.
  - a. Bio-piracy
  - b. Biosafety
  - c. Bioethics
  - d. Bio-patents
  - e. Bio-logistic
2. The right of patients having self-decision is called.
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
3. Following is not code of ethics.
  - a. Integrity
  - b. Objectivity
  - c. Confidentiality
  - d. Behaviour
  - e. Autonomy
4. -----in the context of medical ethics, if it's fair and balanced
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
5. -----Principle requiring that physicians provide, positive benefits
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity

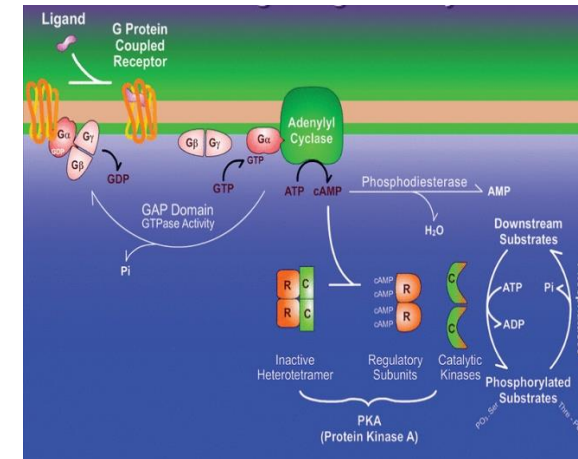
**RAWALPINDI MEDICAL UNIVERSITY  
ANATOMY DEPARTMENT  
1<sup>ST</sup> YEAR MBBS VIDEO ASISSTED QUIZ MSK-I MODULE EXAM**

- I. What is this clinical condition? (1)
- II. Describe its features with the muscle affected (4)



**RAWALPINDI MEDICAL UNIVERSITY**  
**BIOCHEMISTRY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS VIDEO ASISSTED QUIZ MSK-I MODULE EXAM**

1. Name this signaling pathway and ligands that bind to GPCR. (2)
2. What is the mechanism of action of G proteins? (2)
3. Name the drugs/compounds that inhibit phosphodiesterase (1)






Department of Medical Education (DME)

## Musculoskeletal-II Module

**Study Guide**  
**First Year MBBS 2022 - 2023**





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Additional Director Medical Education, Asst. Director Medical Education,	Curriculum Committee	Vice Chancellor



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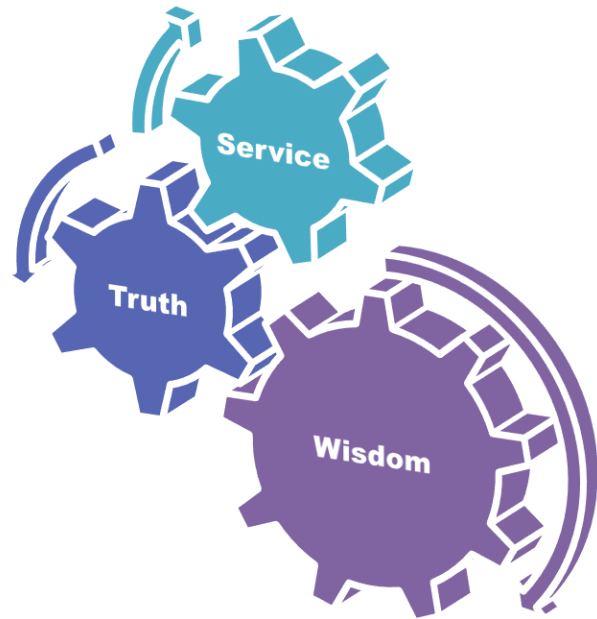
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## University Moto, Vision, Values & Goals

### RMU Motto



### Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

### Vision and Values

Highly recognized and accredited centre of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

### Goals of the Undergraduate Integrated Modular Curriculum

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the Health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of knowledge to help you attain personal and professional growth & excellence.

**Second Year MBBS 2023**

**Study Guide**

**MSK-II Module**

## Discipline Wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
II	<ul style="list-style-type: none"> <li>Anatomy</li> </ul>	<ul style="list-style-type: none"> <li>Muscles</li> <li>Skin</li> </ul>	<ul style="list-style-type: none"> <li>Development of Axial Skeleton</li> <li>Development of limbs</li> <li>Development of muscles</li> </ul>	General Histology <ul style="list-style-type: none"> <li>Muscles</li> <li>Skin</li> <li>Skin appendages</li> </ul>	Gluteal Region to Lateral compartment of leg
	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>Protein chemistry, Protein separation techniques, Collagen and Elastin</li> </ul>			
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle.</li> <li>Molecular Mechanism of skeletal muscle contraction, Rigormortis, Muscular dystrophies</li> <li>Introduction to muscle physiology, Structure of sarcomere</li> <li>Energetics, efficiency and types of contraction, heat production in muscle</li> <li>Physiologic anatomy, types and properties of Smooth Muscle</li> <li>Mechanism of smooth muscle contraction &amp; its control</li> <li>Introduction to pericardium Properties of myocardium &amp; endocardium, myocardial action potential</li> <li>Regulation of myocardial activity</li> <li>Comparison of 3 types of Muscle</li> <li>Introduction to CVS</li> <li>Excitatory &amp; Conducting system of heart</li> </ul>			
	<ul style="list-style-type: none"> <li>Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to Professional Ethics and PM&amp;DC Code of Conduct</li> <li>History of Medical Ethics</li> </ul>			
	<ul style="list-style-type: none"> <li>Research Club Activity (IUGRC)</li> </ul>	<ul style="list-style-type: none"> <li>Student Practical Session-I</li> <li>Student Practical Session-II</li> </ul>			
	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Communication Skills</li> </ul>			
	<ul style="list-style-type: none"> <li>Behavioural Sciences</li> </ul>	<ul style="list-style-type: none"> <li>Rights and Responsibilities of patients and doctors</li> </ul>			
	<ul style="list-style-type: none"> <li>Radiology &amp; Artificial Intelligence</li> </ul>	<ul style="list-style-type: none"> <li>x-rays of hipbone lower limb</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>The Holy Quran Translation Component</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical Integration</li> </ul>	<ul style="list-style-type: none"> <li>Clinically co-related lectures</li> </ul>			



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## MSK-II Module Team

Module Name	:	MSK- II Module
Duration of module	:	05 Weeks
Coordinator	:	Dr. Fahd Anwar
Co- Coordinator	:	Dr. Sajjad Hussain
Reviewed by	:	Module Committee

Module Committee		Module task force	
Vice Chancellor RMU	Prof. Dr. Muhammad Umar	Coordinator	Dr. Fahd Anwar
Director DME	Prof. Dr. Rai Muhammad Asghar	DME Focal Person	Dr. Sidra Hamid
Convener Curriculum	Prof. Dr. Naeem Akhter	Co-coordinator	Dr. Sajjad Hussain (Senior Demonstrator of Anatomy)
Chairperson Anatomy & Dean Basic Sciences	Prof Dr. Ayesha Yousaf	Co-Coordinator	Dr. Almas (Senior Demonstrator Biochemistry)
Additional Director DME	Prof. Dr. Ifra Saeed	Co-coordinator	Dr. Fareed Ullah Khan (Senior Demonstrator Physiology) & Clinical Co- Coordinator
Chairperson Physiology	Prof. Dr. Samia Sarwar		
Chairperson Biochemistry	Dr. Aneela Jamil	<b>DME Implementation Team</b>	
		Director DME	Prof. Dr. Rai Muhammad Asghar
Focal Person Anatomy First Year MBBS	Prof Dr. Ayesha Yousaf	Implementation Incharge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
Focal Person Physiology	Dr. Sidra Hamid	Deputy Director DME	Dr. Shazia Zeb
Focal Person Biochemistry	Dr. Aneela Jamil	Module planner & Implementation coordinator	Dr. Sidra Hamid
Focal Person Pharmacology	Dr. Zunera Hakim	Editor	Muhammad Arslan Aslam
Focal Person Pathology	Dr. Asiya Niazi		
Focal Person Behavioral Sciences	Dr. Saadia Yasir		
Focal Person Community Medicine	Dr. Afifa Kulsoom		
Focal Person Quran Translation Lectures	Dr. Fahd Anwar		

## Module III – MSK-II Module

**Rationale:** This module describes the structural organization, functions, and congenital anomalies of musculoskeletal system. It explains the mechanism of neuromuscular transmission, comparison of three types of muscle and physiology of smooth and cardiac muscle, its biochemical basis and the importance of Ca<sup>++</sup> in the body. This module covers cardiac muscle physiology including conducting system of heart. It depicts structure and function of joints in upper and lower limb. It elaborates identification of common fractures of long bones on radiograph.

### Module Outcomes

At the end of this module the student should be able to:

#### Knowledge:

1. Explain the development & structure of musculoskeletal system.
2. Explain the physiological and biochemical factors affecting neuromuscular transmission.
3. Explain physiology of smooth and cardiac muscle.
4. Apply the knowledge of the basic sciences to understand common fractures.
5. Use technology based medical education including
  - **Artificial Intelligence.**
6. Appreciate concepts & importance of
  - **Family Medicine**
  - **Biomedical Ethics**
  - **Research**

#### Skill:

1. Dissect limbs to demonstrate regional Anatomy and relationships of various structures to each other.
2. Identify histological features of connective tissue and muscles under microscope.
3. Perform practicals on estimation of calcium and protein chemistry.

#### Attitude:

1. Demonstrate a professional attitude, team building spirit and good communication skills and cadaveric handling.

## SECTION - I

### Terms & Abbreviations

#### Contents

- Domains of Learning
- Teaching and Learning

#### Methodologies/Strategies

- Large Group Interactive Session (LGIS)
- Small Group Discussion (SGD)
- Self-Directed Learning (SDL)
- Case Based Learning (CBL)
- Problem- Based Learning (PBL)
- Skill Labs/Practicals (SKL)

#### Tables & Figures

- Table1. Domains of learning according to Blooms Taxonomy
- Figure 1. Prof Umar's Model of Integrated Lecture
- Table2. Standardization of teaching content in Small Group Discussions
- Table 3. Steps of taking Small Group Discussions
- Figure 2. PBL 7 Jumps Model

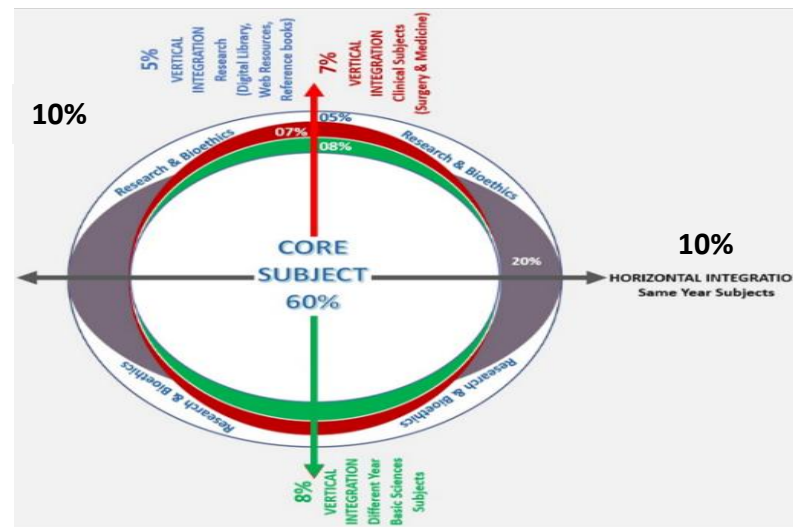
**Table1. Domains of Learning According to Blooms Taxonomy**

Sr. #	Abbreviation	Domains of learning
1.	C	<b>Cognitive Domain:</b> knowledge and mental skills.
	• C1	Remembering
	• C2	Understanding
	• C3	Applying
	• C4	Analyzing
	• C5	Evaluating
	• C6	Creating
2.	P	<b>Psychomotor Domain:</b> motor skills.
	• P1	Imitation
	• P2	Manipulation
	• P3	Precision
	• P4	Articulation
	• P5	Naturalization
3.	A	<b>Affective Domain:</b> feelings, values, dispositions, attitudes, etc
	• A1	Receive
	• A2	Respond
	• A3	Value
	• A4	Organize
	• A5	Internalize

## Teaching and Learning Methodologies / Strategies

### Large Group Interactive Session (LGIS)

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will be followed for delivery of all LGIS. The lecturer will introduce a topic or common clinical condition and explain the underlying phenomena through questions, pictures, videos of patients, interviews and exercises, etc. Students are actively involved in the learning process.



**Figure 1. Prof Umar's Model of Integrated Lecture**



## Small Group Discussion (SGD)

This format helps students to clarify concepts acquire skills and attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics or power point presentations. Students exchange opinions and apply knowledge gained from lectures, SGDs and self study. The facilitator role is to ask probing questions, summarize and help to clarify the concepts.

**Table 2. Standardization of teaching content in Small Group Discussions**

S. No	Topics	Approximate %
1	Title Of SGD	
2	Learning Objectives from Study Guides	
3	Horizontal Integration	5%+5%=10%
4	Core Concepts of the topic	60%
5	Vertical Integration	20%
6	Related Advance Research points	3%
7	Related Ethical points	2%

**Table 3. Steps of Implementaion of Small Group Discussions**

Step 1	Sharing of Learning objectives by using students Study guides	First 5 minutes
Step 2	Asking students pre-planned questions from previous teaching session to develop co-relation (these questions will be standardized)	5minutes
Step 3	Students divided into groups of three and allocation of learning objectives	5minutes
Step 4	ACTIVITY: Students will discuss the learning objectives among themselves	15 minutes
Step 5	Each group of students will present its learning objectives	20 min
Step 6	Discussion of learning content in the main group	30min
Step 7	Clarification of concept by the facilitator by asking structured questions from learning content	15 min
Step 8	Questions on core concepts	
Step 9	Questions on horizontal integration	
Step 10	Questions on vertical integration	
Step 11	Questions on related research article	
Step 12	Questions on related ethics content	
Step 13	Students Assessment on online MS teams (5 MCQs)	5 min
Step 14	Summarization of main points by the facilitator	5 min
Step 15	Students feedback on the SGD and entry into log book	5 min
Step 16	Ending remarks	

### Self Directed Learning (SDL)

- Self- directed learning is a process where students take primary charge of planning, continuing, and evaluating their learning experiences.
- Time Home assignment
- Learning objectives will be defined
- Learning resources will be given to students = Textbook (page no), web site
- Assessment:
  - i Will be online on LMS (Mid module/ end of Module)
  - ii.OSPE station

### Case Based Learning (CBL)

- It's a learner centered model which engages students in discussion of specific scenarios that typically resemble real world examples.
- Case scenario will be given to the students
- Will engage students in discussion of specific scenarios that resemble or typically are real-world examples.
- Learning objectives will be given to the students and will be based on
  - i. To provide students with a relevant opportunity to see theory in practice
  - ii. Require students to analyze data in order to reach a conclusion.
  - iii. Develop analytic, communicative, and collaborative skills along with content knowledge.

### Problem Based Learning (PBL)

- Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.
- This problem is what drives the motivation and the learning.

The 7- Jump-Format of PBL (Masstricht Medical School)	
Step 7	Synthese & Report
Step 6	Collect Information from outside
Step 5	Generate learning Issues
Step 4	Discuss and Organise Ideas
Step 3	Brainstorming to Identify Explanations
Step 2	Define the Problem
Step 1	Clarify the Terms and Concepts of the Problem Scenario
	Problem- Scenario

**Figure 2. PBL 7 Jumps Model**

## Practical Sessions/Skill Lab (SKL)

Practical Session/ Skill Lab (SKL)	
Demonstration/ power point presentation 4-5 slide	10-15 minutes
Practical work	25-30 minutes
Write/ draw and get it checked by teacher	20-25 minutes
05 mcqs at the end of the practical	10 minutes
At the end of module practical copy will be signed by head of department	
At the end of block the practical copy will be signed by	
Head of Department	
Dean	
Medical education department	
QEC	

## SECTION – II

### Learning Objectives, Teaching Strategies & Assessments

#### Contents

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry

**Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)**  
**Anatomy Large Group Interactive Session (LGIS)**

Topic	Learning Objectives At The End Of Lecture Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
General Anatomy Muscle I	<ul style="list-style-type: none"> <li>• Classify muscles with examples according to               <ol style="list-style-type: none"> <li>i) Shape`</li> <li>ii) Histology</li> <li>iii) Development</li> <li>iv) Contraction</li> </ol> </li> <li>• Describe the general features of skeletal muscle.</li> <li>• Differentiate between Red white and intermediate fibers.</li> <li>• Describe blood supply and nerve supply of skeletal muscles.</li> <li>• Correlate clinical condition</li> <li>• How to use digital library</li> <li>• Read a research article</li> </ul>	C1  C2 C2 C2 C3 C3 C3	LGIS	MCQ SAQ VIVA
General Histology Muscle-I	<ul style="list-style-type: none"> <li>• Classify muscle on histological basis.</li> <li>• Describe histological structure of skeletal muscles</li> <li>• Discuss ultrastructure of skeletal muscles</li> <li>• Understand the contraction mechanisim</li> <li>• Correlate clinical condition</li> <li>• How to use digital library</li> <li>• Read a research article</li> </ul>	C1 C2 C2 C2 C3 C3 C3	LGIS	MCQ SAQ VIVA
General Anatomy Muscle II	<ul style="list-style-type: none"> <li>• Discuss connective tissue associated with skeletal muscle.</li> <li>• Discuss parts of skeletal muscles.</li> <li>• Give classification of skeletal muscles.</li> <li>• Explain the actions of a prime mover or agonist Fixators</li> <li>• Synergist and antagonist with examples.</li> <li>• Correlate clinical condition</li> <li>• How to use digital library</li> <li>• Read a research article</li> </ul>	C2 C2 C1 C2  C3 C3 C3	LGIS	MCQ SAQ VIVA

General Histology Muscle-II	<ul style="list-style-type: none"> <li>Describe histological structure of cardiac and smooth muscles</li> <li>Describe ultrastructure of smooth and cardiac muscles.</li> <li>Differentiate between skeletal smooth and cardiac muscles.</li> <li>Discuss regeneration of muscle fibers</li> <li>Correlate clinical condition</li> <li>How to use digital library</li> <li>Read a research article</li> </ul>	C2 C2 C2 C3 C3 C3	LGIS	MCQ SAQ VIVA
General Histology Skin	<ul style="list-style-type: none"> <li>Enlist components of integumentary system</li> <li>Describe histological structure of skin with special reference to cells residing in epidermis.</li> <li>Describe histological features of thick and thin skin</li> <li>Differentiate between thick and thin skin</li> <li>Correlate clinical condition</li> <li>How to use digital library</li> <li>Read a research article</li> </ul>	C1 C2  C2 C2 C3 C3 C3	LGIS	MCQ SAQ VIVA
General Embryology Development of axial skeleton	<ul style="list-style-type: none"> <li>Discuss the cartilagenous stage of vertebral column</li> <li>Discuss the bony stage of vertebral column</li> <li>Describe development of ribs and sternum.</li> <li>Correlate clinical condition</li> <li>How to use digital library</li> <li>Read a research article</li> </ul>	C2 C2 C2 C3 C3 C3	LGIS	MCQ SAQ VIVA
General Histology Skin appendages	<ul style="list-style-type: none"> <li>Describe appendages of skin</li> <li>Discuss histological structure of hair</li> <li>Discuss histological structure of nail</li> <li>Discuss histological structure of glands of skin</li> <li>Correlate clinical conditions</li> <li>How to use digital library</li> <li>Read a research article</li> </ul>	C2 C2 C2 C2 C3 C3 C3	LGIS	MCQ SAQ VIVA
General Embryology Development of limbs	<ul style="list-style-type: none"> <li>Enlist different stages of limb development</li> <li>Discuss early and late stage of limb development</li> <li>Correlate congenital anomalies of limb development</li> <li>How to use digital library</li> </ul>	C1 C2 C3  C3	LGIS	MCQ SAQ VIVA

	<ul style="list-style-type: none"> <li>• Read a research article</li> </ul>	C3		
General Embryology Development of muscles	<ul style="list-style-type: none"> <li>• Discuss development of skeletal muscle with special reference to myotomes, pharyngeal arch muscles and limb muscle along with limb skeleton.</li> <li>• Describe development of smooth and cardiac muscles with anomalies.</li> <li>• Correlate clinical condition</li> <li>• How to use digital library</li> <li>• Read a research article</li> </ul>	C2 C2 C3 C3 C3	LGIS	MCQ SAQ VIVA
General Anatomy Skin	<ul style="list-style-type: none"> <li>• Enlist functions of skin</li> <li>• Discuss types of skin</li> <li>• Compare between thick and thin skin</li> <li>• Classify skin lines</li> <li>• Describe the significance of skin lines</li> <li>• Discuss burns of skin</li> <li>• Correlate clinical conditions</li> <li>• How to use digital library</li> <li>• Read a research article</li> </ul>	C1 C2 C2 C1 C2 C3 C3 C3	LGIS	MCQ SAQ VIVA



## Physiology Large Group Interactive Session (LGIS)

Topic	Learning Objectives At The End Of Lecture Students Should Be Able To:	References	Learning Resources
Introduction to muscle physiology, Structure of Sarcomere	<p>Explain the physiologic anatomy of skeletal muscle</p> <p>Draw and label the sarcomere</p>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 01, Excitable tissue: Muscle (Chapter 05, Page 99)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular Physiology (Chapter 1. Page 34)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Muscle (Chapter 12, Page 411)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 79)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/8iklTDIra5Q">https://youtu.be/8iklTDIra5Q</a></li> <li>2. <a href="https://www.sciencedirect.com/science/article/abs/pii/S0197018687901070">https://www.sciencedirect.com/science/article/abs/pii/S0197018687901070</a></li> <li>3. <a href="https://teachmeanatomy.com/histology/tissue-structure/muscle-histology/skeletal-muscle/">https://teachmeanatomy.com/histology/tissue-structure/muscle-histology/skeletal-muscle/</a></li> </ol>
Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle	<p>Discuss the sliding filament model of muscle contraction</p> <p>Describe the structure sarcotubular system and its importance in muscle contraction</p>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 01, Excitable tissue: Muscle (Chapter 05, Page 103)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular Physiology (Chapter 1. Page 36)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Muscle (Chapter 12, Page 413, 421)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04, page 68)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 81) (Chapter 07, Page 93, 97)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://www.sciencedirect.com/science/article/abs/pii/S0197018687901070">https://www.sciencedirect.com/science/article/abs/pii/S0197018687901070</a></li> <li>2. <a href="https://youtu.be/8iklTDIra5Q">https://youtu.be/8iklTDIra5Q</a></li> <li>3. <a href="https://link.springer.com/article/10.1007/s12551-013-0135-x">https://link.springer.com/article/10.1007/s12551-013-0135-x</a></li> </ol>

<p>Molecular Mechanism of skeletal muscle contraction, Rigor mortis, Muscular dystrophies</p>	<p>Define motor unit Discuss recruitment and its effect on force of contraction Discuss Molecular Mechanism of skeletal muscle contraction</p>	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 36)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 413, 421)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04, page 70)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 82, 88)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/RTnKBt2sDf0">https://youtu.be/RTnKBt2sDf0</a></li> <li>2. <a href="https://youtu.be/NvV2xTrShvg">https://youtu.be/NvV2xTrShvg</a></li> </ol>
<p>Length tension curve, Load and velocity of contraction, diseases of muscle</p>	<p>Draw and describe Length duration curve Load and velocity of contraction</p>	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 39)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 431, 435)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04, page 74)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 91)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=85&amp;ContentID=P00792">https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=85&amp;ContentID=P00792</a></li> <li>2. <a href="https://www.sciencedirect.com/topics/engineering/length-tension-curve">https://www.sciencedirect.com/topics/engineering/length-tension-curve</a></li> </ol>
<p>Energetics, efficiency and types of contraction, heat production in muscle</p>	<p>Elaborate Energetic and efficiency of contraction. Discuss heat production in nerve and muscle</p>	<ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 431)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04, page 77, 84)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 85, 87)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://www.sciencedirect.com/topics/engineering/length-tension-curve">https://www.sciencedirect.com/topics/engineering/length-tension-curve</a></li> <li>2. <a href="https://youtu.be/3ntuIKD4kvY">https://youtu.be/3ntuIKD4kvY</a></li> </ol>

<p>Properties of skeletal muscles, Tetanus &amp; Fatigue</p>	<p>Discuss various properties of skeletal muscle in detail Tetanus and fatigue</p>	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25TH Edition.Section 01,Excitable tissue:Muscle (Chapter 05, Page 110)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 422,424,428)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor’s.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 74,86)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/v5Nm_LaAQVo">https://youtu.be/v5Nm_LaAQVo</a></li> <li>2. <a href="https://www.sciencedirect.com/science/article/abs/pii/S2387020622003485">https://www.sciencedirect.com/science/article/abs/pii/S2387020622003485</a></li> </ol>
<p>Introduction to CVS</p>	<p>Introduction to Cardiovascular system. Classify blood vessels</p>	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25TH Edition.Section 05,Cardiovascular physiology (Chapter 29, Page 519)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Cardiovascular physiology (Chapter 14,Page 469)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor’s.13th Edition.Section 02, Introduction to Cardiovascular system.(Chapter 05,page 101)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/28CYhgjrBLA">https://youtu.be/28CYhgjrBLA</a></li> <li>2. <a href="https://litfl.com/cardiovascular-physiology-overview/">https://litfl.com/cardiovascular-physiology-overview/</a></li> </ol>
<p>Physiologic anatomy, types and properties of Smooth Muscle</p>	<p>Enlist type of smooth muscles and explain their characteristics Explain the properties of smooth muscle</p>	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 40)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 436)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Excitation and Contraction of Smooth muscle.Section 02. (Chapter 08, Page 101)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://www.kenhub.com/en/library/anatomy/smooth-musculature">https://www.kenhub.com/en/library/anatomy/smooth-musculature</a></li> <li>2. <a href="https://youtu.be/qEVRoKuo4U">https://youtu.be/qEVRoKuo4U</a></li> </ol>

<p>Introduction to pericardium Properties of myocardium &amp; endocardium, myocardial action potential</p>	<p>Describe the physiologic anatomy of myocardium Discuss properties of myocardium Discuss in detail various properties of myocardium Describe the mechanism of production of action potential and its propagation Describe excitation contraction coupling in detail Discuss propagation of electrical activity in cardiac muscle</p>	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6th Edition. Cardiovascular Physiology (Chapter 14. Page 131)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 482)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. (Chapter 09, Page 114)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/L2Gf9cj7jBw">https://youtu.be/L2Gf9cj7jBw</a></li> <li>2. <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential">https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential</a></li> </ol>
<p>Mechanism of smooth muscle contraction &amp; its control</p>	<p>Explain the chemical and physical basis of smooth muscle contraction</p>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 42)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 439, 443)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Excitation and Contraction of Smooth muscle. Section 02. (Chapter 08, Page 103, 105)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://www.kenhub.com/en/library/anatomy/smooth-musculature">https://www.kenhub.com/en/library/anatomy/smooth-musculature</a></li> <li>2. <a href="https://youtu.be/qEVRoKuo4U">https://youtu.be/qEVRoKuo4U</a></li> </ol>
<p>Regulation of myocardial activity</p>	<p>Describe the regulation of pumping activity of heart</p>	<ul style="list-style-type: none"> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Excitation and Contraction of Smooth muscle. Section 02. (Chapter 09, Page 123)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://pubmed.ncbi.nlm.nih.gov/1661829/">https://pubmed.ncbi.nlm.nih.gov/1661829/</a></li> <li>2. <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential">https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential</a></li> </ol>
<p>Comparison of 3 types of muscle</p>	<ul style="list-style-type: none"> <li>• Discuss differences among three types of muscle in detail</li> </ul>	<ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 444)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://training.seer.cancer.gov/anatomy/muscular/types.html">https://training.seer.cancer.gov/anatomy/muscular/types.html</a></li> <li>2. <a href="https://youtu.be/eShBZ3-RxHA">https://youtu.be/eShBZ3-RxHA</a></li> </ol>

Excitatory & Conducting system of heart	<ul style="list-style-type: none"> <li>Describe the conductive system of heart in detail</li> <li>Enlist the various components of conductive system of heart</li> <li>Describe the mechanism of production of action potential in SA node, AV node, ventricles.also describe its propogation</li> </ul>	<ul style="list-style-type: none"> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 488)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 08,page 155,162)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Section 02. (Chapter 10, Page 127,133)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/TnFoJ7Hhi-M">https://youtu.be/TnFoJ7Hhi-M</a></li> <li><a href="https://teachmeanatomy.info/thorax/organs/heart/conducting-system/">https://teachmeanatomy.info/thorax/organs/heart/conducting-system/</a></li> </ol>
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### Biochemistry Large Group Interactive Session (LGIS)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching strategy	Assessment Tool
Protein chemistry				
Properties of amino acids& Important peptides	<ul style="list-style-type: none"> <li>Describe amphoteric properties of amino acids</li> <li>Discuss Post transitional amino acids and location of amino acids in proteins</li> <li>Explain Important peptides</li> </ul>	C2 C2 C2	LGIS	MCQs, SAQs & Viva
Proteins	<ul style="list-style-type: none"> <li>Discuss Importance of proteins</li> <li>Classify proteins</li> <li>Describe Functions of proteins</li> </ul>	C1 C2 C2	LGIS	MCQs, SAQs & Viva
Primary structure of proteins	<ul style="list-style-type: none"> <li>Describe Primary structure of protein</li> <li>Discuss Peptide bond</li> </ul>	C2 C2	LGIS	MCQs, SAQs & Viva
Secondary structure of proteins	<ul style="list-style-type: none"> <li>Enlist Types of secondary structure.</li> <li>Describe Secondary structure of proteins.</li> <li>Elaborate Significance of secondary structure</li> </ul>	C1 C2 C2	LGIS	MCQs, SAQs & Viva
	<ul style="list-style-type: none"> <li>Describe Tertiary and quaternary structure of proteins</li> </ul>	C2	LGIS	MCQs, SAQs &

Tertiary and quaternary structure	<ul style="list-style-type: none"> <li>Understand the forces stabilizing protein structure</li> </ul>	C2		Viva
Protein folding And denaturation	<ul style="list-style-type: none"> <li>Discuss Folding of proteins</li> <li>Describe protein misfolding</li> <li>Interpret the clinical cases related to protein misfolding</li> <li>Discuss denaturation of proteins</li> </ul>	C2 C2 C3 C2	LGIS	MCQs, SAQs & Viva
Collagen and Elastin	<ul style="list-style-type: none"> <li>Describe structure of collagen and elastin</li> <li>Discuss differences between collagen and elastin</li> <li>Explain Synthesis of collagen</li> <li>Enlist Factor regulating and helping in strengthening of collagen</li> <li>Interpret defects of collagen synthesis and elastin</li> </ul>	C2 C2 C2 C1 C3	LGIS	MCQs, SAQs & Viva
Techniques for separation of proteins	<ul style="list-style-type: none"> <li>Describe Techniques for separation of proteins</li> </ul>	C2	LGIS	MCQs, SAQs & Viva

### Anatomy Small Group Discussion (SGDs)

Topic	Learning Objectives Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tools
Hip Bone-I	<ul style="list-style-type: none"> <li>• Demonstrate the anatomical position</li> <li>• Identify bony features of ilium.</li> <li>• Describe the muscular, ligamentous, and capsular attachments.</li> <li>• Discuss the ventral and dorsal auricular surfaces, ossification.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	P  C1  C2 C2 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Hip Bone-II	<ul style="list-style-type: none"> <li>• Demonstrate the anatomical position</li> <li>• Identify bony features of pubis and ischium.</li> <li>• Describe the muscular, ligamentous, and capsular attachments.</li> <li>• Discuss the ventral and dorsal auricular surfaces, ossification.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	P C1 C2  C2 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Femur	<ul style="list-style-type: none"> <li>• Demonstrate the anatomical position of bone</li> <li>• Demonstrate different parts</li> <li>• Describe proximal and distal articulations</li> <li>• State angle of femoral torsion.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	P C1 C2 C1 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE

Femur and Patella	<ul style="list-style-type: none"> <li>• Demonstrate the anatomical position of bones</li> <li>• Describe muscle attachment and ossification</li> <li>• Discuss fractures with special reference to the fracture of neck of femur in old age.</li> <li>• Describe anatomy of patella and factors responsible for its stability.</li> <li>• Enumerate different bursae related to patella</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>P C2 C3</p> <p>C2</p> <p>C1 C3 C3 C3</p>	Skill Lab	<p>MCQ SEQ VIVA OSPE</p>
Anterolateral Compartment Of Thigh (Muscles)	<ul style="list-style-type: none"> <li>• Describe the origin and insertion of muscles in anterior compartment of thigh.</li> <li>• Describe the origin and insertion of muscles in lateral compartment of thigh.</li> <li>• Discuss the femoral triangle and adductor canal with contents</li> <li>• Identify these muscles.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>C2</p> <p>C2</p> <p>C2</p> <p>C1 C3 C3 C3</p>	Skill Lab	<p>MCQ SEQ VIVA OSPE</p>
Anterolateral compartment of thigh (Neurovascular organization)	<ul style="list-style-type: none"> <li>• Describe the nerves and vessels of anterolateral compartment of thigh</li> <li>• Discuss various relation of vessels and nerves in anterolateral compartment of thigh</li> <li>• Identify these structures</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>C2</p> <p>C2</p> <p>C1 C3 C3 C3</p>	Skill Lab	<p>MCQ SEQ VIVA OSPE</p>
Medial Compartment of thigh	<ul style="list-style-type: none"> <li>• Describe the muscles of medial compartment of thigh</li> <li>• Discuss origin, insertion and nerve supply of medial compartment of thigh</li> <li>• Describe the course relations and branches of obturator nerve.</li> <li>• Correlate the clinical aspects</li> </ul>	<p>C2</p> <p>C2</p> <p>C2 C3</p>	Skill Lab	<p>MCQ SEQ VIVA OSPE</p>



	<ul style="list-style-type: none"> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	C3 C3		
Gluteal Region (Muscles)	<ul style="list-style-type: none"> <li>• Tabulate the he various muscles of gluteal region with origin, insertion, action nerve supply.</li> <li>• Enlist various structures undercover of gluteal maximus i.e. muscles, vessels, nerves, bones and joints, ligaments, bursae.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	C2 C1 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Gluteal Region (Neurovascular organization)	<ul style="list-style-type: none"> <li>• Describe trochanteric anastomosis and cruciate anastomosis.</li> <li>• Enumerate the structures passing through greater sciatic foraman.</li> <li>• Discuss the formation course relations, branches, distribution of sciatic nerve with applied anatomy..</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	C2 C1 C2 C2 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Posterior Compartment of Thigh (Muscles)	<ul style="list-style-type: none"> <li>• Enlist the Hamstring muscles</li> <li>• Discuss origin insertion, nerve supply and actions</li> <li>• Identify the muscles</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	C1 C2 C1 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Posterior Compartment of thigh (Neurovascular Organization)	<ul style="list-style-type: none"> <li>• Describe the nerves and vessels of posterior compartment of thigh</li> <li>• Discuss course, relations , distribution and branches of neurovascular structures of posterior compartment</li> <li>• Identify these structures</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> </ul>	C2 C2 C1 C3	Skill Lab	MCQ SEQ VIVA OSPE

	<ul style="list-style-type: none"> <li>• Use digital library</li> </ul>	C3 C3		
Hip Joint	<ul style="list-style-type: none"> <li>• Describe the type of joint</li> <li>• Describe articular surfaces,</li> <li>• Describe capsular attachments.</li> <li>• Discuss synovial membrane and its folding.</li> <li>• Enlist ligaments and their attachments</li> <li>• Discuss movements possible at hip joint and muscles producing them</li> <li>• Describe blood supply and nerve supply.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	C2 C2 C2 C2 C1 C2 C2 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Tibia	<ul style="list-style-type: none"> <li>• Identify bone</li> <li>• Demonstrate its side.</li> <li>• Demonstrate its normal anatomical position.</li> <li>• Describe bony features.</li> <li>• Discuss attachment of muscle and ligament</li> <li>• Describe articular surfaces</li> <li>• Identify nutrient foramen</li> <li>• Describe its ossification</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	C1 P P C2 C2 C2 C1 C2 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Fibula	<ul style="list-style-type: none"> <li>• Identify bone</li> <li>• Demonstrate its side.</li> <li>• Demonstrate its normal anatomical position.</li> <li>• Describe bony features.</li> <li>• Discuss attachment of muscles and ligaments</li> <li>• Describe articular surfaces</li> <li>• Identify nutrient foramen</li> <li>• Describe its ossification</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> </ul>	C1 P P C2 C2 C2 C1 C2 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE

	<ul style="list-style-type: none"> <li>• Use digital library</li> </ul>	C3		
Popliteal Fossa	<ul style="list-style-type: none"> <li>• Identify surface landmarks</li> <li>• Enlist contents</li> <li>• Discuss boundaries, roof and floor</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	C1 C1 C2 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Knee Joint	<ul style="list-style-type: none"> <li>• State type of joint</li> <li>• Describe its articular surfaces</li> <li>• Demonstrate capsular attachments,</li> <li>• Enlist extra capsular and intracapsular ligaments and their attachments</li> <li>• Demonstrate the movements possible at knee joint and muscles producing them.</li> <li>• Describe the concept of locking and unlocking of knee joint</li> <li>• Describe blood supply and nerve supply of joint</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	C1 C2 P C1 C1 p C2  C2  C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Anterior Compartment Of Leg (Muscles and Neurovascular Organization)	<ul style="list-style-type: none"> <li>• Demonstrate surface landmarks</li> <li>• Discuss superficial fascia &amp; deep fascia, their contents including retinecula</li> <li>• Describe Origin, insertion, nerve supply and action of all muscles of anterior compartment of leg</li> <li>• Identify different structures in compartment</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	P C2  C2  C1 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Surface Anatomy/Radiology	<ul style="list-style-type: none"> <li>• Demonstrate the surface anatomy of various structures present in anterior, medial and lateral compartment of thigh</li> <li>• Demonstrate the surface anatomy of various structures present in anterior compartment of thigh</li> </ul>	P   P	Skill Lab	MCQ SEQ VIVA OSPE

	<ul style="list-style-type: none"> <li>• Demonstrate major landmarks of thigh and anterior compartment of leg on radiographs</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	P C3 C3 C3		
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### Physiology Small Group Discussion (SGDs)

Topic	Learning Objectives Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tools
Physiology of Smooth Muscle	• Enlist type of smooth muscles and explain their characteristics	C1	SGD	MCQ SAQ VIVA
	• Explain the chemical and physical basis of smooth muscle contraction	C2		
	• Explain the properties of smooth muscle	C2		
Introduction to myocardium Properties of myocardium Myocardial action potentials and regulation of myocardial activity	• Describe the physiologic anatomy of myocardium	C1	SGD	MCQ SAQ VIVA
	• Discuss properties of myocardium			
	• Discuss in detail various properties of myocardium	C2		
	• Describe the mechanism of production of action potential and its	C1		
	• Discuss propagation of electrical activity in cardiac muscle	C2		
	• Describe excitation contraction coupling in detail	C1		
	• Describe the regulation of pumping activity of heart	C1		
ECG changes in blocks and arrhythmias	• Define arrhythmia	C1	LGIS	MCQ SAQ VIVA
	• Describe abnormal sinus rhythms	C1		
	• Discuss and draw ECG changes in arrhythmias	C2		
	• Describe abnormal rhythms resulting from the block of heart signals within the intra cardiac conduction pathways	C1		
	• Describe different degrees of heart block and ECG changes	C1		
	• Describe abnormal rhythms resulting from the block of heart signals within the intra cardiac conduction pathways	C1		

	<ul style="list-style-type: none"> <li>• Explain the following with the help of relevant ECGs.</li> <li>• Premature contractions.</li> <li>• Paroxysmal tachycardia.</li> <li>• Ventricular fibrillation.</li> <li>• Atrial fibrillation.</li> <li>• Atrial flutter.</li> <li>• Cardiac arrest.</li> </ul>	C2		
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### Biochemistry Small Group Discussion (SGDs)

Topic	Learning Objectives At The End of Tutorial Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Protein structure	<ul style="list-style-type: none"> <li>• Explain primary, secondary, tertiary and quaternary structures of proteins</li> </ul>	C2	SGD	MCQs & SAQs
Protein folding and misfolding	<ul style="list-style-type: none"> <li>• Describe protein folding with related disorders</li> </ul>	C2	SGD	MCQs & SAQs
Collagen	<ul style="list-style-type: none"> <li>• Discuss structure of collagen</li> <li>• Describe synthesis of collagen</li> <li>• Interpret related clinical disorders</li> </ul>	C2 C2 C3	SGD	MCQs & SAQs
Elastin	<ul style="list-style-type: none"> <li>• Discuss structure of elastin</li> <li>• Interpret related clinical disorders</li> </ul>	C2 C2	SGD	MCQs & SAQs

### Anatomy Self Directed Learning (SDL)

Topics Of SDL	Learning Objective	References
Hip Bone	<ul style="list-style-type: none"> <li>• Demonstrate the anatomical position</li> <li>• Identify bony features of ilium.</li> <li>• Describe the muscular, ligamentous, and capsular attachments.</li> <li>• Discuss the ventral and dorsal auricular surfaces, ossification.</li> <li>• Demonstrate the anatomical position</li> <li>• Identify bony features of pubis and ischium.</li> <li>• Describe the muscular, ligamentous, and capsular attachments.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510-516,526,328,329).</p> <p><a href="https://www.youtube.com/watch?v=AeuLBN5ouwo">https://www.youtube.com/watch?v=AeuLBN5ouwo</a>  <a href="https://link.springer.com/referenceworkentry/10.1007/978-3-030-43240-9_2">https://link.springer.com/referenceworkentry/10.1007/978-3-030-43240-9_2</a></p>
Femur	<ul style="list-style-type: none"> <li>• Demonstrate the anatomical position of bone</li> <li>• Demonstrate different parts</li> <li>• Describe proximal and distal articulations</li> <li>• State angle of femoral torsion.</li> <li>• Demonstrate the anatomical position of bone</li> <li>• Describe muscle attachment and ossification</li> <li>• Discuss fractures with special reference to the fracture of neck of femur in old age.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 20,435,510,516-518,527,659-660).</p> <p><a href="https://www.youtube.com/watch?v=AeuLBN5ouwo">https://www.youtube.com/watch?v=AeuLBN5ouwo</a>  <a href="https://link.springer.com/chapter/10.1007/978-981-13-8468-4_10">https://link.springer.com/chapter/10.1007/978-981-13-8468-4_10</a></p>

<p>Anterolateral Compartment Of Thigh</p>	<ul style="list-style-type: none"> <li>• Describe the origin and insertion of muscles in anteriorlateral compartment of thigh.</li> <li>• Describe the nerves and vessels of anterolateral compartment of thigh</li> <li>• Discuss the femoral triangle and adductor canal with contents</li> <li>• Identify these muscles.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510, 545-548,557-558).  <a href="https://www.youtube.com/watch?v=AeuLBN5ouwo">https://www.youtube.com/watch?v=AeuLBN5ouwo</a>  <a href="https://link.springer.com/article/10.1186/s10195-023-00691-w">https://link.springer.com/article/10.1186/s10195-023-00691-w</a></p>
<p>Medial Compartment Of Thigh</p>	<ul style="list-style-type: none"> <li>• Describe the muscles of medial compartment of thigh</li> <li>• Discuss origin, insertion and nerve supply of medial compartment of thigh</li> <li>• Describe the course relations and branches of obturator nerve.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 548-551).  <a href="https://www.youtube.com/watch?v=AeuLBN5ouwo">https://www.youtube.com/watch?v=AeuLBN5ouwo</a>  <a href="https://link.springer.com/article/10.1186/s10195-023-00691-w">https://link.springer.com/article/10.1186/s10195-023-00691-w</a></p>
<p>Gluteal Region</p>	<ul style="list-style-type: none"> <li>• Tabulate the he various muscles of gluteal region with origin, insertion, action nerve supply.</li> <li>• List various structures undercover of gluteal maximus i.e. muscles, vessels, nerves, bones and joints, ligaments, bursae.</li> <li>• Describe trochanteric anastomosis and cruciate anastomosis.</li> <li>• Enumerate the structures passing through greater sciatic foraman.</li> <li>• Discuss the formation course relations, branches, distribution of sciatic nerve with applied anatomy..</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510, 562-563,575-583).  <a href="https://www.youtube.com/watch?v=AeuLBN5ouwo">https://www.youtube.com/watch?v=AeuLBN5ouwo</a>  <a href="https://link.springer.com/chapter/10.1007/978-3-030-11033-8_5">https://link.springer.com/chapter/10.1007/978-3-030-11033-8_5</a></p>

<p>Posterior Compartment Of Thigh</p>	<ul style="list-style-type: none"> <li>• Tabulate the Hamstring muscles</li> <li>• Discuss origin insertion, nerve supply and action</li> <li>• Describe the nerves and vessels of posterior compartment of thigh</li> <li>• Discuss course relations distribution and branches of neurovascular structures of posterior compartment</li> <li>• Identify these structures</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 569-572).  <a href="https://www.youtube.com/watch?v=AeuLBN5ouwo">https://www.youtube.com/watch?v=AeuLBN5ouwo</a>  <a href="https://link.springer.com/article/10.1186/s10195-023-00691-w">https://link.springer.com/article/10.1186/s10195-023-00691-w</a></p>
<p>Hip Joint</p>	<ul style="list-style-type: none"> <li>• Describe the type of joint</li> <li>• Describe articular surfaces,</li> <li>• Describe capsular attachments.</li> <li>• Discuss synovial membrane and its folding.</li> <li>• Enlist ligaments and their attachments</li> <li>• Discuss movements possible at hip joint and muscles producing them</li> <li>• Describe blood supply and nerve supply.</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510-626,629-632,660-661).  <a href="https://www.youtube.com/watch?v=AeuLBN5ouwo">https://www.youtube.com/watch?v=AeuLBN5ouwo</a>  <a href="https://link.springer.com/referenceworkentry/10.1007/978-3-030-43240-9_2">https://link.springer.com/referenceworkentry/10.1007/978-3-030-43240-9_2</a></p>
<p>Tibia</p>	<ul style="list-style-type: none"> <li>• Identify bone</li> <li>• Demonstrate its side.</li> <li>• Demonstrate its normal anatomical position.</li> <li>• Describe bony features.</li> <li>• Discuss attachment of muscle and ligament</li> <li>• Describe articular surfaces</li> <li>• Identify nutrient foramen</li> <li>• Describe its ossification</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 19, 510,520-521,604).  <a href="https://www.youtube.com/watch?v=AeuLBN5ouwo">https://www.youtube.com/watch?v=AeuLBN5ouwo</a>  <a href="https://link.springer.com/chapter/10.1007/978-3-030-93685-3_14">https://link.springer.com/chapter/10.1007/978-3-030-93685-3_14</a>  <a href="https://link.springer.com/chapter/10.1007/978-3-319-78387-1_69">https://link.springer.com/chapter/10.1007/978-3-319-78387-1_69</a></p>



Fibula	<ul style="list-style-type: none"> <li>• Identify bone</li> <li>• Demonstrate its side.</li> <li>• Demonstrate its normal anatomical position.</li> <li>• Describe bony features.</li> <li>• Discuss attachment of muscleS and ligamentS</li> <li>• Describe articular surfaces</li> <li>• Identify nutrient foramen</li> <li>• Describe its ossification</li> <li>• Correlate the clinical aspects</li> <li>• Read relevant research article</li> <li>• Use digital library</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 20,510,513,521,528,687,790).  <a href="https://www.youtube.com/watch?v=AeuLBN5ouwo">https://www.youtube.com/watch?v=AeuLBN5ouwo</a></p> <p><a href="https://link.springer.com/chapter/10.1007/978-3-030-93685-3_14">https://link.springer.com/chapter/10.1007/978-3-030-93685-3_14</a></p> <p><a href="https://link.springer.com/chapter/10.1007/978-3-319-78387-1_69">https://link.springer.com/chapter/10.1007/978-3-319-78387-1_69</a></p>
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### Physiology Self Directed Learning (SDL)

Topics Of SDL	Learning Objective	References	Learning Resources
SDL (On Campus): Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle	Discuss the sliding filament model of muscle contraction Describe the structure sarcotubular systemand its importance in muscle contraction	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition.Section 01,Excitable tissue:Muscle (Chapter 05,Page 103)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cellular Physiology (Chapter 1.Page 36)</li> <li>• Human Physiology by Dee Unglaub Silverthorn. 8<sup>TH</sup> Edition.Muscle (Chapter 12,Page 413,421)</li> <li>• Physiological Basis of Medical Practice byBest &amp; Taylor’s.13<sup>th</sup> Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 68)</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Contraction ofSkeletal muscle.Section 02. (Chapter 06,Page 81) (Chapter 07, Page 93,97)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://www.sciencedirect.com/science/article/abs/pii/0197018687901070">https://www.sciencedirect.com/science/article/abs/pii/0197018687901070</a></li> <li>• <a href="https://youtu.be/8iklTDlra5Q">https://youtu.be/8iklTDlra5Q</a></li> <li>• <a href="https://link.springer.com/article/10.1007/s12551-013-0135-x">https://link.springer.com/article/10.1007/s12551-013-0135-x</a></li> </ul>

Molecular Mechanism of skeletal muscle contraction, Rigor	Define motor unit Discuss recruitment and its effect on force of contraction	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular Physiology (Chapter 1. Page 36)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 413, 421)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04, page 68)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 81) (Chapter 07, Page 93, 97)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://youtu.be/RTnKbt2sDf0">https://youtu.be/RTnKbt2sDf0</a></li> <li>• <a href="https://youtu.be/NvV2xTrShvg">https://youtu.be/NvV2xTrShvg</a></li> </ul>
Molecular Mechanism of skeletal muscle contraction, Rigor mortis, Muscular dystrophies	Define motor unit Discuss recruitment and its effect on force of contraction Discuss Molecular Mechanism of skeletal muscle contraction	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular Physiology (Chapter 1. Page 36)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 413, 421)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04, page 70)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 82, 88)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://youtu.be/RTnKbt2sDf0">https://youtu.be/RTnKbt2sDf0</a></li> <li>• <a href="https://youtu.be/NvV2xTrShvg">https://youtu.be/NvV2xTrShvg</a></li> </ul>
Length tension curve, Load and velocity of	Draw and describe Length duration curve Load and velocity of contraction	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular Physiology (Chapter 1. Page 39)</li> <li>• Human Physiology by Dee Unglaub Silver</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=85&amp;ContentID=P00792">https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=85&amp;ContentID=P00792</a></li> <li>• <a href="https://www.sciencedirect.com/topics/engineering/length-tension-curve">https://www.sciencedirect.com/topics/engineering/length-tension-curve</a></li> </ul>

contraction, diseases of muscle		<p>thorn. 8TH Edition.Muscle (Chapter 12,Page 431,435)</p> <ul style="list-style-type: none"> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, ,(Chapter 04,page 74)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 91)</li> </ul>	
Energetics, efficiency and types of contraction, heat production in muscle	Elaborate Energetic and efficiency of contraction. Discuss heat production in nerve and muscle	<ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 431)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, ,(Chapter 04,page 77,84)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 85,87)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://www.sciencedirect.com/topics/engineering/length-tension-curve">https://www.sciencedirect.com/topics/engineering/length-tension-curve</a></li> <li>• <a href="https://youtu.be/3ntulKD4kvY">https://youtu.be/3ntulKD4kvY</a></li> </ul>
Properties of skeletal muscles, Tetanus & Fatigue	Discuss various properties of skeletal muscle in detail Tetanus and fatigue	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology.25TH Edition.Section 01,Excitable tissue:Muscle (Chapter 05, Page 110)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 422,424,428)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 74,86)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://youtu.be/v5Nm_LaAQVo">https://youtu.be/v5Nm_LaAQVo</a></li> <li>• <a href="https://www.sciencedirect.com/science/article/abs/pii/S2387020622003485">https://www.sciencedirect.com/science/article/abs/pii/S2387020622003485</a></li> </ul>

Introduction to CVS	Introduction to Cardiovascular system. Classify blood vessels	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology.25TH Edition.Section 05,Cardiovascular physiology (Chapter 29, Page 519)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Cardiovascular physiology (Chapter 14,Page 469)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 02, Introduction to Cardiovascular system.(Chapter 05,page 101)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://youtu.be/28CYhgjrBLA">https://youtu.be/28CYhgjrBLA</a></li> <li>• <a href="https://litfl.com/cardiovascular-physiology-overview/">https://litfl.com/cardiovascular-physiology-overview/</a></li> </ul>
Physiologic anatomy, types and properties of Smooth Muscle	Enlist type of smooth muscles and explain their characteristics Explain the properties of smooth muscle	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 40)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 436)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Excitation and Contraction of Smooth muscle.Section 02. (Chapter 08, Page 101)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://www.kenhub.com/en/library/anatomy/smooth-musculature">https://www.kenhub.com/en/library/anatomy/smooth-musculature</a></li> <li>• <a href="https://youtu.be/qEVRoKuo4U">https://youtu.be/qEVRoKuo4U</a></li> </ul>
Introduction to pericardium Properties of myocardium & endocardium, myocardial action potential	Describe the physiologic anatomy of myocardium Discuss properties of myocardium Discuss in detail various properties of myocardium Describe the mechanism of production of action potential and its propagation Describe excitation contraction coupling in detail Discuss propagation of electrical activity in cardiac muscle	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 14. Page 131)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 482)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. (Chapter 09, Page 114)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://youtu.be/L2Gf9cj7jBw">https://youtu.be/L2Gf9cj7jBw</a></li> <li>• <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential">https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential</a></li> </ul>

Mechanism of smooth muscle contraction & its control	Explain the chemical and physical basis of smooth muscle contraction	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 42)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 439, 443)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Excitation and Contraction of Smooth muscle. Section 02. (Chapter 08, Page 103, 105)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://www.kenhub.com/en/library/anatomy/smooth-musculature">https://www.kenhub.com/en/library/anatomy/smooth-musculature</a></li> <li>• <a href="https://youtu.be/qEVRoKuo4U">https://youtu.be/qEVRoKuo4U</a></li> </ul>
Regulation of myocardial activity	Describe the regulation of pumping activity of heart	<ul style="list-style-type: none"> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Excitation and Contraction of Smooth muscle. Section 02. (Chapter 09, Page 123)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/1661829/">https://pubmed.ncbi.nlm.nih.gov/1661829/</a></li> <li>• <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential">https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential</a></li> </ul>
Comparison of 3 types of muscle	<ul style="list-style-type: none"> <li>• Discuss differences among three types of muscle in detail</li> </ul>	<ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 444)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://training.seer.cancer.gov/anatomy/muscular/types.html">https://training.seer.cancer.gov/anatomy/muscular/types.html</a></li> <li>• <a href="https://youtu.be/eShBZ3-RxHA">https://youtu.be/eShBZ3-RxHA</a></li> </ul>
Excitatory & Conducting system of heart	<ul style="list-style-type: none"> <li>• Describe the conductive system of heart in detail</li> <li>• Enlist the various components of conductive system of heart</li> <li>• Describe the mechanism of production of action potential in SA node, AV node, ventricles. also describe its propagation</li> </ul>	<ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 488)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13th Edition. (Chapter 08, page 155, 162)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14th Edition. Section 02. (Chapter 10, Page 127, 133)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://youtu.be/TnFoJ7Hhi-M">https://youtu.be/TnFoJ7Hhi-M</a></li> <li>• <a href="https://teachmeanatomy.info/thorax/organs/heart/conducting-system/">https://teachmeanatomy.info/thorax/organs/heart/conducting-system/</a></li> </ul>

## Biochemistry Self Directed Learning (SDL)

Topic	Learning Objectives At the end of lecture students should be able to	References
<b>Protein chemistry</b>		
Properties of amino acids & Important peptides	<ul style="list-style-type: none"> <li>• Describe amphoteric properties of amino acids</li> <li>• Discuss Post transitional amino acids and location of amino acids in proteins</li> <li>• Explain Important peptides</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Mushtaq 8<sup>th</sup> Edition Chapter No. 4 pg 97</li> </ul>
Proteins	<ul style="list-style-type: none"> <li>• Discuss Importance of proteins</li> <li>• Classify proteins</li> <li>• Describe Functions of proteins</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Mushtaq 8<sup>th</sup> Edition Chapter No. 4 pg 97, 98</li> </ul>
Primary structure of proteins	<ul style="list-style-type: none"> <li>• Describe Primary structure of protein</li> <li>• Discuss Peptide bond</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No. 2 pg 14</li> </ul>
Secondary structure of proteins	<ul style="list-style-type: none"> <li>• Enlist Types of secondary structure.</li> <li>• Describe Secondary structure of proteins.</li> <li>• Elaborate Significance of secondary structure</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No. 2 pg 16</li> </ul>
Tertiary and quaternary structure	<ul style="list-style-type: none"> <li>• Describe Tertiary and quaternary structure of proteins</li> <li>• Understand the forces stabilizing protein structure</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No. 2 pg 19</li> </ul>
Protein folding And denaturation	<ul style="list-style-type: none"> <li>• Discuss Folding of proteins</li> <li>• Describe protein misfolding</li> <li>• Interpret the clinical cases related to protein misfolding</li> <li>• Discuss denaturation of proteins</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No. 2 pg 20, 21</li> </ul>
Collagen and Elastin	<ul style="list-style-type: none"> <li>• Describe structure of collagen and elastin</li> <li>• Discuss differences between collagen and elastin</li> <li>• Explain Synthesis of collagen</li> <li>• Enlist Factor regulating and helping in strengthening of collagen</li> <li>• Interpret defects of collagen synthesis and elastin</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No. 4 pg 45,97</li> </ul>
Techniques for separation of proteins	<ul style="list-style-type: none"> <li>• Describe Techniques for separation of proteins</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Mushtaq 8<sup>th</sup> Edition Chapter No. 4 pg 104</li> </ul>

### Histology Practicals Skill Laboratory (SKL)

Practical	At The End Of This Skill Lab, Student Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Skeletal muscle	<ul style="list-style-type: none"> <li>• Identify muscle under microscope</li> <li>• Illustrate microscopic structure of muscle</li> <li>• Write two points of identification</li> <li>• Focus the slide</li> </ul>	P C2 C1 P	Skill Lab	OSPE
Cardiac muscle Smooth muscle	<ul style="list-style-type: none"> <li>• Identify muscles under microscope</li> <li>• Illustrate microscopic structure of muscles</li> <li>• Write two points of identification</li> <li>• Focus the slide</li> </ul>	P C2 C1 P	Skill Lab	OSPE
Thick skin	<ul style="list-style-type: none"> <li>• Identify thick skin under microscope</li> <li>• Illustrate microscopic structure of thick skin</li> <li>• Write two points of identification</li> <li>• Focus the slide</li> </ul>	P C2 C1 P	Skill Lab	OSPE
Thin skin	<ul style="list-style-type: none"> <li>• Identify thin skin under microscope</li> <li>• Illustrate microscopic structure of thin skin</li> <li>• Write two points of identification</li> <li>• Focus the slide</li> </ul>	P C2 C1 P	Skill Lab	OSPE

### Physiology Practicals Skill Laboratory (SKL)

Practical	At The End Of This Skill Lab, Student Should Be Able To Illustrate:	References
Determination of RBC count	• Apparatus identification	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	
	• Procedure	
	• Recall composition of Diluents	
	• Comprehend	
	• Calculation on hemocytometer	
Determination of TLC	• Recall Normal values	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Apparatus identification	
	• Principle	
	• Procedure	

	<ul style="list-style-type: none"> <li>Recall composition of Diluents</li> <li>Comprehend Calculation on hemocytometer</li> <li>Recall Normal values</li> </ul>	
Determination of Platelet Count	<ul style="list-style-type: none"> <li>Apparatus identification</li> <li>Principle</li> </ul>	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	<ul style="list-style-type: none"> <li>Procedure</li> </ul>	
	<ul style="list-style-type: none"> <li>Recall composition of Diluents</li> </ul>	
	<ul style="list-style-type: none"> <li>Comprehend, Calculation on hemocytometer</li> <li>Recall Normal values</li> </ul>	
Determination of ABO, Blood groups	<ul style="list-style-type: none"> <li>Principle</li> <li>Procedure</li> <li>Methods</li> <li>Types of blood groups</li> <li>Clinical Correlations of blood transfusion</li> </ul>	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail

### Biochemistry Practicals Skill Laboratory (SKL)

Topic	Learning Objectives At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Color tests for detection of proteins	Perform the color tests	P	Skill Lab	OSPE
Detection of proteins by Isoelectric pH	Detect proteins by isoelectric pH	P	Skill Lab	OSPE
Fractional precipitation of proteins	Detect proteins by precipitation reactions (precipitation by full and half saturation with ammonium sulphate)	P	Skill Lab	OSPE
Chromatography	Separate proteins by Chromatography	P	Skill Lab	OSPE



## **SECTION - III**

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- **CBLs**
- **Vertical Integration LGIS**
- **Longitudinal Themes**
  - **Biomedical Ethics & Professionalism**
  - **Family Medicine**
  - **Artificial Intelligence (Innovation)**
  - **Integrated Undergraduate Research Curriculum (IUGRC)**

**Basic And Clinical Sciences (Vertical Integration)**  
**Case Based Learning (CBL)**

Subject	Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain
Anatomy	• Traumatic Hip dislocation	Apply basic knowledge of subject to study clinical case.	C3
	• Fracture of neck of femur	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• Weight Training	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• Marfan Syndrome	Apply basic knowledge of subject to study clinical case.	C3
	• Collagen deficiency	Apply basic knowledge of subject to study clinical case.	C3

**Large Group Interactive Sessions (LGIS)**  
**Radiology**

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Radiology of hip bone & Lower Limb	• Interpret normal x-rays of Hip bone & Lower Limb	C2	LGIS	MCQs
	• Discuss features of different Fractures of Hip Bone & Lower Limb	C2		

## Biomedical Ethics

### Practical Session 1

#### Affective & Psychomotor Domain

Introduction to Professional Ethics and PM&DC Code of Conduct	<p>Discussion will cover;</p> <ul style="list-style-type: none"> <li>• Introduction to Professional Ethics and PM&amp;DC Code of Conduct</li> <li>• Purpose of medical code of conduct by Regulatory body PM&amp;DC; covering following subtopics                             <ul style="list-style-type: none"> <li>• What Is the ‘Professional Ethics and Code of Conduct’?</li> <li>• Why to Have the Code of Conduct?</li> <li>• Who Needs to Follow the Code of Conduct?</li> <li>• Who is it for?</li> </ul> </li> </ul> <p>What Are the Code of Conduct Requirements?</p>	<p>At the end of the session students should be able to</p> <ul style="list-style-type: none"> <li>• Cognizant with need for professional code of conduct by PM&amp;DC. <b>C1</b></li> <li>• Elaborate the purpose and relevance for medical code of conduct at undergraduate level . <b>C2</b></li> </ul>	<p>LGIS</p> <p>1hr contact session in 2-4 parallel classes conducted by Senior faculty</p>	<p>1 MCQs of level C1 to C3 will cover this session teachings in relevant block examination in pool of total 04 MCQs.</p> <p>Result / marks obtained will contribute towards Internal assessment (IA) in 1<sup>st</sup> Prof. MBBS exam.</p>	<p>PMDC Code of Ethics: <a href="http://www.pmdc.org.pk/LinkClick.aspx?fileticket=v5WmQYMVhz4%3D&amp;tabid=102&amp;mid=554">http://www.pmdc.org.pk/LinkClick.aspx?fileticket=v5WmQYMVhz4%3D&amp;tabid=102&amp;mid=554</a></p>
History of Medical Ethics	<p>Discussion on Health Research ethics focusing;</p> <ul style="list-style-type: none"> <li>•Historical perspective of Tuskegee studies, Willow brook Experiment</li> <li>•Codes of medical ethics: traditional foundations and contemporary practice</li> <li>•Nuremburg code, Belmont report, Declaration of Helsinki and importance of historical background of ethics in current research trends</li> <li>• General ethical principles including explanation of 04 basic principles of Beneficence, non-maleficence, respect and justice.                             <ul style="list-style-type: none"> <li>- Interpretation research ethics for;</li> <li>- Informed consent and confidentiality in research HR</li> </ul> </li> </ul>	<p>At the end of the session students should be able to;</p> <ul style="list-style-type: none"> <li>• Explain the meaning of the term “ethics”. <b>C1</b></li> <li>• Describe the historical perspective of global development of medical ethics. <b>C1</b></li> <li>• Describe the codes of medical ethics and their implications. <b>C1</b></li> <li>• Recognize ethical issues relevant to the case situation and apply the ethical codes as appropriate. <b>C2</b></li> </ul>	<p>LGIS</p> <p>1hr contact session in 2-4 parallel classes, Conducted by Senior faculty.</p>	<p>1 MCQs of level C1 to C3 will cover this session teachings in relevant block examination in pool of total 04 MCQs.</p> <p>Result / marks obtained will contribute towards Internal assessment (IA) in 1<sup>st</sup> Prof. MBBS exam.</p>	<p>Guidelines and Teachers Handbook for Introducing Bioethics to Medical and Dental Students <a href="http://nbcPakistan.org.pk/assets/may-16-bioethics-facilitator-book---may-16%2C-2017.pdf">http://nbcPakistan.org.pk/assets/may-16-bioethics-facilitator-book---may-16%2C-2017.pdf</a></p> <p>The Nuremburg Code: <a href="http://www.hhs.gov/ohrp/archives/nurcode.html">http://www.hhs.gov/ohrp/archives/nurcode.html</a></p> <p>10 WMA Declaration of Helsinki: <a href="http://www.wma.net/en/30publications/10policies/b3/">http://www.wma.net/en/30publications/10policies/b3/</a></p> <p>CIOMS Guidelines: <a href="http://www.cioms.ch/publications/layout_guide2002.pdf">http://www.cioms.ch/publications/layout_guide2002.pdf</a> .</p>

		<ul style="list-style-type: none"> <li>Discuss the development of indigenous ethical codes in the South-East Asian Region. <b>C2.</b></li> <li>Demonstrate sensitivity to cultural diversity in medical care. <b>C3</b></li> </ul>			Nuffield Council on Bioethics Guidelines: <a href="http://www.sirc.org/news/nuffield.shtml">http://www.sirc.org/news/nuffield.shtml</a>
Laboratory Ethics	<p>Discussion will cover basic elements of Laboratory Ethics focusing;</p> <ul style="list-style-type: none"> <li>Importance of medical professionalism for the medical student; including respect and gratitude towards colleagues</li> <li>Code of conduct: Collaboration, partnership, Teamwork , Maintaining dress code, religion obligations of medical doctor , focus on physicians' character, virtues and duties</li> <li>Delineate the ethical consideration while performing procedures on real patients or simulated patients in Laboratory setting</li> </ul>	<p>At the end of the session students should be able to ;</p> <ul style="list-style-type: none"> <li>Understand the importance of taking permission before performing procedures (drawing blood, administering injections etc.) during laboratory sessions .<b>A1</b></li> <li>Show Respects other health professional team members and complete assigned task in professional manner.<b>A1</b></li> <li>Employ collaborative negotiation to resolve conflict, anger, confusion and misunderstanding. <b>A2</b></li> </ul>	<p>Case based discussion in 2 hr contact session in 4-6 parallel classes conducted by faculty of respective departments</p> <p>Role plays</p> <p>Reflective writing</p>	<p>Assignment based assessment under aggregate Marks ( Internal Assessment )</p> <p>Assignment to be uploaded on LMS</p>	<ul style="list-style-type: none"> <li>Real life scenarios in form of Case base learning /problem based learning (PBL) To be share with students one week before the session</li> </ul> <p>Introduction to criteria for assessment of behavior, code of conduct and professionalism at RMU</p>

### Behavioural Sciences

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Rights and Responsibilities of patients and doctors	➤ To be able to identify and differentiate own rights and rights of the patients.	C2	LGIS	MCQS
	• To apply this knowledge in clinical settings	C2	CBL	

## Family Medicine

Topic	• At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Communication skills	• To be able to communicate with the patients keeping mind the principle of communication skills	C2	LGIS CBL	MCQS

## Integrated Undergraduate Research Curriculum (IUGRC)

Session	Learning Objectives
Students Practical Session 1: (placement in 1 <sup>st</sup> Module) (work track & assessment by Logbook)	<p>In supervised session, at the end of the session, participants would be able to; <b>(Los)</b></p> <ol style="list-style-type: none"> <li>1. Comprehend the “theme and scheme” of IUGRC-1<sup>st</sup> Year Practical component.</li> <li>2. Identify their individual role in Poster formation process according to steps of “updated evidence in Health” (UEIH) work.</li> <li>3. Take leads for broader readings / literature review on boarder areas of UEIH</li> <li>4. Make account on LMS, how to upload their individual assigned work.</li> <li>5. Access HEC Digital Library, PERN access.</li> <li>6. Group work learning protocols</li> </ol>
Practical session 2: (placement in 2nd Module) (work track & assessment by Logbook)	<p>In supervised session, after individual work sharing &amp; supervised brainstorming (PAL) on ideas on broader areas UEIH-Poster formation, students will: (session outlines or Los)</p> <ol style="list-style-type: none"> <li>1. Identify specific areas of work within the borde area of study done after 1<sup>st</sup> Practical session.</li> <li>2. Do earlier discussion on sub-topics to sub-groups on specific area or topic for UEIH for Poster formation.</li> <li>3. Perform some literature search, retrieval &amp; archiving for detailed study after the CS.</li> <li>4. Do discussions on assigned work on individual or subgroup basis.</li> <li>5. Plan mutual sub-group work within group, for their better understanding, supervised by their relevant mentor.</li> <li>6. Finalize the topic under supervision of supervisor (mentor) for UEIH for Poster formation.</li> </ol>

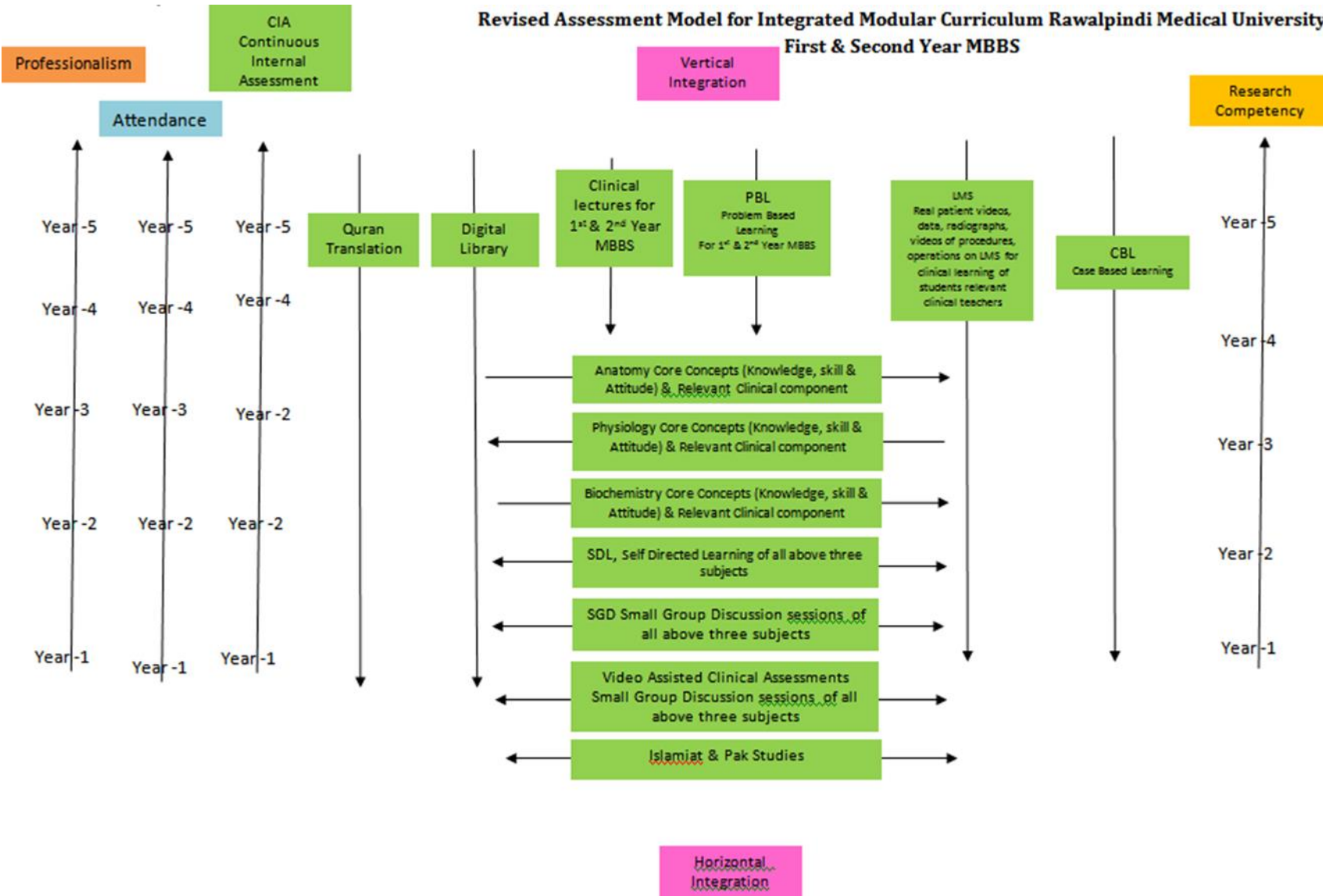
## **SECTION - IV**

### **Assessment Policies**

#### **Contents**

- **Assessment plan**
- **Types of Assessment:**
- **Modular Examinations**
- **Block Examination**
- **Table 4: Assessment Frequency & Time in MSK-II Module**

## Revised Assessment Model for Integrated Modular Curriculum Rawalpindi Medical University First & Second Year MBBS



### Gauge for Continuous Internal Assessment (CIA)

Red Zone	High Alert	Yellow Zone	Green Zone	Excellent	Extra Ordinary
0 - 25%	26 - *50%	51 - 60%	61 - 70%	71 - 80%	81 - 100%

\*50% and above is Passing Marks.

### Gauge for attendance percentage

Red Zone	High Alert	Yellow Zone-1	Yellow Zone-2	Green Zone	Excellent
0 - 25%	26 - 50%	51 - 60%	61 - 74%	*75 - 80%	81 - 100%

90% is eligibility criteria for appearing in professional examination.

## Assessment plan

University has followed the guidelines of Pakistan Medical and Dental Council for assessment. Assessment is conducted at the mid modular, modular and block levels.

### Types of Assessment:

The assessment is formative and summative.

Formative Assessment	Summative Assessment
Formative assessment is taken at modular (2/3 <sup>rd</sup> of the module is complete) level through MS Teams. Tool for this assessment is best choice questions and all subjects are given the share according to their hour percentage.	Summative assessment is taken at the mid modular (LMS Based), modular and block levels.

### Modular Assessment

Theory Paper	Viva Voce
There is a module examination at the end of first module of each block. The content of the whole teaching of the module are tested in this examination. It consists of paper with objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module. (Annexure I attached)	Structured table viva voce is conducted including the practical content of the module.

### Block Assessment

On completion of a block which consists of two modules, there is a block examination which consists of one theory paper and a structured viva with OSPE.

Theory Paper	Block OSPE
There is one written paper for each subject. The paper consists of objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module.	This covers the practical content of the whole block.



**Table 4-Assessment Frequency & Time in MSK-II**

Block	Sr #	Module – 1 MSK-II Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block-I	1	Mid Module Examinations LMS based (Anatomy, Physiology & Biochemistry)	Summative	30 Minutes	3 Hour 15 Minutes	45 Minutes	2 Formative	6 Summative
	2	Topics of SDL Examination on MS Team	Formative	30 Minutes				
	3	End Module Examinations (SEQ & MCQs Based)	Summative	2 Hours				
	4	Anatomy Structured and Clinically Oriented Viva	Summative	10 Minutes				
	5	Physiology Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	6	Assessment of Clinical Lectures	Formative	15 Minutes				
	7	Assessment of Bioethics Lectures	Summative	2 Minutes				
	8	Assessment of IUGRC Lectures	Summative	10 Minutes				

## Learning Resources

Subject	Resources
Anatomy	<p><b>A. Gross Anatomy</b></p> <ol style="list-style-type: none"> <li>1. Gray's Anatomy by Prof. Susan Standring 42th edition, Elsevier.</li> <li>2. Clinical Anatomy for Medical Students by Richard S. Snell 10<sup>th</sup> edition.</li> <li>3. Clinically Oriented Anatomy by Keith Moore 9<sup>th</sup> edition.</li> <li>4. Cunningham's Manual of Practical Anatomy by G.J. Romanes, 16th edition, Vol-I, II and III</li> </ol> <p><b>B. Histology</b></p> <ol style="list-style-type: none"> <li>1. B. Young J. W. Health Wheather's Functional Histology 6<sup>th</sup> edition.</li> <li>2. Medical Histology by Prof. Laiq Hussain 7<sup>th</sup> edition.</li> </ol> <p><b>C. Embryology</b></p> <ol style="list-style-type: none"> <li>1. Keith L. Moore. The Developing Human 11<sup>th</sup> edition.</li> <li>2. Langman's Medical Embryology 14<sup>th</sup> edition.</li> </ol>
Physiology	<p><b>A. Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Textbook Of Medical Physiology by Guyton And Hall 14<sup>th</sup> edition.</li> <li>2. Ganong ' S Review of Medical Physiology 26<sup>th</sup> edition.</li> </ol> <p><b>B. Reference Books</b></p> <ol style="list-style-type: none"> <li>1. Human Physiology by Lauralee Sherwood 10<sup>th</sup> edition.</li> <li>2. Berne &amp; Levy Physiology 7<sup>th</sup> edition.</li> <li>3. Best &amp; Taylor Physiological Basis of Medical Practice 13<sup>th</sup> edition.</li> <li>4. Guyton &amp; Hall Physiological Review 3<sup>rd</sup> edition.</li> </ol>
Biochemistry	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Harper's Illustrated Biochemistry 32th edition.</li> <li>2. Lehninger Principle of Biochemistry 8<sup>th</sup> edition.</li> <li>3. Biochemistry by Devlin 7<sup>th</sup> edition.</li> </ol>
Community Medicine	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Community Medicine by Parikh 25<sup>th</sup> edition.</li> <li>2. Community Medicine by M Illyas 8<sup>th</sup> edition.</li> <li>3. Basic Statistics for the Health Sciences by Jan W Kuzma 5<sup>th</sup> edition.</li> </ol>
Pathology/Microbiology	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Robbins &amp; Cotran, Pathologic Basis of Disease, 10<sup>th</sup> edition.</li> <li>2. Rapid Review Pathology, 5<sup>th</sup> edition by Edward F. Goljan MD.</li> <li>3. <a href="http://library.med.utah.edu/WebPath/webpath.html">http://library.med.utah.edu/WebPath/webpath.html</a></li> </ol>
Pharmacology	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Lippincot Illustrated Pharmacology 9<sup>th</sup> edition.</li> <li>2. Basic and Clinical Pharmacology by Katzung 5<sup>th</sup> edition.</li> </ol>

## **SECTION - V**

### **Time Table**

**Integrated Spiral Clinically Oriented Modular Curriculum for First Year MBBS**

**MSK-II Module Time Table**

**First Year MBBS**

**Session 2022 - 2023**

**Batch- 50**

## MSK-II Module Team

Module Name	:	MSK- II Module
Duration of module	:	05 Weeks
Coordinator	:	Dr. Fahd Anwar
Co- Coordinator	:	Dr. Sajjad Hussain
Reviewed by	:	Module Committee

Module Committee		Module task force	
Vice Chancellor RMU	Prof. Dr. Muhammad Umar	Coordinator	Dr. Fahd Anwar
Director DME	Prof. Dr. Rai Muhammad Asghar	DME Focal Person	Dr. Sidra Hamid
Convener Curriculum	Prof. Dr. Naeem Akhter	Co-coordinator	Dr. Sajjad Hussain (Senior Demonstrator of Anatomy)
Chairperson Anatomy & Dean Basic Sciences	Prof Dr. Ayesha Yousaf	Co-Coordinator	Dr. Almas (Senior Demonstrator Biochemistry)
Additional Director DME	Prof. Dr. Ifra Saeed	Co-coordinator	Dr. Fareed Ullah Khan (Senior Demonstrator Physiology) & Clinical Co- Coordinator
Chairperson Physiology	Prof. Dr. Samia Sarwar		
Chairperson Biochemistry	Dr. Aneela Jamil	<b>DME Implementation Team</b>	
Focal Person Anatomy First Year MBBS	Prof Dr. Ayesha Yousaf	Director DME	Prof. Dr. Rai Muhammad Asghar
Focal Person Physiology	Dr. Sidra Hamid	Implementation Incharge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
Focal Person Biochemistry	Dr. Aneela Jamil	Deputy Director DME	Dr. Shazia Zeb
Focal Person Pharmacology	Dr. Zunera Hakim	Module planner & Implementation coordinator	Dr. Sidra Hamid
Focal Person Pathology	Dr. Asiya Niazi	Editor	Muhammad Arslan Aslam
Focal Person Behavioral Sciences	Dr. Saadia Yasir		
Focal Person Community Medicine	Dr. Afifa Kulsoom		
Focal Person Quran Translation Lectures	Dr. Fahd Anwar		

## Discipline Wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
II	<ul style="list-style-type: none"> <li>Anatomy</li> </ul>	<ul style="list-style-type: none"> <li>Muscles</li> <li>Skin</li> </ul>	<ul style="list-style-type: none"> <li>Development of Axial Skeleton</li> <li>Development of limbs</li> <li>Development of muscles</li> </ul>	General Histology <ul style="list-style-type: none"> <li>Muscles</li> <li>Skin</li> <li>Skin appendages</li> </ul>	Gluteal Region to Lateral compartment of leg
	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>Protein chemistry, Protein separation techniques, Collagen and Elastin</li> </ul>			
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle.</li> <li>Molecular Mechanism of skeletal muscle contraction, Rigormortis, Muscular dystrophies</li> <li>Introduction to muscle physiology, Structure of sarcomere</li> <li>Energetics, efficiency and types of contraction, heat production in muscle</li> <li>Physiologic anatomy, types and properties of Smooth Muscle</li> <li>Mechanism of smooth muscle contraction &amp; its control</li> <li>Introduction to pericardium Properties of myocardium &amp; endocardium, myocardial action potential</li> <li>Regulation of myocardial activity</li> <li>Comparison of 3 types of Muscle</li> <li>Introduction to CVS</li> <li>Excitatory &amp; Conducting system of heart</li> </ul>			
	<ul style="list-style-type: none"> <li>Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to Professional Ethics and PM&amp;DC Code of Conduct</li> <li>History of Medical Ethics</li> </ul>			
	<ul style="list-style-type: none"> <li>Research Club Activity (IUGRC)</li> </ul>	<ul style="list-style-type: none"> <li>Student Practical Session-I</li> <li>Student Practical Session-II</li> </ul>			
	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Communication Skills</li> </ul>			
	<ul style="list-style-type: none"> <li>Behavioural Sciences</li> </ul>	<ul style="list-style-type: none"> <li>Rights and Responsibilities of patients and doctors</li> </ul>			
	<ul style="list-style-type: none"> <li>Radiology &amp; Artificial Intelligence</li> </ul>	<ul style="list-style-type: none"> <li>x-rays of hipbone lower limb</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>The Holy Quran Translation Component</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical Integration</li> </ul>	<ul style="list-style-type: none"> <li>Clinically co-related lectures</li> </ul>			

## Categorization of Modular Content Department of Anatomy

Category A*	Category B**		Category C***			
Embryology	General Histology	General Anatomy	Demonstrations (SGD)	Practicals/Skill lab. (SKL)	CBL	SDL
<ul style="list-style-type: none"> <li>- Development of Axial Skeleton</li> <li>- Development of limbs</li> <li>- Development of muscles</li> </ul>	<ul style="list-style-type: none"> <li>- Muscles-I</li> <li>- Muscles-II</li> <li>- Skin</li> <li>- Skin</li> <li>- Appendages</li> </ul>	<ul style="list-style-type: none"> <li>- Muscles-I</li> <li>- Muscles-II</li> <li>- Skin</li> </ul>	<p><b>Gross Anatomy:</b></p> <ul style="list-style-type: none"> <li>- Hip bone</li> <li>- Femur</li> <li>- Anterolateral compartment of thigh (muscles)</li> <li>- Anterolateral compartment of thigh (neurovascular organization)</li> <li>- Medial compartment of thigh</li> <li>- Gluteal region (muscles)</li> <li>- Gluteal region (neurovascular organization)</li> <li>- Posterior compartment of thigh (muscles)</li> <li>- Posterior compartment of thigh (neurovascular organization)</li> <li>- Hip joint</li> <li>- Tibia</li> <li>- Fibula</li> <li>- Popliteal fossa</li> <li>- Knee joint</li> <li>- Anterior compartment of leg (muscles)</li> <li>- Anterior compartment of leg (neurovascular organization)</li> <li>- Lateral compartment of leg</li> <li>- Surface marking and radiology</li> </ul>	<ul style="list-style-type: none"> <li>- Skeletal muscles</li> <li>- Smooth muscle and cardiac muscle</li> <li>- Thick skin</li> <li>- Thin skin</li> </ul>	<ul style="list-style-type: none"> <li>- Hip Dislocation</li> <li>- Fracture of neck of femur</li> </ul>	<ul style="list-style-type: none"> <li>- Hip bone</li> <li>- Femur</li> <li>- Anterolateral compartment of thigh</li> <li>- Medial compartment of thigh</li> <li>- Gluteal region</li> <li>- Posterior compartment of thigh</li> <li>- Hip joint, Tibia &amp; Fibula</li> </ul>

**Category A\*:** By Professors

**Category B\*\*:** By Associate & Assistant Professors

**Category C\*\*\*:** By Senior Demonstrators & Demonstrators

### Teaching Staff / Human Resource of Department of Anatomy

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of Anatomy department	01
2.	Associate professor of Anatomy department	01
3.	Assistant professor of Anatomy department (AP)	01
4.	Demonstrators of Anatomy department	04

#### Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$2 * 13 = 26$ hours
2.	Small Group Discussions (SGD)	$2 * 21 = 42$ hours
3.	Case Based Learning (CBL)	$2 * 2 = 4$ hours
4.	Practical / Skill Lab	$1.5 * 20 = 30$ hours

#### Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$1 * 13 = 13$ hours
2.	Small Group Discussions (SGD)	$2 * 21 = 42$ hours
3.	Case Based Learning (CBL)	$2 * 2 = 4$ hours
4.	Practical / Skill Lab	$1.5 * 4 = 6$ hours
5.	Self-Directed Learning (SDL)	$1 * 8 = 8$ hours



## Department of Physiology

Category A	Category B	Category C
Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle ( <b>Prof. Dr. Samia Sarwar/Dr Aneela</b> ) (Even)	Introduction to pericardium Properties of myocardium & endocardium, myocardial action potential ( <b>By Dr. Sidra</b> )	Length tension curve, Load and velocity of contraction, diseases of muscle ( <b>By Dr. Nayab</b> )
		Properties of skeletal muscles, Tetanus & Fatigue ( <b>By Dr. Nayab</b> )
Molecular Mechanism of skeletal muscle contraction, Rigormortis, Muscular dystrophies ( <b>Prof. Dr. Samia Sarwar/ Dr Aneela</b> ) (Even)	Regulation of myocardial activity ( <b>By Dr Sidra</b> )	Practical: <ol style="list-style-type: none"> <li>1. Determination of RBC count</li> <li>2. Determination of TLC</li> <li>3. Determination of Platelet Count</li> <li>4. Determination of ABO, Blood groups</li> </ol>
	Introduction to muscle physiology, Structure of sarcomere ( <b>By Dr Aneela</b> ) (Even)	SGD: <ol style="list-style-type: none"> <li>1. Sliding filaments of skeletal muscle, sarcotubular system</li> <li>2. Physiology of smooth muscle, mechanism of smooth muscle contraction</li> <li>3. Properties of myocardium, myocardial action potential, Excitatory and conduction system of heart</li> <li>4. Comparison of three types of muscle</li> </ol>
	Physiologic anatomy, types and properties of Smooth Muscle ( <b>By Dr Aneela</b> )	SDL: (ON CAMPUS) <ol style="list-style-type: none"> <li>1. Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle</li> <li>2. Molecular Mechanism of skeletal muscle contraction, Rigor mortis, Muscular dystrophies</li> <li>3. Length tension curve, Load and velocity of contraction, diseases of muscle</li> <li>4. Physiological properties and types of Smooth Muscle</li> <li>5. Mechanism of smooth muscle contraction &amp; its control</li> <li>6. Regulation of myocardial activity</li> <li>7. Excitatory &amp; Conducting system of heart</li> <li>8. Comparison of 3 types of muscle</li> </ol>
	Mechanism of smooth muscle contraction & its control ( <b>By Dr Aneela</b> )	
	Comparison of 3 types of Muscle ( <b>By Dr Aneela</b> )	

	Introduction to muscle physiology, Structure of sarcomere <b>(By Dr Uzma) (Odd)</b>	SDL: (OFF CAMPUS) 1. Introduction to muscle physiology, Structure of sarcomere 2. Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle 3. Mechanism of skeletal muscle contraction. 4. Rigor mortis, Muscular dystrophies 5. Energetics, efficiency and types of contraction 6. Properties of skeletal muscles, Tetanus & Fatigue 7. Physiological properties of Smooth Muscle 8. Myocardial Action potential
	Sarcotubular system, excitation contraction coupling mechanism inskeletal muscle <b>(By Dr Uzma) (Odd)</b>	
	Molecular Mechanism of skeletal muscle contraction , Rigormortis, Muscular dystrophies <b>(By Dr Uzma)(Odd)</b>	
	Energetics, efficiency and types of contraction, heat production in muscle <b>(By Dr Uzma)</b>	
	Introduction to CVS <b>(By Dr Fahad)</b>	
	Excitatory & Conducting system of heart <b>(By Dr Fahad)</b>	PBL=NIL CBL=NIL

**Category A\*:** By Professors

**Category B\*\*:** By Associate & Assistant Professors

**Category C\*\*\*:** By Senior Demonstrators & Demonstrators

### Teaching Staff / Human Resource of Department of Physiology

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of Physiology department	01
2.	Associate professor of Physiology department	01
3.	Assistant professor of Physiology department (AP)	01 (DME)
4.	Demonstrators of Physiology department	07

#### Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$13 * 2 = 26$ hours
2.	Small Group Discussions (SGD) / (CBL)	$20 * 1.5 = 30$ hours
3.	Practical / Skill Lab	$20 * 1.5 = 30$ hours

## Department of Biochemistry

Category A*	Category B**	Category C***				
LGIS	LGIS	PBL	CBL	Practical's	SGD	
Protein folding and denaturation	Properties of amino acids and important peptides		Protein folding and misfolding	<ul style="list-style-type: none"> <li>Color tests for detection of proteins</li> </ul>	Protein structure	
	Classification of protein and function of protein			<ul style="list-style-type: none"> <li>Detection of proteins by Isoelectric pH</li> </ul>		
	Primary structures of proteins			Fractional precipitation of proteins	Collagen	
Collagen and elastin	Secondary structure of protein			Chromatography	Elastin	
Techniques of separation of protein	Tertiary and quaternary structure of proteins					

**Category A\*:** By HOD and Assistant Professor

**Category B\*\*:** By All (HOD, Assistant Professors, Senior Demonstrators)

**Category C\*\*\*:** By All Demonstrators

## Teaching Staff / Human Resource of Department of Biochemistry

Sr. #	Designation Of Teaching Staff / Human Resource	Total Number Of Teaching Staff
1.	Assistant Professor of Biochemistry department	02
2.	Demonstrators of biochemistry department	08

### Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$8 * 1 = 5$ hours
2.	Small Group Discussions (SGD)	$1.5 * 4 = 6$ hours
3.	Case Based Learning (PBL)	$2 * 1 = 2$ hours
4.	Practical / Skill Lab	$1.5 * 04 = 6$ hours

### Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	8
2.	Small Group Discussions (SGD)	6
3.	Case Based Learning (PBL)	02
4.	Practical / Skill Lab	6
5.	Self-Directed Learning (SDL)	08

**Time Table For Module MSK-II (First Week)**  
**(15-05-2023 To 20-05-2023)**

Date/Day	8:00 AM – 09:00 AM	9:00 AM – 10:00 AM	10:00 AM – 11:00 AM	11:00 AM – 12:00 PM	12:00 PM – 12:20 PM	12:20 PM – 2:00 PM	02:00- 03:00PM	
Monday 15-05-2023	Viva Voce of Block-I (Foundation + MSK-II)					<b>B r e a k</b>	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Intro. to muscle physiology, structure of sarcomere
Tuesday 16-05-2023	Integrated + Gross OSPE						Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle
Wednesday 17-05-2023	SGD/Dissection	Anatomy LGIS		Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Classification of proteins
	Hip bone	General Anatomy Muscle I Asst. Prof. Dr Arsalan Even	General Histology Muscle I Assoc. Prof. Dr Mohtasham Odd	Introduction to muscle physiology, Structure of sarcomere Dr Aneela (Even)	Introduction to muscle physiology, Structure of sarcomere Dr. Uzma (Odd)			
Thursday 18-05-2023	CBL/Dissection	Anatomy LGIS		Biomedical Ethics			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Introduction to proteins and amino acids
	Hip bone	General Histology Muscle I Assoc. Prof. Dr Mohtasham Even	General Anatomy Muscle I Asst. Prof. Dr Arsalan Odd	Introduction to Professional Ethics and PM&DC Code of Conduct Dr. Aneela Even      Dr. Kashid Odd				
Friday 19-05-2023	8:00 AM – 09:00 AM	9:00 AM – 10:00 AM	Biochemistry LGIS		Practical & SGD/CBL Topics & venue mentioned at the end	12:00 PM – 01:00PM  SDL Anatomy Hip bone		
	CBL / Dissection	Anatomy LGIS		Collagn structure, synthesuis and related disorders				
		General Anatomy Muscle II Asst. Prof. Dr Arsalan Even	General Histology Muscle II Assoc. Prof. Dr Mohtasham Odd					Properties of amino acids & important peptides Dr. Rahat Even
Saturday 20-05-2023	SGD / Dissection	Biochemistry LGIS		Physiology LGIS		Break	Practical & SGD/CBL Topics & venue mentioned at the end	
	Femur / Patella	Collagn structure, synthesuis and related disorders Dr. Isma Even	Properties of amino acids & important peptides Dr. Rahat Odd	Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle Prof.Dr. Samia Sarwar/ Dr Aneela (Even)	Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle Dr. Uzma (Odd)			

Topics For Practical with Venue						Topics For Small Group Discussion& CBLs With Venue				
<ul style="list-style-type: none"> <li>Anatomy Histology Practical: Skeletal Muscles</li> <li>Physiology Practical: Determination of Red blood cell count</li> <li>Biochemistry Practical: Color tests for detection of proteins</li> </ul>						<ul style="list-style-type: none"> <li>Physiology SGD: Sliding filaments of skeletal muscle, sarcotubular system (Lecture Hall 5)</li> <li>Biochemistry SGD: Protein structure</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	1-90	Dr Urooj Shah	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	91-180	Dr Zeneera Saqib	Lecture Hall No.04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	181-270	Dr Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C	D	271 onwards	Dr Qurat ul Ain	New Lecture theatre complex no.3	
Saturday	A	E	C	D	B					
Venue For First Year Batches for PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue						Biochemistry	Physiology	
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq	1.	A	1-70	Dr. Almas Ijaz	Dr. Sheena Tariq	
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani	2.	B	71-140	Dr. Rahat Afzal	Dr Uzma Kiyani	
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar	3.	C	141-210	Dr. Romessa	Dr fahd Anwar	
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah	4.	D	211-280	Dr Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish	
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)	5.	E	281 onwards	Dr. Nayab Ramzan	Dr Fareed	
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)	<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>					
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh (PBL) Dr. Shazia Noreen (SGD)	<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03		
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)	<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Time Table For Module MSK-II (Second Week)**  
**(22-05-2023 To 27-06-2023)**

**S P O R T S                      W E E K**



**Time Table For Module MSK-II (Third Week)**  
**(29-05-2023 To 03-06-2023)**

Date/Day	8:00 AM – 09:00 AM	9:00 AM – 10:00 AM	10:00 AM – 11:00 AM	11:00 AM – 12:00 PM	12:00 PM – 12:20 PM	12:20 PM – 2:00 PM	02:00- 03:00PM		
Monday 29-05-2023	SGD / Dissection		Anatomy LGIS		Physiology LGIS		<b>B r e a k</b>		
	Anterolateral compartment of thigh (Muscles & Neurovascular organization)		General Embryology	General Histology	Molecular Mechanism of skeletal muscle contraction	Molecular Mechanism of skeletal muscle contraction		Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Molecular Mechanism of skeletal muscle
			Development of Axial Skeleton	Histology of Skin	rigor mortis, Muscular dystrophies	rigor mortis, Muscular dystrophies			
Prof. Dr Ayesha Even			Assoc. Prof. Dr Mohtasham Odd	Prof .Dr.Samia Sarwar/ Dr. Aneela (Even)	Dr. Uzma(Odd)				
Tuesday 30-05-2023	SGD / Dissection	Anatomy LGIS		Biochemistry LGIS		Physiology LGIS			
	Dissection	General Histology Muscle II	General Anatomy Muscle II	Classification and functions of proteins	Elastin structure and related disorders	Length tension curve, Load and velocity of contraction, diseases of muscle		Energetics, efficiency and types of contraction, heat production in muscle	Practical & SGD/CBL Topics & venue mentioned at the end
		Assoc. Prof. Dr Mohtasham Even	Asst. Prof. Dr Arsalan Odd	Dr. Rahat Even	Dr. Isma Odd	Dr. Nayab Even	Dr. Uzma Odd		
Wednesday 31-05-2023	SGD / Dissection		Biochemistry LGIS		Physiology LGIS		<b>B r e a k</b>		
	Medial Compartment of thigh		Elastin structure and related disorders	Classification and functions of proteins	Energetics, efficiency and types of contraction, heat production in muscle	Length tension curve, Load and velocity of contraction, diseases of muscle		Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Collagen and related disorders
			Dr. Isma Even	Dr. Rahat Odd	Dr. Uzma Even	Dr. Nayab Odd			
SGD / Dissection			Anatomy LGIS		Research Club Activity				
Thursday 01-06-2023	Dissection		General Histology	General Embryology	Student Practical Session-I Leacture Hall Complex No. 2			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Secondary Structure of protiens
			Histology of Skin	Development of Axial Skeleton					
			Assoc. Prof. Dr Mohtasham Even	Prof. Dr Ayesha Odd			Dr. Khaula Noreen & Dr. Gul Maher Research Team-I (Roll no 1-180) NLC 2		
Friday 02-06-2023	SGD / Dissection		Anatomy LGIS		Quran Translation		12:00 PM – 01:00PM	<b>B r e a k</b>	
	Gluteal Region (muscles)		General Histology	General Embryology	Imaniat-I	Ibadat-II	SDL Anatomy Anterolateral compartment of thigh		
			Histology of Skin appendages	Development of limbs					
Assoc. Prof. Dr Mohtasham Even			Prof. Dr Ayesha Odd	Mufti Naeem Sherazi Even					Molana Abdul Waahid Abbasi Odd
Saturday 03-06-2023	SGD / Dissection		Anatomy LGIS		Biochemistry LGIS		12:00PM-12:20PM		<b>B r e a k</b>
	Gluteal Region (Neurovascular organization)		General Embryology	General Histology	Protein folding and misfolding	Primary protein structure	Practical & SGD/CBL Topics & venue mentioned at the end		
			Development of limbs	Histology of Skin appendages					
Prof. Dr Ayesha Even			Assoc. Prof. Dr Mohtasham Odd	Dr. Isma (Even)				Dr. Rahat Odd	

Topics For Practical With Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>Anatomy Histology Practical: Smooth and cardiac muscles</li> <li>Physiology Practical: Determination of Total leukocyte Count (TLC)</li> <li>Biochemistry practical: Detection of proteins by Isoelectric pH</li> </ul>						<ul style="list-style-type: none"> <li>Physiology SGD: Physiology of smooth muscle, mechanism of smooth muscle contraction (Lecture Hall 5)</li> <li>Biochemistry CBL: Protein folding and misfolding</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	1-90	Dr Urooj Shah	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	91-180	Dr Zeneera Saqib	Lecture Hall No.04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	181-270	Dr Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C	D	271 onwards	Dr Qurat ul Ain	New Lecture theatre complex no.3	
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1.	A	1-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2.	B	71-140	Dr. Rahat Afzal	Dr Uzma Kiyani
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar		3.	C	141-210	Dr. Romessa	Dr fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah		4.	D	211-280	Dr Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	E	281 onwards	Dr. Nayab Ramzan	Dr Fareed
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)		<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>				
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh (PBL) Dr. Shazia Noreen (SGD)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03	
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02	
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Time Table For Module MSK-II (Fourth Week)**  
**(05-06-2023 To 10-06-2023)**

Date/Day	8:00 AM – 9:00 AM	10:00AM – 11:00AM	11:00 AM – 12:00 PM	12:00 PM – 12:20 PM	12:20 PM – 2:00 PM	02:00- 03:00PM
Monday 05-06-2023	SGD / Dissection	Anatomy LGIS		Physiology LGIS		<b>B r e a k</b>
	Dissection	General Embryology		Properties of skeletal muscles, Tetanus & Fatigue	Introduction to CVS	
		Development of Muscles Prof. Dr Ayesha Even	General Anatomy of Skin Asst. Prof. Dr Arsalan Odd			
Tuesday 06-06-2023	SGD / Dissection	Biochemistry LGIS		Physiology LGIS		<b>B r e a k</b>
	Posterior compartment of thigh (muscles)	Primary protein structure Dr. Rahat Even	Protein folding and misfolding Dr. Isma (odd)	Introduction to CVS Dr. Fahd Even	Properties of skeletal muscles, Tetanus & Fatigue Dr. Nayab Odd	
Wednesday 07-06-2023	SGD / Dissection	Anatomy LGIS		Biochemistry LGIS		<b>B r e a k</b>
	Posterior compartment of thigh (Neurovascular organization)	General Anatomy General Anatomy of Skin Asst. Prof. Dr Arsalan Even	General Embryology Development of Muscles Prof. Dr Ayesha Odd	Secondary protein structure Dr. Rahat Even	Protein separation techniques Dr. Isma Odd	
Thursday 08-06-2023	SGD / Dissection	Research Club Activity				<b>B r e a k</b>
	Dissection	Student Practical Session-II Lecture Hall Complex No. 3				
			Dr. Khaula Noreen Research Team-I(roll no 1-180) NLC 2		Dr. Gul Maher Research Team-I (roll no 181-ONWARDS) NLC 3	
Friday 09-06-2023	CBL/ Dissection	9:00AM – 10:00AM		Quran Tranlation		12:00 PM – 01:00PM
	Tibia	Biochemistry LGIS		Quran Tranlation		SDL Anatomy Gluteal Region
		Protein separation techniques Dr. Isma Even	Secondary protein structure Dr. Rahat Odd	Ibadat-II Mufti Naeem Sherazi Even	Imaniat -I Molana Abdul Waahid Abbasi Odd	
Saturday 10-06-2023	SGD / Dissection	Biochemistry LGIS		Biomedical Ehtics		12:00PM-12:20PM
	Hip joint	Protein folding & denaturation Dr. Isma Riaz even	Tertiary and quaternary structure Dr. Rahat odd	History of Medical Ethics		<b>B r e a k</b>
				Dr. Arsalan Even	Dr. Maria Odd	
					Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Properties of skeletal muscles, Tetanus & Fatigue
					Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Energetics, efficiency, and types of contraction
					Muscle	Biochemistry Protein misfolding disorders <b>Online SDL Evaluation</b>
					Practical & SGD/CBL Topics & venue mentioned at the end	Biochemistry Protein Denaturation
						SDL Anatomy Posterior compartment of thigh <b>Online Clinical evaluation</b>

Topics For Practical With Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>Anatomy Histology Practical: Thick Skin</li> <li>Physiology Practical: Determination of platelet count</li> <li>Biochemistry Practical: Fractional precipitation of proteins</li> </ul>						Physiology SGD: Properties of myocardium, myocardial action potential, Excitatory and conduction system of heart (Physiology Lecture 05) Biochemistry SGD: Collagen				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	1-90	Dr Urooj Shah	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	91-180	Dr Zeneera Saqib	Lecture Hall No.04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	181-270	Dr Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C	D	271 onwards	Dr Qurat ul Ain	New Lecture theatre complex no.3	
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1.	A	1-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2.	B	71-140	Dr. Rahat Afzal	Dr Uzma Kiyani
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar		3.	C	141-210	Dr. Romessa	Dr fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah		4.	D	211-280	Dr Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	E	281 onwards	Dr. Nayab Ramzan	Dr Fareed
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh (PBL) Dr. Shazia Noreen (SGD)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture # 03	
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02	
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						
Venues for Large Group Interactive Session (LGIS) and SDL										

**Time Table For Module MSK-II (Fifth Week)**  
**(12-06-2023 To 17-06-2023)**

Date/Day	8:00 AM – 09:00 AM	9:00 AM – 10:00 AM	10:00 AM – 11:00 AM	11:00 AM – 12:00 PM	12:00 PM – 12:20 PM	12:20 PM – 2:00 PM	02:00- 03:00PM		
Monday 12-06-2023	SGD / Dissection		Biochemistry LGIS	Physiology LGIS		<b>B r e a k</b>	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Physiological properties of Smooth Muscle	
	Fibula		Tertiary and quaternary structure	Protein folding & denaturation	Physiologic anatomy, types and properties of Smooth muscle				Introduction to pericardium Properties of myocardium & endocardium myocardial action potential
Tuesday 13-06-2023	SGD / Dissection		Behavioural Sciences	Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Myocardial Action potential	
	Popliteal Fossae		Communication Skills	Introduction to pericardium Properties of myocardium & endocardium myocardial action potential	Physiologic anatomy, types and properties of Smooth muscle				
Wednesday 14-06-2023	SGD / Dissection		Behavioural Sciences (LGIS)	Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Importance of various classes of protein	
	Knee joint		Rights and Responsibilities of patients and doctors	Mechanism of smooth muscle contraction & its control	Regulation of myocardial activity				
Thursday 15-06-2023	SGD / Dissection		Radiology	Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL lastin and related disorders	
	Anterior compartment of leg (muscles and neurovascular organization)		x-rays of hipbone lower limb	Regulation of myocardial activity	Mechanism of smooth muscle contraction & its control				
Friday 16-06-2023	SGD/ Dissection	Quran Tranlation		Physiology LGIS		12:00 PM – 01:00PM	SDL Anatomy Tibia, Fibula		
	Lateral compartment of leg (muscles and neurovascular organization)	Ibadat-III	Immaniat-II	Ibadat-IV	Immaniat-III	Excitatory & Conducting system of heart		Comparison of 3 types of muscle	
Saturday 17-06-2023	SGD / Dissection		Dissection		Physiology LGIS		12:00 PM-12:20 PM	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Anatomy Hip joint, Knee Joint
	Surface Anatomy / Radiology		Dissection		Comparison of 3 types of muscle	Excitatory & Conducting system of heart			
				Dr. Aneela Even	Dr. Fahd Odd	Break			

Topics For Practical With Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>Anatomy Histology Practical: Thick Skin</li> <li>Physiology Practical: Determination of ABO, Blood groups</li> <li>Biochemistry Practical: Chromatography</li> </ul>						Physiology SGD: Comparison of three types of muscle (Physiology Lecture 05) Biochemistry SGD: Elastin				
Schedule for Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	1-90	Dr Urooj Shah	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	91-180	Dr Zeneera Saqib	Lecture Hall No.04 Anatomy Lecture Hall	
Wednesday	E	D	B	C	A	C	181-270	Dr Ali Raza	Dissection Hall	
Thursday	B	A	D	E	C	D	271 onwards	Dr Qurat ul Ain	New Lecture theatre complex no.3	
Saturday	A	E	C	D	B					
Venue For First Year Batches for PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1.	A	1-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2.	B	71-140	Dr. Rahat Afzal	Dr Uzma Kiyani
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar		3.	C	141-210	Dr. Romessa	Dr fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah		4.	D	211-280	Dr Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	E	281 onwards	Dr. Nayab Ramzan	Dr Fareed
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)		<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>				
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh (PBL) Dr. Shazia Noreen (SGD)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03	
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02	
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Time Table For Module MSK-II (Sixth Week)**  
**(19-06-2023 To 24-06-2023)**

<b>Date &amp; Day</b>	<b>8:00 AM – 9:00 AM</b>	<b>11:00AM – 12:00 PM</b>
<b>Monday</b> 19-06-2023	SDL For Exam Preparation	
<b>Tuesday</b> 20-06-2023	Anatomy Theory Paper	
<b>Wednesday</b> 21-06-2023	Physiology theory Paper	
<b>Thursday</b> 22-06-2023	Biochemistry Theory paper& Allied	
<b>Friday</b> 23-06-2023	Anatomy Viva Voce (Roll no :1-180 students) & Physiology Viva Voce (Roll no :181 to 322 students)	
<b>Saturday</b> 24-06-2023	Physiology Viva Voce (Roll no :1-180 students) & Anatomy Viva Voce (Roll no :181 to 322 students)	

## SECTION VI

**Table of Specification (TOS) For MSK-II Module Examination for First Year MBBS**

Sr. #	Discipline	No. of MCQs (%)	No. of MCQs according to cognitive domain			No. of SEQs (%)		No. of SEQs according to cognitive domain			Viva voce/OSPE	Total Marks
			C1	C2	C3	No. of items	Marks	C1	C2	C3		
1.	Anatomy	25	15	5	5	5	25	1	2	2	50	100
2.	Physiology	30	18	9	3	4	20	1	1.5	1.5	50	100
3.	Biochemistry	7	4	3	-	3	15	1	1	1	5	29
4.	Bioethics & Professionalism	5										5
5.	Research Club Activity (IUGRC)	10										6
6.	Family Medicine	1										1
7.	Behavioural Sciences	2										2
8.	Radiology & Artificial Intelligence Innovation	3										3
<b>Grand Total</b>											<b>246</b>	



## **Annexure-I**

**(Sample MCQ & SEQ papers)**

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**ANATOMY DEPARTMENT**  
**1<sup>st</sup> Year MBBS MCQs Module Exam (MSK-II)**

1. A 50-years-old man complaint of a lump in his groin. His physician suspected enlarged superficial inguinal lymph nodes. Which area should be examined to find the source?
  - a. Skin of the buttocks
  - b. Skin of the scrotum
  - c. Both skin of buttocks and scrotum
  - d. Glans penis
  - e. Posterolateral part of calf
3. A football player presented in emergency with injury. The doctor tested his knee by pulling anteriorly on the leg with knee flexed. The leg moved forward significantly due to the damage of?
  - a. Anterior Cruciate Ligament
  - b. Medical Meniscus
  - c. Lateral Meniscus
  - d. Oblique Poptiteal Ligament
  - e. Posterior Cruciate Ligament
5. A cardiac patient was advised to undergo coronary artery grafting. From which of following vein graft can be used as in this procedure.
  - a. Femoral vein
  - b. Perforating vein
  - c. Great saphenous vein
  - d. Small saphneous vein
  - e. Popliteal vein
2. A 52-years-old woman fell after slipping and was unable to extend her leg at the knee joint. Which of the following muscles were most likely to be damaged as a result of this accident?
  - a. Semitendinosus
  - b. Sartorius
  - c. Gracilis
  - d. Quadriceps femoris
  - e. Biceps femoris
4. While observing a patient walking a doctor noticed a tilt in the pelvis towards right. Which nerve could be impacted in this scenario.
  - a. Right superior gluteal nerve
  - b. Right superior gluteal nerve
  - c. Right inferior gluteal nerve
  - d. Right inferior gluteal nerve
  - e. Right femoral nerve

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**ANATOMY DEPARTMENT**  
**1<sup>st</sup> Year MBBS SEQs Module Exam (MSK-II)**

Note: Attempt all questions. All questions carry equal marks. Draw diagram where necessary

1. a. Name the opening present in upper mid part of fascia lata of thigh. Give location and margins of opening. Enlist structures passing through it? 0.5+0.5+0.5+1.5  
b. Name arteries contributing in anastomosis around lesser trochanter of femur. 2
2. a. Name the opening present in upper mid part of fascia lata of thigh. Give location and margins of opening. Enlist structures passing through it? 0.5+0.5+0.5+1.5  
b. Name arteries contributing in anastomosis around lesser trochanter of femur. 2
3. a. A patient walked in OPD with waddling gait. On examination his pelvis tilted towards unsupported side when he was asked to raise his leg.
  - I. Which nerve is damaged 1
  - II. Enlist muscles that are damaged 1
  - III. Explain the mechanism behind this clinical condition 1.5b. Discuss unhappy triad of knee 1.5

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>st</sup> Year MBBS MCQs Module Exam (MSK-II)**

1. Stress relaxation is the characteristic feature of:
  - a. Slow oxidative skeletal muscle fibres
  - b. Smooth muscle
  - c. Cardiac muscle
  - d. Fast oxidative skeletal muscle fibres
  - e. Fast glycolytic skeletal muscle fibres
  
2. The attachment –detachment cycling of the myosin head with the actin filament requires the following chemical change in regulatory protein chains:
  - a. Phosphorylation
  - b. Hydroxylation
  - c. Oxidation
  - d. Methylation
  - e. Carboxylation
  
3. The enzyme important for cessation of smooth muscle contraction is:
  - a. Creatine Kinase
  - b. Myosin phosphatase
  - c. Myosin Light chain kinase
  - d. ATPase
  - e. Hyaluronidase
  
4. The following connections are present between autonomic nerve fibers and multi –unit smooth muscle fibres:
  - a. Gap junctions
  - b. Tight junctions
  - c. Contact junctions
  - d. Desmosomes
  - e. Hemidesmosomes
  
5. Prolonged holding of contractions of smooth muscle is facilitated by:
  - a. Stress Relaxation
  - b. Latch mechanism
  - c. The walk –along mechanism
  - d. Excitation-contraction coupling
  - e. Reverse stress relaxation

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>st</sup> Year MBBS SEQs Module Exam (MSK-II)**

- Q.1 A young male athlete was fond of going to gym for body building. He was using energy drinks and special protein supplements to increase his muscle endurance. He was mainly interested in power lifting exercises.
- a. Which type of skeletal muscle contraction he was doing predominantly? **(1)**
  - b. Name the type of skeletal muscle fibers involved in causing this type of contraction. **(1)**
  - c. Differentiate between the two types of skeletal muscle fibers. **(3)**
- Q.2 A 65-year-old male presented with burning micturition, increased urinary frequency, and nocturia. His Urine R/E showed numerous pus cells and he was diagnosed to be suffering from urinary tract infection.
- a. Name the type of smooth muscle present in the wall of urinary bladder & type of its innervation. **(0.5,0.5)**
  - b. Briefly write about the Latch phenomenon & its significance. **(2,2)**
- Q.3 During postmortem of 38-year-old male the examining doctor observed stiffness of muscles and joints of the deceased.
- a. Name this condition which has been developed after death. **(1)**
  - b. What is the molecular basis of this condition? **(3)**
  - c. What is the medicolegal importance of muscle stiffness after death? **(1)**
- Q.4 A 45-year-old male presented in emergency department of Rawalpindi Institute of Cardiology with severe bradycardia and fainting attack.
- a. Name the normal pacemaker of the heart. **(0.5)**
  - b. Briefly write the molecular mechanism of the normal pacemaker potential. **(3)**
  - c. Draw & label excitatory & conductive system of the heart. **(1.5)**
- Q.5 Draw a flow chart elaborating the excitation-contraction coupling mechanism for skeletal muscle. **(5)**

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**BIOCHEMISTRY DEPARTMENT**  
**1<sup>st</sup> Year MBBS SEQs Module Exam (MSK-II)**

1. Each turn of  $\alpha$ -helix contains the amino acid residues:
  - a. 3.0
  - b. 3.6
  - c. 4.2
  - d. 4.5
  - e. 4.8
2. One of the following proteins is chromoprotein as well as metalloprotein
  - a. Ferritin
  - b. Albumin
  - c. Myoglobin
  - d. Hemoglobin
  - e. Transferrin
3. In protein structure, alpha helix and beta sheets are examples of:
  - a. Primary structure
  - b. Secondary structure
  - c. Tertiary structure
  - d. Quaternary structure
  - e. Protein folding
4. Disulfide bond is formed between sulfhydryl groups of
  - a. Alanine
  - b. Methionine
  - c. Cysteine
  - d. Valine
  - e. Proline

**SEQ**

Q. a. Describe secondary structure of proteins with at least two suitable examples. 03

b. Discuss causes of protein misfolding. 02

**RAWALPINDI MEDICAL UNIVERSITY**  
**1ST YEAR MBBS BIOETHICS MCQs EXAM**

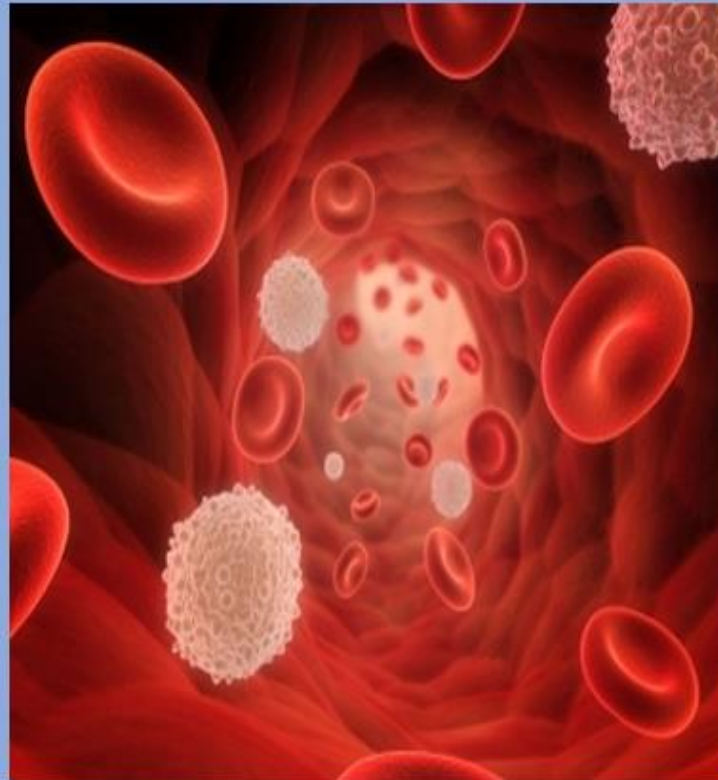
1. ---Includes rules of conduct that may be used to regulate our activities concerning the biological world.
  - a. Bio-piracy
  - b. Biosafety
  - c. Bioethics
  - d. Bio-patents
  - e. Bio-logistic
2. The right of patients having self-decision is called.
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
3. Following is not code of ethics.
  - a. Integrity
  - b. Objectivity
  - c. Confidentiality
  - d. Behaviour
  - e. Autonomy
4. -----in the context of medical ethics, if it's fair and balanced
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
5. -----Principle requiring that physicians provide, positive benefits
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity




**Blood & Immunity Module**

**Study Guide**

**First Year MBBS 2022 - 2023**





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<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>
Additional Director Medical Education, Asst. Director Medical Education,	Curriculum Committee	Vice Chancellor



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## University Moto, Vision, Values & Goals

### RMU Motto



### Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

### Vision and Values

Highly recognized and accredited centre of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

### Goals of the Undergraduate Integrated Modular Curriculum

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of knowledge to help you attain personal and professional growth & excellence.

**First Year MBBS 2023**

**Study Guide**

**Blood and Immunity Module**

## Discipline wise Details of Modular Contents

Block	Subjects	Embryology	Histology	Gross Anatomy	CBL	SDL
II	<ul style="list-style-type: none"> <li>Anatomy</li> </ul>	<ul style="list-style-type: none"> <li>Development of pharyngeal arches</li> <li>Development of spleen</li> <li>Development of thymus</li> </ul>	<ul style="list-style-type: none"> <li>Spleen</li> <li>Thymus</li> <li>Lymph nodes</li> <li>Tonsils</li> </ul>	<p style="text-align: center;">Lower Limb</p> <ul style="list-style-type: none"> <li>Posterior compartment of leg to foot</li> </ul>	<ul style="list-style-type: none"> <li>Ankle sprain</li> <li>Flat foot</li> </ul>	<ul style="list-style-type: none"> <li>Posterior compartment of leg and flexor retinaculum</li> <li>Neurovascular organization of posterior compartment of leg</li> <li>Foot joints</li> <li>Ankle joints</li> <li>Sole of foot</li> <li>Spleen</li> <li>Gait cycle</li> </ul>
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>Plasma Proteins</li> <li>Stages of erythropoiesis &amp; factors affecting erythropoiesis</li> <li>Hemoglobin &amp; Hemoglobinopathies, Iron Metabolism</li> <li>Red cell fragility, ESR &amp; Red cell indices, Anemia &amp; polycythemia</li> <li>Fate of RBCs &amp; Jaundice</li> <li>Types of immunity, Physiology of innate immunity tolerance &amp; auto immunity</li> <li>Physiology of acquired immunity B-Cells</li> <li>Physiology of acquired immunity T-Cells. Allergy and Hypersensitivity reactions, Auto-immune diseases and AIDS</li> <li>Composition of blood &amp; Hemopoiesis</li> <li>WBCs classification &amp; formation. Neutrophils, Eosinophils &amp; Basophils and their properties</li> <li>Platelet formation &amp; function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR</li> <li>Blood coagulation</li> <li>Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)</li> <li>Thromboembolic condition (DVT, Pulmonary Embolism, DIC) Anticoagulant therapy (Heparin, warfarin, Prevention of blood clotting outside the body)</li> <li>Physiological mechanism of temperature regulation</li> <li>Role of Hypothalamus in temperature regulation</li> <li>Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold)</li> <li>ABO &amp; Rh Blood grouping system</li> <li>Rh Blood grouping system and Erythroblastosis fetalis</li> <li>Blood transfusion hazards</li> <li>Tissue and organ transplantations</li> </ul>				
	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>Heme synthesis</li> <li>Porphyria</li> </ul>				



	<ul style="list-style-type: none"> <li>• Breakdown of hemoglobin</li> <li>• Jaundice</li> <li>• Blood</li> <li>• Structure of hemoglobin and myoglobin</li> <li>• Types of Hemoglobin</li> <li>• Oxygen dissociation curve.</li> <li>• Abnormalities in Hemoglobin.</li> <li>• Hemoglobinopathies</li> <li>• Plasma proteins</li> <li>• Acute phase proteins &amp; Albumin</li> <li>• Haptoglobin and transferrin.</li> <li>• Ferritin and hemosiderin</li> <li>• Ceruloplasmin.</li> <li>• Antiproteases and amyloidosis</li> <li>• Immunoglobulins</li> <li>• AIDs</li> <li>• Folic acid.</li> <li>• Vitamin B12</li> <li>• Iron</li> </ul>
<ul style="list-style-type: none"> <li>• Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>• Activity I</li> <li>• Activity II</li> <li>• Activity III</li> </ul>
<ul style="list-style-type: none"> <li>• Research Club Activity (IUGRC)</li> </ul>	<ul style="list-style-type: none"> <li>• Student practical session no 3</li> </ul>
<ul style="list-style-type: none"> <li>• Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>• Approach to a Patient Aneamia</li> </ul>
<ul style="list-style-type: none"> <li>• Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>• The Holy Quran Translation Component</li> </ul>
<ul style="list-style-type: none"> <li>• Vertical Integration</li> </ul>	<ul style="list-style-type: none"> <li>• Clinically content relevant to Blood &amp; Immunity module</li> <li>• Mediators of Inflammation (Pathology)</li> <li>• Anemia (Medicine)</li> <li>• Jaundice (Medicine)</li> <li>• Rh incompatibility and its significance -immune (Gynae &amp; Obs)</li> </ul>

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## Blood and Immunity Module Team

Module Name : Blood and Immunity Module  
 Duration of module : 05 Weeks  
 Coordinator : Dr. Isma Riaz  
 Co-coordinator : Dr. Isma Riaz  
 Reviewed by : Module Committee

Module Committee			Module Task Force Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Isma Riaz (Senior Demonstrator of Biochemistry)
2.	Director DME	Prof. Dr. Rai Muhammad Asghar	2.	DME Focal Person	Dr. Sidra Hamid (Assistant Professor of Physiology)
3.	Convener Curriculum	Prof. Dr. Naeem Akhter	3.	Co-coordinator	Dr. Sajjad Hussain (Senior Demonstrator)
4.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	4.	Co-Coordinator	Dr. Isma Riaz (Senior Demonstrator of Biochemistry)
5.	Additional Director DME	Prof. Dr. Ifra Saeed	5.	Co-coordinator	Dr. Kamil Tahir (Senior Demonstrator of Physiology)
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar			
7.	Chairperson Biochemistry	Dr. Aneela Jamil	DME Implementation Team		
			1.	Director DME	Prof. Dr. Rai Muhammad Asghar
8.	Focal Person Anatomy First Year MBBS	Prof. Dr. Ayesha Yousaf	2.	Implementation Incharge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
9.	Focal Person Physiology	Dr. Sidra Hamid	3.	Deputy Director DME	Dr Shazia Zaib
10.	Focal Person Biochemistry	Dr. Aneela Jamil	4.	Module planner & Implementation coordinator	Dr. Sidra Hamid
11.	Focal Person Pharmacology	Dr. Zunera Hakim	5.	Editor	Muhammad Arslan Aslam
12.	Focal Person Pathology	Dr. Asiya Niazi			
13.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
14.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
15.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar			

## Module IV- Blood and Immunity Module

### Rationale

Blood is a specialized connective tissue that delivers necessary substances such as nutrients and oxygen to the cells and transports metabolic waste products away from those same cells.. Blood accounts for 8% of the human body weight. The average adult has a blood volume of roughly 5 liters, composed of plasma and several kinds of cells (occasionally called corpuscles); these formed elements of the blood are erythrocytes (red blood cells, RBCs), leukocytes (white blood cells), and thrombocytes (platelets). By volume, the red blood cells constitute about 45% of whole blood, the plasma about 54.3%, and white cells about 0.7%.

White blood cells are part of the body's immune system; they destroy and remove old or aberrant cells and cellular debris, as well as attack infectious agents (pathogens) and foreign substances.

The rationale behind is to introduce the students the basic constituents, functions and transport of various substances through blood.

### Module Outcomes

By the end of the module, students will be able to:

#### Knowledge

- This module is expected to build students basic knowledge about normal structure, organization, functions and development of blood and immunity system.
- Used technology based Medical Education including **Artificial Intelligence**
- Appreciate concept and importance of **Biomedical Ethics, Research Family Medicine**

#### Skills

- Demonstrate effective skill for performing and interpreting various laboratory tests like Haemin crystal test.
- Demonstrate awareness of ethical, legal and social implecation of issues related to bioethics.

#### Attitude

- Demonstrate **professional attitude, team-building spirit and good communication specially in small group discussions.**

This module will run in 5 weeks duration. Instructional strategies are given in the time table and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

## SECTION - I

### Terms & Abbreviations

#### Contents

- Domains of Learning
- Teaching and Learning

#### Methodologies/Strategies

- Large Group Interactive Session (LGIS)
- Small Group Discussion (SGD)
- Self-Directed Learning (SDL)
- Case Based Learning (CBL)
- Problem- Based Learning (PBL)
- Skill Labs/Practicals (SKL)

#### Tables & Figures

- Table1. Domains of learning according to Blooms Taxonomy
- Figure 1. Prof Umar's Model of Integrated Lecture
- Table2. Standardization of teaching content in Small Group Discussions
- Table 3. Steps of taking Small Group Discussions
- Figure 2. PBL 7 Jumps Model

**Table1. Domains of Learning According to Blooms Taxonomy**

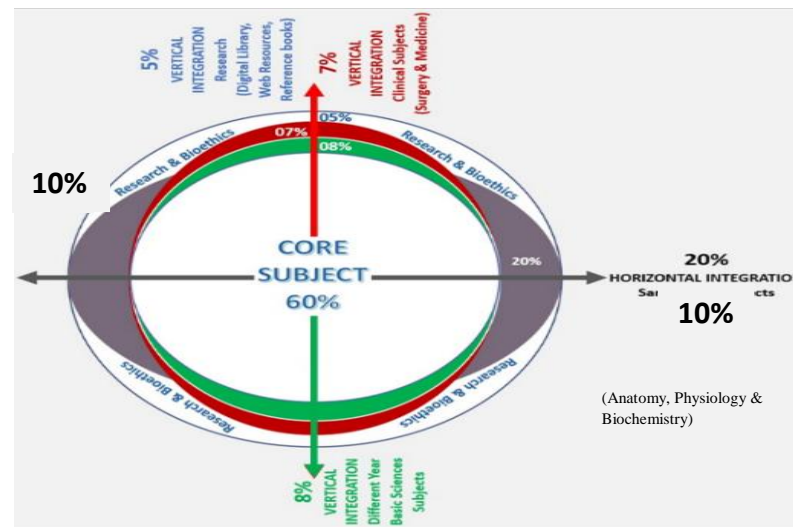
Sr. #	Abbreviation	Domains of learning
1.	C	<b>Cognitive Domain:</b> knowledge and mental skills.
	• C1	Remembering
	• C2	Understanding
	• C3	Applying
	• C4	Analyzing
	• C5	Evaluating
	• C6	Creating
2.	P	<b>Psychomotor Domain:</b> motor skills.
	• P1	Imitation
	• P2	Manipulation
	• P3	Precision
	• P4	Articulation
	• P5	Naturalization
3.	A	<b>Affective Domain:</b> feelings, values, dispositions, attitudes, etc
	• A1	Receive
	• A2	Respond
	• A3	Value
	• A4	Organize
	• A5	Internalize



## Teaching and Learning Methodologies / Strategies

### Large Group Interactive Session (LGIS)

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will be followed for delivery of all LGIS. The lecturer will introduce a topic or common clinical condition and explains the underlying phenomena through questions, pictures, videos of patients, interviews and exercises, etc. Students are actively involved in the learning process.



**Figure 1. Prof Umar's Model of Integrated Lecture**

## Small Group Discussion (SGD)

This format helps students to clarify concepts acquire skills and attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics or power point presentations. Students exchange opinions and apply knowledge gained from lectures, SGDs and self study. The facilitator role is to ask probing questions, summarize and help to clarify the concepts.

**Table 2. Standardization of teaching content in Small Group Discussions**

S. No	Topics	Approximate %
1	Title Of SGD	
2	Learning Objectives from Study Guides	
3	Horizontal Integration	5%+5%=10%
4	Core Concepts of the topic	60%
5	Vertical Integration	20%
6	Related Advance Research points	3%
7	Related Ethical points	2%

**Table 3. Steps of Implementaion of Small Group Discussions**

Step 1	Sharing of Learning objectives by using students Study guides	First 5 minutes
Step 2	Asking students pre-planned questions from previous teaching session to develop co-relation (these questions will be standardized)	5minutes
Step 3	Students divided into groups of three and allocation of learning objectives	5minutes
Step 4	ACTIVITY: Students will discuss the learning objectives among themselves	15 minutes
Step 5	Each group of students will present its learning objectives	20 min
Step 6	Discussion of learning content in the main group	30min
Step 7	Clarification of concept by the facilitator by asking structured questions from learning content	15 min
Step 8	Questions on core concepts	
Step 9	Questions on horizontal integration	
Step 10	Questions on vertical integration	
Step 11	Questions on related research article	
Step 12	Questions on related ethics content	
Step 13	Students Assessment on online MS teams (5 MCQs)	5 min
Step 14	Summarization of main points by the facilitator	5 min
Step 15	Students feedback on the SGD and entry into log book	5 min
Step 16	Ending remarks	

### Self Directed Learning (SDL)

- Self- directed learning is a process where students take primary charge of planning, continuing, and evaluating their learning experiences.
- Time Home assignment
- Learning objectives will be defined
- Learning resources will be given to students = Textbook (page no), web site
- Assessment:
  - i Will be online on LMS (Mid module/ end of Module)
  - ii.OSPE station

### Case Based Learning (CBL)

- It's a learner centered model which engages students in discussion of specific scenarios that typically resemble real world examples.
- Case scenario will be given to the students
- Will engage students in discussion of specific scenarios that resemble or typically are real-world examples.
- Learning objectives will be given to the students and will be based on
  - i. To provide students with a relevant opportunity to see theory in practice
  - ii. Require students to analyze data in order to reach a conclusion.
  - iii. Develop analytic, communicative, and collaborative skills along with content knowledge.

### Problem Based Learning (PBL)

- Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.
- This problem is what drives the motivation and the learning.

The 7- Jump-Format of PBL (Mastricht Medical School)	
Step 7	Synthese & Report
Step 6	Collect Information from outside
Step 5	Generate learning Issues
Step 4	Discuss and Organise Ideas
Step 3	Brainstorming to Identify Explanations
Step 2	Define the Problem
Step 1	Clarify the Terms and Concepts of the Problem Scenario
	Problem- Scenario

Figure 2. PBL 7 Jumps Model

## Practical Sessions/Skill Lab (SKL)

Practical Session/ Skill Lab (SKL)	
Demonstration/ power point presentation 4-5 slide	10-15 minutes
Practical work	25-30 minutes
Write/ draw and get it checked by teacher	20-25 minutes
05 mcqs at the end of the practical	10 minutes
At the end of module practical copy will be signed by head of department	
At the end of block the practical copy will be signed by	
Head of Department	
Dean	
Medical education department	
QEC	

## SECTION – II

### Learning Objectives, Teaching Strategies & Assessments

#### Contents

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry

## Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

### Anatomy Large Group Interactive Session (LGIS)

Topic	At the End of The Session Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
(General Histology) Lymph node	• Classify lymphoid tissue	C2	LGIS	MCQ SAQ VIVA
	• Define diffuse lymphoid tissue, nodular lymphoid tissue and lymphoid organs	C1		
	• Discuss the histological features of lymph node	C2		
	• Enlist functions of lymph node	C1		
	• Understand the supporting elements of lymph node	C2		
	• Describe filtration through lymph node	C2		
	• Discuss importance of high endothelial venules in lymph node	C2		
	• Discuss the clinical correlation of lymph node	C3		
	• How to use digital library	C3		
	• Read a research article	C3		
(General Histology) Thymus & Tonsil	• Describe the location and functions of thymus	C1	LGIS	MCQ SAQ VIVA
	• Enumerate different types of reticuloepithelial cells	C1		
	• Describe microscopic structure of thymus	C2		
	• Compare the histological structure of thymus and other lymphoid organs	C2		
	• Discuss blood thymus barrier	C2		
	• Describe general histological structure of tonsils	C2		
	• Differentiate palatine, lingual, and pharyngeal tonsils histologically	C2		
	• Discuss the clinical correlation of thymus	C3		
	• Read a research article	C3		
	• How to use digital library	C3		
(General Histology) Spleen	• Describe the location and functions of spleen	C2	LGIS	MCQ SAQ VIVA
	• Describe microscopic structure of spleen	C2		
	• Differentiate between red and white pulp of spleen	C2		
	• Discuss blood circulation through spleen	C2		
	• Discuss the clinical correlation of spleen	C3		

	• Read a research article	C3		
	• How to use digital library	C3		
(General Embryology) Development of Pharyngeal arches & pouches	• Define pharyngeal arches and pouches	C1	LGIS	MCQ SAQ VIVA
	• Discuss the components of pharyngeal arches and pouches	C2		
	• Describe the development and fate of each pharyngeal arch and pouches	C2		
	• Discuss the clinical correlation of pharyngeal arches and pouches	C3		
	• Read a research article	C3		
	• How to use digital library	C3		

### Physiology Large Group Interactive Session (LGIS)

Topics	At the end of lecture students should be able to:	Learning Domains	Teaching Strategy	Assessment Tools
Composition of blood & Hemopoiesis	1.Describe composition and general functions of blood 2.Explain the role of bone marrow in hemopoiesis and erythropoiesis 3.Draw steps of hemopoiesis 4. Define committed and uncommitted cells	1.C2 2. C2 3. C3 4. C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Plasma Proteins	1.Enumerate plasma proteins, their properties, sites of production and their functions. 2.Explain effects of deficiency of plasma proteins 3.Discuss conditions associated with decreased production and increased excretion of plasma proteins	C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE



WBCs classification & formation. Neutrophils, Eosinophils & Basophils and their properties	<ol style="list-style-type: none"> <li>1. Enumerate and explain various types of leukocytes and steps of leucopoiesis.</li> <li>2. Explain the characteristics and functions.</li> <li>3. Conditions in which these cells are increased and decreased.</li> <li>4. Leukemias and their effects on the body</li> </ol>	C1/C2 C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Stages of erythropoiesis & factors affecting erythropoiesis	<ol style="list-style-type: none"> <li>1. Elaborate Morphological features of RBCs.</li> <li>2. Describe the stages of production of RBCs.</li> <li>3. Recall Life span of RBCs</li> <li>4. Enumerate and explain factors which affect erythropoiesis.</li> <li>5. Enlist sites of production of erythropoietin</li> <li>6. Describe recombinant erythropoietin.</li> <li>7. Explain mechanism of release and action of erythropoietin</li> </ol>	C2 C1 C1 C2 C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Monocytes - macrophage system & lymphocytes	<ol style="list-style-type: none"> <li>1. Explain the characteristics and functions of monocytes.</li> <li>2. Explain monocyte-macrophage system; importance</li> </ol>	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Hemoglobin & Hemoglobinopathies, Iron Metabolism	<ol style="list-style-type: none"> <li>1. Discuss details about iron metabolism in body including iron absorption and storage.</li> <li>2. Understand the structure, synthesis and functions of hemoglobin and its types.</li> <li>3. Enlist different types of hemoglobinopathies</li> </ol>	C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Process of inflammation and Lines of defense during inflammation	<ol style="list-style-type: none"> <li>1. Describe the role of neutrophils and monocytes in inflammation.</li> <li>2. Elaborate Lines of defense</li> </ol>	1.C1, C2 2. C1, C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Red cell fragility, ESR & Red cell indices, Anemia & polycythemia	<ol style="list-style-type: none"> <li>1. Define RBC fragility; importance; conditions in which fragility is changed.</li> <li>2. Discuss various blood indices, give their formulae, correlated with different types of anemias.</li> <li>3. Enumerate various types of anemias and polycythemias.</li> <li>4. Discuss details about various types of anemias and polycythemia and their effect on circulatory system.</li> </ol>	C1 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Platelet formation & function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)	<ol style="list-style-type: none"> <li>1. Explain thrombocytopoiesis.</li> <li>2. Describe functions of platelets</li> <li>3. Define hemostasis.</li> <li>4. Explain steps of hemostasis</li> </ol>	C2 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Fate of RBCs & Jaundice	<ol style="list-style-type: none"> <li>1. Give life span of RBCs and explain their destruction.</li> <li>2. Describe various types, compare and differentiate between various types of jaundice</li> </ol>	C1, C2 C1, C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Blood coagulation	<ol style="list-style-type: none"> <li>1. Explain hemostasis, mechanism of blood coagulation, fibrinolysis and anticoagulants</li> </ol>	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Types of immunity, Physiology of innate immunity tolerance & auto immunity	<ol style="list-style-type: none"> <li>1. Define immunity and its types.</li> <li>2. Compare and contrast innate and acquired immunity.</li> <li>3. Difference between passive and active immunity</li> </ol>	C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)	<ol style="list-style-type: none"> <li>1. Explain Intravascular coagulation.</li> <li>2. Discuss Bleeding disorders.</li> <li>3. Enlist Types of hemophilia</li> </ol>	1.C2 2.C2 3. C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Physiology of acquired immunity B-Cells	<ol style="list-style-type: none"> <li>1. Enumerate various types of lymphocytes</li> <li>2. Discuss their important characteristics and</li> <li>3. Explain the mechanism of preprocessing</li> </ol>	C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Thromboembolic condition (DVT, Pulmonary Embolism, DIC) Anticoagulant therapy (Heparin, warfarin, Prevention of blood clotting outside the body)	<ul style="list-style-type: none"> <li>• Discuss different Thromboembolic Conditions</li> <li>• Explain Pulmonary Embolism and clinical correlation <ul style="list-style-type: none"> <li>• Enlist different Anticoagulant therapy</li> </ul> </li> </ul>	C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Physiology of acquired immunity T-Cells. Allergy and Hypersensitivity reactions, Auto-immune diseases and AIDS	<ol style="list-style-type: none"> <li>1. Define clone and explain the roles of T and B lymphocyte clones in immunity</li> <li>2. Discuss the mechanisms involved in Immune Tolerance</li> <li>3. Compare Type I and Type IV hypersensitivity reactions</li> <li>4. Describe the process of immunization</li> <li>5. Understand role of T-lymphocytes in transplants</li> <li>6. Identify different types of tissue grafts</li> </ol>	C1, C2 C2 C2 C1 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Physiological mechanism of temperature regulation	<ol style="list-style-type: none"> <li>1. Explain Concept of temperature</li> <li>2. Discuss Physiological mechanism of temperature regulation</li> </ol>	C2 C2	LGIS	MCQ SEQ VIVA VOCE

				MCQ (LMS based Assessment, MST based Assessment) OSPE
ABO & Rh Blood grouping system	<ol style="list-style-type: none"> <li>1. Enlist Blood group and its types</li> <li>2. Explain Rh Blood Grouping System</li> </ol>	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Role of Hypothalamus in temperature regulation	<ol style="list-style-type: none"> <li>1. Discuss Role of Hypothalamus in temperature regulation</li> <li>2. Explain Temperature Regulating centers</li> </ol>	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Rh Blood grouping system and Erythroblastosis fetalis	<ol style="list-style-type: none"> <li>1. Discuss Rh Blood Grouping System</li> <li>2. Explain Erythroblastosis fetalis</li> <li>3. Discuss Clinical correlation</li> </ol>	C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold)	<ol style="list-style-type: none"> <li>1. Discuss Disorders of temperature regulation</li> <li>2. Explain Concept of Fever</li> <li>3. Clinical correlation Of Heat Stroke</li> </ol>	1.C2 2.C2 3.C3	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

<p>Blood transfusion hazards. Tissue and organ transplantations</p>	<ol style="list-style-type: none"> <li>1. Discuss Blood transfusion hazards.</li> <li>2. Explain Effect of blood transfusion on various organs</li> <li>3. Explain Tissue and organ transplantations</li> </ol>	<p>C2 C2 C2</p>	<p>LGIS</p>	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE</p>
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### Biochemistry Large Group Interactive Session (LGIS)

Topics	At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Blood	• Enlist various functions performed by blood.	C1	LGIS	MCQs SAQs
	• Describe Composition of blood.	C2		
Structure of hemoglobin and myoglobin	• Describe Structure of hemoglobin	C2	LGIS	MCQs SAQs
	• Describe structure of myoglobin.	C2		
	• Discuss Biochemical roles of hemoglobin and myoglobin.	C2		
Types of Hemoglobin	• Enlist various types of Hemoglobin.	C1	LGIS	MCQs SAQs
	• Describe Importance of heme and globin components	C2		
	• Interpret importance of HbA1c in diagnosis of Diabetes	C3		
Oxygen dissociation curve.	• Discuss Importance of oxygen dissociation curve.	C2	LGIS	MCQs SAQs
	• Enlist various factors affecting the curve.	C1		
Abnormalities in Hemoglobin.	• Elaborate congenital abnormalities in structure of Hemoglobin.	C2	LGIS	MCQs SAQs
	• Enlist Structural defects of hemoglobin	C1		
	• Discuss Preventive measures.	C2		
Hemoglobinopathies	• Discuss hemoglobinopathies.	C2	LGIS	MCQs SAQs
	• Enlist Types of thalassemia.	C1		
	• Discuss Familial counseling.	C2		
	• Elaborate Preventive measures.	C2		
Heme synthesis	• Describe enzymatic regulation of heme synthesis	C2	LGIS	MCQs SAQs
Porphyria	• Discuss various types of porphyria	C2		
Breakdown of hemoglobin	• Elaborate steps in the breakdown of hemoglobin.	C2	LGIS	MCQs SAQs
	• Describe Steps in synthesis of Bilirubin	C2		
Jaundice.	• Recall Normal level of S. Bilirubin.	C1	LGIS	MCQs SAQs
	• Define jaundice.	C1		
	• Recall normal level of Bilirubin	C1		
	• Enlist types of Jaundice.	C1		
	• Describe Biochemical tests to distinguish various types of jaundice.	C2	LGIS	

	• . Describe Physiological Jaundice	C2		
Plasma proteins	• Describe plasma proteins.	C2	LGIS	MCQs SAQs
	• Discuss Biochemical role of various plasma proteins.	C2		
	• Recall normal levels of plasma proteins	C1		
	• Illustrate Role of A/G ratio.	C3		
Acute phase proteins & Albumin	• Enlist various proteins raise in inflammation.	C1	LGIS	MCQs SAQs
	• Describe Role of albumin.	C2		
	• Discuss Role of C- reactive protein.	C2		
Haptoglobin and transferrin	• Describe Structure of Haptoglobin and transferrin.	C2	LGIS	MCQs SAQs
	• Discuss biochemical Role of Haptoglobin and transferrin.	C2		
Ferritin and hemosiderin	• Describe biochemical role of ferritin and hemosiderin.	C2	LGIS	MCQs SAQs
	• Describe Hemosiderosis.	C2		
Ceruloplasmin.	• Describe biochemical role of ceruloplasmin.	C2	LGIS	MCQs SAQs
	• Discuss Wilson's disease.	C2		
Iron	• Recall Sources of iron.	C1	LGIS	MCQs SAQs
	• Describe Transport and absorption of iron.	C2		
	• Discuss hyper and hypo functions of iron.	C2		
Immunoglobulins	• Describe Structure of Immunoglobulin.	C2	LGIS	MCQs SAQs
	• Discuss biochemical role of various Immunoglobulin.	C2		
	• Elaborate Class switching.	C2		
AIDs	• Define AIDs	C1	LGIS	MCQs SAQs
	• Describe Immunological defects in AIDs.	C2		
	• Discuss various preventive measures.	C2		
Folic acid.	• Recall Sources of folic acid.	C1	LGIS	MCQs SAQs
	• Discuss deficiency effects of folic acid	C2		
	• Describe biochemical role of folic acid.	C2		
	• Recall Recommended Dietary allowance.	C1		
Vitamin B12	• Recall Sources of Vitamin B12	C1	LGIS	MCQs SAQs
	• Describe biochemical role of vitamin B12	C2		
	• Discuss Deficiency effects of B12	C2		

### Anatomy Small Group Discussion (SGDs)

Topic	At the End Of The Session Students Should Be Able To:	Learning Domains	Teaching Strategy	Assessment Tools
Posterior Compartment of Leg (muscles) and flexor retinaculum	• Illustrate cutaneous innervation	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe superficial fascia & deep fascia.	C2		
	• Discuss superficial and deep muscle groups in posterior compartment	C2		
	• Tabulate origin, insertion, nerve supply and action of all muscles of posterior compartment of leg	C2		
	• Discuss ruptured calcaneal tendon, calcaneal bursitis and accessory soleus muscle	C3		
	• How to use digital library	C3		
	• Read a research article	C3		
Posterior Compartment of Leg (Neurovascular organization)	• Describe origin, course relations, branches and tributaries of neurovascular bundle	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss superficial veins i.e long and short saphenous veins	C2		
	• Palpate the posterior tibial pulse	C3		
	• Discuss clinical correlation related to venous return in leg	C3		
	• How to use digital library	C3		
	• Read a research article	C3		
Bones of Foot	• Enumerate the bones of foot	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Identify different bones of foot	C1		
	• Discuss bony features and muscle attachment	C2		
	• Discuss fracture of metatarsals and os trigonum, avascular necrosis of head of talus	C3		
	• Read a research article	C3		
	• How to use a digital library	C3		
Dorsum of foot	• Tabulate muscle on the dorsal aspect of foot	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe blood supply and nerve supply	C2		
	• Discuss cutaneous innervation of dorsum of foot	C2		
	• Palpate the dorsalis pedis artery on dorsum of foot	C3		
	• Discuss other clinicals related to the dorsum of the foot	C3		
	• Read a research article	C3		



	• How to use a digital library	C3		
Ankle Joint	• Describe the articular surfaces of ankle joint	C2	Skill Lab	MCQ SAQ VIVA OSPE
	• Describe the attachment of capsule	C2		
	• Enumerate the ligaments	C1		
	• Discuss the movements possible at ankle joint and muscles producing them	C2		
	• Discuss ankle sprain	C3		
	• Discuss different types of ankle injuries	C3		
	• Read a research article	C3		
	• How to use a digital library	C3		
Joints of Foot	• Classify the joints of foot	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss the articular surfaces, joint capsules, ligaments, movements and muscles producing movements	C2		
	• Discuss major ligaments in detail	C2		
	• Discuss tibial nerve entrapment	C3		
	• Discuss club foot, claw foot and other clinical conditions	C3		
	• Read a research article	C3		
	• How to use a digital library	C3		
Sole of foot (Muscles)	• Identify Surface landmarks	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe cutaneous innervation of sole of foot	C2		
	• Describe Plantar aponeurosis its attachments	C2		
	• Discuss flexor retinaculum	C2		
	• Discuss muscles in different layers of foot with origin, insertion, nerve supply and actions	C2		
	• Read a research article	C3		
	• How to use a digital library	C3		
Sole of foot (Neurovascular Organization)	• Enlist nerves and arteries present in sole of foot	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss route and relations of neurovascular bundle in sole of foot	C2		
	• Describe the formation of vascular arches of foot along with clinicals	C2, C3		
	• Discuss plantar fasciitis	C3		
	• Discuss other clinical correlations	C3		
	• Read a research article	C3		
	• How to use a digital library	C3		

Arches of Foot and Gait Cycle	• Classify the arches of foot	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe different components of arches of foot	C2		
	• Discuss stability factors of arches of foot	C2		
	• Discuss pes planus (flat foot), club foot and other clinicals	C3		
	• Discuss gait cycle and its stages	C2		
	• Read a research article	C3		
	• How to use a digital library	C3		
Thymus, Tonsils	• Describe location of thymus and tonsils	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss anatomical features of thymus and tonsils	C2		
	• Describe blood supply, venous drainage and lymphatic drainage of thymus and tonsils	C2		
	• Enumerate functions of thymus and tonsils	C1		
	• Discuss clinical correlations of thymus and tonsils	C3		
	• Read a research article	C3		
	• How to use a digital library	C3		
Spleen	• Discuss the location of spleen	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Enumerate anatomical relations of spleen	C1		
	• Discuss blood supply, venous drainage and lymphatic drainage of spleen	C2		
	• Discuss clinical correlations of spleen with special reference to splenectomy	C3		
	• Read a research article	C3		
	• How to use a digital library	C3		
Radiology and Surface Marking	• Identify different structures on radiographs	C3	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Demonstrate the surface anatomy of various structures present in posterior compartment of leg and foot	P		
	• Demonstrate the surface anatomy of spleen, thymus and tonsils	P		

### Physiology Small Group Discussion (SGDs)

Topics	At the end of discussion students should be able to:	Learning Domains	Teaching Strategy	Assessment Tools
Functions & composition of blood, Hemopoiesis and Bone marrow	<ol style="list-style-type: none"> <li>1. Describe composition and general functions of blood</li> <li>2. Explain the role of bone marrow in hemopoiesis and erythropoiesis</li> <li>3. Draw steps of hemopoiesis</li> <li>4. Define committed and uncommitted cells</li> <li>5. Correlate basic knowledge with clinical application</li> </ol>	<ol style="list-style-type: none"> <li>1. C2</li> <li>2. C2</li> <li>3. C3</li> <li>4. C1</li> <li>5. C3</li> </ol>	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Hemoglobin & Hemoglobinopathies, Iron Metabolism	<ol style="list-style-type: none"> <li>1. Discuss details about iron metabolism in body including iron absorption and storage</li> <li>2. Understand the structure, synthesis and functions of hemoglobin and its types</li> <li>3. Enlist different types of hemoglobinopathies</li> <li>4. Correlate basic knowledge with clinical application</li> </ol>	<ol style="list-style-type: none"> <li>C2</li> <li>C2</li> <li>C1</li> <li>C3</li> </ol>	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Platelet formation & function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)	<ol style="list-style-type: none"> <li>1. Explain thrombocytopenia</li> <li>2. Describe functions of platelets</li> <li>3. Define hemostasis</li> <li>4. Explain steps of hemostasis</li> <li>5. Correlate basic knowledge with clinical application</li> </ol>	<ol style="list-style-type: none"> <li>C2</li> <li>C2</li> <li>C1</li> <li>C2</li> <li>C3</li> </ol>	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Physiological mechanism of temperature regulation	<ol style="list-style-type: none"> <li>1. Explain Concept of temperature</li> <li>2. Discuss Physiological mechanism of temperature regulation</li> <li>3. Correlate basic knowledge with clinical application</li> </ol>	<ol style="list-style-type: none"> <li>C2</li> <li>C2</li> <li>C3</li> </ol>	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
	<ol style="list-style-type: none"> <li>1. Elaborate Morphological features of RBCs</li> <li>2. Describe the stages of production of RBCs</li> </ol>	<ol style="list-style-type: none"> <li>C2</li> <li>C1</li> </ol>		MCQ

Stages of Erythropoiesis Factors Affecting Erythropoiesis (First week)	<ol style="list-style-type: none"> <li>3. Recall Life span of RBCs</li> <li>4. Enumerate and explain factors which affect erythropoiesis</li> <li>5. Enlist sites of production of erythropoietin</li> <li>6. Describe recombinant erythropoietin</li> <li>7. Explain mechanism of release and action of erythropoietin</li> </ol>	<p>C1 C2 C1 C2 C2</p>	SGD	<p>SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE</p>
Physiology of WBC (third week)	<ol style="list-style-type: none"> <li>1. Enumerate and explain various types of leukocytes and steps of leucopoiesis</li> <li>2. Explain the characteristics and functions</li> <li>3. Conditions in which these cells are increased and decreased</li> <li>4. Leukemias and their effects on the body</li> </ol>	<p>C1/C2 C2 C2 C2</p>	SGD	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE</p>
Physiology of platelets (Fourth week)	<ol style="list-style-type: none"> <li>1. Explain thrombocytopenia</li> <li>2. Describe functions of platelets</li> <li>3. Define hemostasis</li> <li>4. Explain steps of hemostasis</li> </ol>	<p>C2 C2 C1 C2</p>	SGD	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE</p>
Blood transfusion hazards. Tissue and organ transplantations (Fifth week)	<ol style="list-style-type: none"> <li>1. Discuss Blood transfusion hazards.</li> <li>2. Explain Effect of blood transfusion on various organs</li> <li>3. Explain Tissue and organ transplantations</li> </ol>	<p>C2 C2 C2</p>	SGD	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE</p>
Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold) (Fifth week)	<ol style="list-style-type: none"> <li>1. Discuss Disorders of temperature regulation</li> <li>2. Explain Concept of Fever</li> <li>3. Clinical correlation Of Heat Stroke</li> </ol>	<p>1.C2 2.C2 3.C3</p>	SGD	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE</p>

### Biochemistry Small Group Discussion (SGDs)

Topic	At the End of Tutorial Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Blood	• Explain structure and biomedical role of hemoglobin & Myoglobin	C2	SGD	MCQs, SAQs Viva
	• Describe oxygen dissociation curve and its significance.	C2		
	• Types of Hb	C1		
Iron	• Describe sources, structure, Biochemical role and related diseases of iron.	C2	SGD	MCQs, SAQs Viva

## Anatomy Self-Directed Learning (SDL)

Topics	Learning objectives	Learning Resources
Posterior compartment of leg and flexor retinaculum	<ul style="list-style-type: none"> <li>• Illustrate cutaneous innervation</li> <li>• Describe superficial fascia &amp; deep fascia.</li> <li>• Discuss superficial and deep muscle groups in posterior compartment</li> <li>• Tabulate origin, insertion, nerve supply and action of all muscles of posterior compartment of leg</li> <li>• Discuss ruptured calcaneal tendon, calcaneal bursitis and accessory soleus muscle</li> </ul>	<ul style="list-style-type: none"> <li>• Clinically Oriented Anatomy 9th Edition, <b>pg no.755</b></li> <li>• <a href="https://www.youtube.com/watch?v=Bj4c7wGdIwc&amp;pp=ygUTY29tcGFydG1lbnRzIG9mIGxlZw%3D%3D">https://www.youtube.com/watch?v=Bj4c7wGdIwc&amp;pp=ygUTY29tcGFydG1lbnRzIG9mIGxlZw%3D%3D</a></li> <li>• <a href="https://www.sciencedirect.com/science/article/abs/pii/S1440244004800343">https://www.sciencedirect.com/science/article/abs/pii/S1440244004800343</a></li> <li>•</li> </ul>
Neurovascular organization of posterior compartment of leg	<ul style="list-style-type: none"> <li>• Describe origin, course relations, branches and tributaries of neurovascular bundle</li> <li>• Discuss superficial veins i.e long and short saphenous veins</li> <li>• Palpate the posterior tibial pulse</li> <li>• Discuss clinical correlation related to venous return in leg</li> </ul>	<ul style="list-style-type: none"> <li>• Clinically Oriented Anatomy 9th Edition, <b>pg no. 755</b></li> <li>• <a href="https://www.youtube.com/watch?v=Bj4c7wGdIwc&amp;pp=ygUTY29tcGFydG1lbnRzIG9mIGxlZw%3D%3D">https://www.youtube.com/watch?v=Bj4c7wGdIwc&amp;pp=ygUTY29tcGFydG1lbnRzIG9mIGxlZw%3D%3D</a></li> <li>• <a href="https://www.mdpi.com/2077-0383/11/21/6448">https://www.mdpi.com/2077-0383/11/21/6448</a></li> </ul>
Foot Joints	<ul style="list-style-type: none"> <li>• Classify the joints of foot</li> <li>• Discuss the articular surfaces, joint capsules, ligaments, movements and muscles producing movements</li> <li>• Discuss major ligaments in detail</li> <li>• Discuss tibial nerve entrapment</li> <li>• Discuss club foot, claw foot and other clinical conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Clinically Oriented Anatomy 9th Edition, <b>pg no. 808</b></li> <li>• <a href="https://www.youtube.com/watch?v=Ex9KzkAYN-8&amp;pp=ygUKZm9vdCBqb2ludA%3D%3D">https://www.youtube.com/watch?v=Ex9KzkAYN-8&amp;pp=ygUKZm9vdCBqb2ludA%3D%3D</a></li> <li>• <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3180294/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3180294/</a></li> </ul>
Ankle joint	<ul style="list-style-type: none"> <li>• Describe the attachment of capsule</li> <li>• Enumerate the ligaments</li> <li>• Discuss the movements possible at ankle joint and muscles producing them</li> <li>• Discuss ankle sprain</li> <li>• Discuss different types of ankle injuries</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Clinically Oriented Anatomy 9th Edition, <b>pg no. 806</b></li> <li>• <a href="https://www.youtube.com/watch?v=Ex9KzkAYN-8&amp;pp=ygUKZm9vdCBqb2ludA%3D%3D">https://www.youtube.com/watch?v=Ex9KzkAYN-8&amp;pp=ygUKZm9vdCBqb2ludA%3D%3D</a></li> <li>• <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3414868/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3414868/</a></li> </ul>

Sole of foot	<ul style="list-style-type: none"> <li>• Identify Surface landmarks</li> <li>• Describe cutaneous innervation of sole of foot</li> <li>• Describe Plantar aponeurosis its attachments</li> <li>• Discuss flexor retinaculum</li> <li>• Discuss muscles in different layers of foot with origin, insertion, nerve supply and actions</li> </ul>	<ul style="list-style-type: none"> <li>• Clinically Oriented Anatomy 9th Edition, <b>pg no. 768-781</b></li> <li>• <a href="https://www.youtube.com/watch?v=JorGDBbPzI&amp;pp=ygUcc29sZSBvZiBmb290IGFuYXRvbXkgbGVjdHVyZQ%3D%3D">https://www.youtube.com/watch?v=JorGDBbPzI&amp;pp=ygUcc29sZSBvZiBmb290IGFuYXRvbXkgbGVjdHVyZQ%3D%3D</a></li> <li>• <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311689/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311689/</a></li> </ul>
Spleen	<ul style="list-style-type: none"> <li>• Discuss the location of spleen</li> <li>• Enumerate anatomical relations of spleen</li> <li>• Discuss blood supply, venous drainage and lymphatic drainage of spleen</li> <li>• Discuss clinical correlations of spleen with special reference to splenectomy</li> </ul>	<ul style="list-style-type: none"> <li>• Clinically Oriented Anatomy 9th Edition, <b>pg no. 487</b></li> <li>• <a href="https://www.youtube.com/watch?v=3K5I6MMDA8M&amp;pp=ygUOc3BsZWVuIGFuYXRvbXk%3D">https://www.youtube.com/watch?v=3K5I6MMDA8M&amp;pp=ygUOc3BsZWVuIGFuYXRvbXk%3D</a></li> <li>• <a href="https://www.sciencedirect.com/science/article/pii/S0046817782802232">https://www.sciencedirect.com/science/article/pii/S0046817782802232</a></li> </ul>
Gait cycle	<ul style="list-style-type: none"> <li>• Define the gait cycle</li> <li>• Discuss the stages of gait cycle</li> </ul>	<ul style="list-style-type: none"> <li>• Clinically Oriented Anatomy 9th Edition, <b>pg no. 701, 768-781</b></li> <li>• <a href="https://www.youtube.com/watch?v=1u6d1CX7o9c&amp;pp=ygUXZ2FpdCBjeWNsZSBiaW9tZWNoYW5pY3M%3D">https://www.youtube.com/watch?v=1u6d1CX7o9c&amp;pp=ygUXZ2FpdCBjeWNsZSBiaW9tZWNoYW5pY3M%3D</a></li> <li>• <a href="https://www.sciencedirect.com/topics/engineering/gait-cycle">https://www.sciencedirect.com/topics/engineering/gait-cycle</a></li> </ul>

### Physiology Self-Directed Learning (SDL)

Topics Of SDL	Learning Objectives	Learning Resources
<p style="text-align: center;"><b>ON CAMPUS</b></p> <p>Platelet formation &amp; function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)</p>	<ol style="list-style-type: none"> <li>1. Explain thrombocytopenia</li> <li>2. Describe functions of platelets</li> <li>3. Define hemostasis                             <ul style="list-style-type: none"> <li>• Explain steps of hemostasis</li> </ul> </li> </ol>	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition. Section 05, (Chapter 31, Page 564) (Chapter 03, Page 79)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 558)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor’s.13<sup>th</sup> Edition. (Chapter 24, Page 413)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 37, Page 477,487)</li> <li>• <a href="https://my.clevelandclinic.org/health/symptoms/21999-hemostasis">https://my.clevelandclinic.org/health/symptoms/21999-hemostasis</a></li> <li>• <a href="https://www.sciencedirect.com/topics/neuroscience/hemostasis">https://www.sciencedirect.com/topics/neuroscience/hemostasis</a></li> </ul>
<p>Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)</p>	<ol style="list-style-type: none"> <li>1. Explain Intravascular coagulation</li> <li>2. Discuss Bleeding disorders                             <ul style="list-style-type: none"> <li>• Enlist Types of hemophilia</li> </ul> </li> </ol>	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition. Section 05, (Chapter 31, Page 566)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor’s.13<sup>th</sup> Edition. (Chapter 24, page 427)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 37, Page 484)</li> <li>• <a href="https://youtu.be/unp3vGsxIIA">https://youtu.be/unp3vGsxIIA</a></li> <li>• <a href="https://www.hematology.org/education/patients/bleeding-disorders">https://www.hematology.org/education/patients/bleeding-disorders</a></li> </ul>
<p style="text-align: center;"><b>(OFF CAMPUS):</b></p> <p>Composition of blood</p>	<ol style="list-style-type: none"> <li>1.Describe composition and general functions of blood</li> <li>2.Explain the role of bone marrow in hemopoiesis and erythropoiesis</li> <li>3.Draw steps of hemopoiesis</li> <li>• 4. Define committed and uncommitted cells</li> </ol>	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition. Section 05, Cardiovascular Physiology (Chapter 31, Page 553)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 547,548)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor’s.13<sup>th</sup> Edition. Section 03, Blood (Chapter 19, Page 347) (Chapter 20, Page 356)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Red blood cells, Anemia and Polycythemia. Section 06. (Chapter 33, Page 439)</li> <li>1. <a href="https://accessmedicine.mhmedical.com/content.aspx?bookid=3047&amp;sectionid=255121548">https://accessmedicine.mhmedical.com/content.aspx?bookid=3047&amp;sectionid=255121548</a></li> <li>• 2.<a href="https://youtu.be/cm8IK24RRvA">https://youtu.be/cm8IK24RRvA</a></li> </ul>



<p>Function of Plasma Proteins</p>	<p>1.Enumerate plasma proteins, their properties, sites of productions and their functions 2.Explain effects of deficiency of plasma proteins</p> <ul style="list-style-type: none"> <li>3.Discuss conditions associated with decreased production and increased excretion of plasma proteins</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Section 05, Cardiovascular Physiology (Chapter 31, Page 563)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 547)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 03, Blood (Chapter 19, Page 348,353)</li> </ul> <ol style="list-style-type: none"> <li><a href="https://www.ncbi.nlm.nih.gov/books/NBK531504/">https://www.ncbi.nlm.nih.gov/books/NBK531504/</a></li> <li><a href="https://accessmedicine.mhmedical.com/content.aspx?bookid=1366&amp;sectionid=73247095">https://accessmedicine.mhmedical.com/content.aspx?bookid=1366&amp;sectionid=73247095</a></li> </ol>
<p>WBCs classification &amp; formation. Neutrophils, Eosinophils &amp; Basophils and their properties</p>	<p>Enumerate and explain various types of leukocytes and steps of leucopoiesis Explain the characteristics and functions Conditions in which these cells are increased and decreased</p> <ul style="list-style-type: none"> <li>Leukemias and their effects on the body</li> </ul>	<ul style="list-style-type: none"> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Resistance of the body to Infection. Section 06. (Chapter 34, Page 449,456,457)</li> </ul> <ol style="list-style-type: none"> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9777002/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9777002/</a></li> <li><a href="https://youtu.be/TelOcCkZX7c">https://youtu.be/TelOcCkZX7c</a></li> </ol>
<p>Monocytes - macrophage system &amp; lymphocytes</p>	<p>Explain the characteristics and functions of monocytes.</p> <ul style="list-style-type: none"> <li>Explain monocyte-macrophage system; importance</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Section 01, Immunity, Infection and Inflammation (Chapter 03, Page 67)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 03, Blood (Chapter 21, Page 371) (Chapter 22, Page 387)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 450-452)</li> </ul> <ol style="list-style-type: none"> <li><a href="https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system">https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system</a></li> <li><a href="https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4">https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4</a></li> </ol>
<p>Process of inflammation and Lines of defense during inflammation</p>	<ol style="list-style-type: none"> <li>Describe the role of neutrophils and monocytes in inflammation</li> </ol> <ul style="list-style-type: none"> <li>Elaborate Lines of defense</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Section 01, Immunity, Infection and Inflammation (Chapter 03, Page 81)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 03, Blood (Chapter 22, Page 384)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 454)</li> </ul>

		<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/WFm9j1rNkQs">https://youtu.be/WFm9j1rNkQs</a></li> <li>2. <a href="https://en.wikipedia.org/wiki/Inflammation">https://en.wikipedia.org/wiki/Inflammation</a></li> <li>3. <a href="https://www.verywellhealth.com/signs-of-inflammation-4580526">https://www.verywellhealth.com/signs-of-inflammation-4580526</a></li> </ol>
Red cell fragility, ESR & Red cell indices, Anemia & polycythemia	<ol style="list-style-type: none"> <li>1. Define RBC fragility; importance; conditions in which fragility is changed.</li> <li>2. Discuss various blood indices, give their formulae, co-relate with different types of anemias.</li> <li>3. Enumerate various types of anemias and polycythemias. <ul style="list-style-type: none"> <li>• Discuss details about various types of anemias and polycythemia and their effect on circulatory system.</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 05, (Chapter 31, Page 555)</li> <li>2. Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 553)</li> <li>3. Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. (Chapter 23, Page 407,409)</li> <li>4. Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 446,447)</li> </ol> <ol style="list-style-type: none"> <li>1. <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/red-blood-cell-indices">https://www.sciencedirect.com/topics/medicine-and-dentistry/red-blood-cell-indices</a></li> <li>2. <a href="https://youtu.be/QUHqYVK-Nhg">https://youtu.be/QUHqYVK-Nhg</a></li> <li>3. <a href="https://youtu.be/mOrRJBqm744">https://youtu.be/mOrRJBqm744</a></li> </ol>
Blood coagulation	<ul style="list-style-type: none"> <li>• Explain hemostasis, mechanism of blood coagulation, fibrinolysis and anticoagulants</li> </ul>	<ol style="list-style-type: none"> <li>1. Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 559)</li> <li>2. Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. (Chapter 24, Page 417)</li> <li>3. Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Section 06. (Chapter 37, Page 479)</li> </ol> <ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/gExUCrpAKyQ">https://youtu.be/gExUCrpAKyQ</a></li> <li>2. <a href="https://medlineplus.gov/lab-tests/coagulation-factor-tests/">https://medlineplus.gov/lab-tests/coagulation-factor-tests/</a></li> </ol>
ABO & Rh Blood grouping system	<ul style="list-style-type: none"> <li>• Blood group and its types Rh Blood Grouping System</li> </ul>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 05, (Chapter 31, Page 558) (Chapter 36, Page 473)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. (Chapter 25, Page 432)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Section 06. (Chapter 36, Page 471)</li> <li>• <a href="https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/abo-blood-group-system">https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/abo-blood-group-system</a></li> <li>• <a href="https://youtu.be/wfqnuYIY78">https://youtu.be/wfqnuYIY78</a></li> </ul>

## Biochemistry Self-Directed Learning (SDL)

Topics Of SDL	Learning Objectives	Learning resources
Structure of hemoglobin and myoglobin	<ul style="list-style-type: none"> <li>Describe Structure of hemoglobin</li> <li>Describe structure of myoglobin.</li> <li>Discuss Biochemical roles of hemoglobin and myoglobin.</li> </ul>	<ul style="list-style-type: none"> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 03, page 25-28)</li> <li><a href="https://doi.org/10.1016/j.bcmed.2017.10.006">https://doi.org/10.1016/j.bcmed.2017.10.006</a></li> <li><a href="https://www.youtube.com/watch?v=Qv-KExGKAYw">https://www.youtube.com/watch?v=Qv-KExGKAYw</a></li> <li>Use digital library</li> <li><a href="https://chemed.chem.purdue.edu/genchem/topicreview/bp/1biochem/blood3.html">https://chemed.chem.purdue.edu/genchem/topicreview/bp/1biochem/blood3.html</a></li> </ul>
Types of Hemoglobin	<ul style="list-style-type: none"> <li>Enlist various types of Hemoglobin.</li> <li>Describe Importance of heme and globin components</li> <li>Interpret importance of HbA1c in diagnosis of Diabetes</li> </ul>	<ul style="list-style-type: none"> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 03, page 33-34)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/34200315/">https://pubmed.ncbi.nlm.nih.gov/34200315/</a></li> <li><a href="https://www.youtube.com/@DrAishwaryaKelkar">https://www.youtube.com/@DrAishwaryaKelkar</a></li> <li>Use digital library</li> <li><a href="https://www.ucsfhealth.org/medical-tests/hemoglobin-electrophoresis#:~:text=Many%20different%20types%20of%20hemoglobin,have%20small%20amounts%20of%20HbF">https://www.ucsfhealth.org/medical-tests/hemoglobin-electrophoresis#:~:text=Many%20different%20types%20of%20hemoglobin,have%20small%20amounts%20of%20HbF</a></li> </ul>
Oxygen dissociation curve.	<ul style="list-style-type: none"> <li>Discuss Importance of oxygen dissociation curve.</li> <li>Enlist various factors affecting the curve.</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 03, page 28-32)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/2650756/">https://pubmed.ncbi.nlm.nih.gov/2650756/</a></li> <li><a href="https://youtu.be/BYGPkRFvzOc">https://youtu.be/BYGPkRFvzOc</a></li> <li>Use digital library</li> <li><a href="https://www.osmosis.org/learn/Oxygen-hemoglobin_dissociation_curve">https://www.osmosis.org/learn/Oxygen-hemoglobin_dissociation_curve</a></li> </ul>
Hemoglobinopathies	<ul style="list-style-type: none"> <li>Discuss hemoglobinopathies.</li> <li>Enlist Types of thalassemia.</li> <li>Discuss Familial counseling.</li> <li>Elaborate Preventive measures.</li> </ul>	<ul style="list-style-type: none"> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 03, page 35-39)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/30193516/">https://pubmed.ncbi.nlm.nih.gov/30193516/</a></li> <li><a href="https://youtu.be/34u1sOLrgV0">https://youtu.be/34u1sOLrgV0</a></li> <li>Use digital library</li> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3163784/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3163784/</a></li> </ul>
Heme synthesis	<ul style="list-style-type: none"> <li>Describe enzymatic regulation of heme synthesis</li> </ul>	<ul style="list-style-type: none"> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 21, page 277-279)</li> </ul>

		<ul style="list-style-type: none"> <li>• <a href="https://www.sciencedirect.com/science/article/pii/S0891584999002233">https://www.sciencedirect.com/science/article/pii/S0891584999002233</a></li> <li>• Use digital library</li> <li>• <a href="https://www.youtube.com/watch?v=f-0n_eOK4JE">https://www.youtube.com/watch?v=f-0n_eOK4JE</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/29126700/">https://pubmed.ncbi.nlm.nih.gov/29126700/</a></li> </ul>
Porphyria	<ul style="list-style-type: none"> <li>• Discuss various types of porphyria</li> </ul>	<ul style="list-style-type: none"> <li>• Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 21, page 279-281)</li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/20226990/">https://pubmed.ncbi.nlm.nih.gov/20226990/</a></li> <li>• <a href="https://www.mayoclinic.org/diseases-conditions/porphyria/symptoms-causes/syc-20356066#:~:text=Porphyria%20(por%2DFEAR%2De,the%20bodys%20organs%20and%20tissues.">https://www.mayoclinic.org/diseases-conditions/porphyria/symptoms-causes/syc-20356066#:~:text=Porphyria%20(por%2DFEAR%2De,the%20bodys%20organs%20and%20tissues.</a></li> <li>• <a href="https://www.aacc.org/science-and-research/clinical-chemistry-trainee-council/trainee-council-in-english/pearls-of-laboratory-medicine/2012/porphyrias">https://www.aacc.org/science-and-research/clinical-chemistry-trainee-council/trainee-council-in-english/pearls-of-laboratory-medicine/2012/porphyrias</a></li> </ul>
Breakdown of hemoglobin	<ul style="list-style-type: none"> <li>• Elaborate steps in the breakdown of hemoglobin.</li> <li>• Describe Steps in synthesis of Bilirubin</li> <li>• Recall Normal level of S. Bilirubin.</li> </ul>	<ul style="list-style-type: none"> <li>• Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 21, page 282-283)</li> <li>• <a href="https://www.sciencedirect.com/science/article/pii/S0891584999002233">https://www.sciencedirect.com/science/article/pii/S0891584999002233</a></li> <li>• Use digital library</li> <li>• <a href="https://www.youtube.com/watch?v=f-0n_eOK4JE">https://www.youtube.com/watch?v=f-0n_eOK4JE</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/29126700/">https://pubmed.ncbi.nlm.nih.gov/29126700/</a></li> </ul>
Jaundice	<ul style="list-style-type: none"> <li>• Define jaundice.</li> <li>• Recall normal level of Bilirubin.</li> <li>• Enlist types of Jaundice.</li> <li>• Describe Biochemical tests to distinguish various types of jaundice.</li> <li>• Describe Physiological Jaundice</li> </ul>	<ul style="list-style-type: none"> <li>• Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 21, page 284-285)</li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/14765767/">https://pubmed.ncbi.nlm.nih.gov/14765767/</a></li> <li>• <a href="https://www.youtube.com/watch?v=gIACp5js4MU">https://www.youtube.com/watch?v=gIACp5js4MU</a></li> <li>• <a href="https://my.clevelandclinic.org/health/diseases/15367-adult-jaundice">https://my.clevelandclinic.org/health/diseases/15367-adult-jaundice</a></li> </ul>

Plasma proteins	<ul style="list-style-type: none"> <li>• Describe plasma proteins.</li> <li>• Discuss Biochemical role of various plasma proteins.</li> <li>• Recall normal levels of plasma proteins</li> <li>• Illustrate Role of A/G ratio.</li> </ul>	<ul style="list-style-type: none"> <li>• Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 588-589)</li> <li>• <a href="http://ib.bioninja.com.au/options/option-d-human-physiology/d3-functions-of-the-liver/plasma-proteins.html">http://ib.bioninja.com.au/options/option-d-human-physiology/d3-functions-of-the-liver/plasma-proteins.html</a></li> <li>• <a href="https://www.nottingham.ac.uk/nmp/sonet/rlos/bioproc/plasma_proteins/page_three.html">https://www.nottingham.ac.uk/nmp/sonet/rlos/bioproc/plasma_proteins/page_three.html</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/21544836/">https://pubmed.ncbi.nlm.nih.gov/21544836/</a></li> <li>• Use digital library</li> </ul>
Acute phase proteins & Albumin	<ul style="list-style-type: none"> <li>• Describe Role of albumin.</li> <li>• Discuss Role of C- reactive protein.</li> </ul>	<ul style="list-style-type: none"> <li>• Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 590-592)</li> <li>• <a href="https://www.youtube.com/watch?v=xMSEI1ad0z8">https://www.youtube.com/watch?v=xMSEI1ad0z8</a></li> <li>• <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3053509/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3053509/</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/9971870/">https://pubmed.ncbi.nlm.nih.gov/9971870/</a></li> <li>• Use digital library</li> </ul>
Haptoglobin and transferrin	<ul style="list-style-type: none"> <li>• Describe Structure of Haptoglobin and transferrin.</li> <li>• Discuss biochemical Role of Haptoglobin and transferrin.</li> </ul>	<ul style="list-style-type: none"> <li>• Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 592)</li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/23016887/">https://pubmed.ncbi.nlm.nih.gov/23016887/</a></li> <li>• <a href="https://www.youtube.com/watch?v=QR_hcSow4OI">https://www.youtube.com/watch?v=QR_hcSow4OI</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/7027909/">https://pubmed.ncbi.nlm.nih.gov/7027909/</a></li> <li>• Use digital library</li> </ul>
Ferritin and hemosiderin	<ul style="list-style-type: none"> <li>• Describe biochemical role of ferritin and hemosiderin.</li> <li>• Describe Hemosiderosis.</li> </ul>	<ul style="list-style-type: none"> <li>• Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 592-594)</li> <li>• <a href="http://www.vivo.colostate.edu/hbooks/pathphys/topics/ferritin.html">http://www.vivo.colostate.edu/hbooks/pathphys/topics/ferritin.html</a></li> <li>• <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4831249/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4831249/</a></li> <li>• <a href="https://www.forthwithlife.co.uk/blog/whats-the-difference-between-ferritin-and-iron/">https://www.forthwithlife.co.uk/blog/whats-the-difference-between-ferritin-and-iron/</a></li> <li>• Use digital library</li> </ul>

Ceruloplasmin.	<ul style="list-style-type: none"> <li>Describe biochemical role of ceruloplasmin.</li> <li>Discuss Wilson's disease.</li> </ul>	<ul style="list-style-type: none"> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 595-597)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/12055353/">https://pubmed.ncbi.nlm.nih.gov/12055353/</a></li> <li><a href="https://www.youtube.com/watch?v=KCh-7Ghj0jY">https://www.youtube.com/watch?v=KCh-7Ghj0jY</a></li> <li><a href="https://www.mountsinai.org/health-library/tests/ceruloplasmin-blood-test">https://www.mountsinai.org/health-library/tests/ceruloplasmin-blood-test</a></li> <li>Use digital library</li> </ul>
Antiproteases and amyloidosis	<ul style="list-style-type: none"> <li>Describe biochemical role of antiproteases and amyloidosis.</li> </ul>	<ul style="list-style-type: none"> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 597-598)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/31986086/">https://pubmed.ncbi.nlm.nih.gov/31986086/</a></li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/1719439/">https://pubmed.ncbi.nlm.nih.gov/1719439/</a></li> <li><a href="https://www.youtube.com/watch?v=CQ5q3phGdtQ">https://www.youtube.com/watch?v=CQ5q3phGdtQ</a></li> <li>Use digital library</li> </ul>
Immunoglobulins	<ul style="list-style-type: none"> <li>Describe Structure of Immunoglobulin.</li> <li>Discuss biochemical role of various Immunoglobulin.</li> <li>Elaborate Class switching.</li> </ul>	<ul style="list-style-type: none"> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 599-603)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/4188929/">https://pubmed.ncbi.nlm.nih.gov/4188929/</a></li> <li><a href="https://www.youtube.com/watch?v=29mlSMaD-cY">https://www.youtube.com/watch?v=29mlSMaD-cY</a></li> <li><a href="https://medlineplus.gov/lab-tests/immunoglobulins-blood-test/#:~:text=Immunoglobulins%20are%20also%20called%20antibodies,to%20destroy%20only%20those%20germs.">https://medlineplus.gov/lab-tests/immunoglobulins-blood-test/#:~:text=Immunoglobulins%20are%20also%20called%20antibodies,to%20destroy%20only%20those%20germs.</a></li> <li>Use digital library</li> </ul>
AIDs	<ul style="list-style-type: none"> <li>Define AIDs</li> <li>Describe Immunological defects in AIDs.</li> <li>Discuss various preventive measures.</li> </ul>	<ul style="list-style-type: none"> <li>Mushtaq volume II, 7<sup>th</sup> edition (chapter 11 page – 333-338)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/3277764/">https://pubmed.ncbi.nlm.nih.gov/3277764/</a></li> <li><a href="https://www.who.int/news-room/fact-sheets/detail/hiv-aids#:~:text=Acquired%20immunodeficiency%20syndrome%20(AIDS)%20is,tuberculosis%2C%20infections%20and%20some%20cancers.">https://www.who.int/news-room/fact-sheets/detail/hiv-aids#:~:text=Acquired%20immunodeficiency%20syndrome%20(AIDS)%20is,tuberculosis%2C%20infections%20and%20some%20cancers.</a></li> <li><a href="https://www.cdc.gov/hiv/basics/whatishiv.html">https://www.cdc.gov/hiv/basics/whatishiv.html</a></li> <li>Use digital library</li> </ul>

Folic acid.	<ul style="list-style-type: none"> <li>Recall Sources of folic acid.</li> <li>Discuss deficiency effects of folic acid</li> <li>Describe biochemical role of folic acid.</li> <li>Recall Recommended Dietary allowance.</li> </ul>	<ul style="list-style-type: none"> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 28, page 378-379)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/29777755/">https://pubmed.ncbi.nlm.nih.gov/29777755/</a></li> <li><a href="https://www.cdc.gov/ncbddd/folicacid/about.html">https://www.cdc.gov/ncbddd/folicacid/about.html</a></li> <li><a href="https://www.cdc.gov/ncbddd/folicacid/about.html#:~:text=When%20the%20baby%20is%20developing,the%20early%20brain%20and%20spine.">https://www.cdc.gov/ncbddd/folicacid/about.html#:~:text=When%20the%20baby%20is%20developing,the%20early%20brain%20and%20spine.</a></li> <li>Use digital library</li> </ul>
Vitamin B12	<ul style="list-style-type: none"> <li>Recall Sources of Vitamin B12</li> <li>Describe biochemical role of vitamin B12</li> <li>Discuss Deficiency effects of B12</li> </ul>	<ul style="list-style-type: none"> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 28, page 379-381)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/25824066/">https://pubmed.ncbi.nlm.nih.gov/25824066/</a></li> <li><a href="https://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional/">https://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional/</a></li> <li><a href="https://www.youtube.com/watch?v=j-2xHmcKkcy">https://www.youtube.com/watch?v=j-2xHmcKkcy</a></li> <li>Use digital library</li> </ul>
Iron	<ul style="list-style-type: none"> <li>Recall Sources of iron.</li> <li>Describe Transport and absorption of iron.</li> <li>Discuss hyper and hypo functions of iron.</li> </ul>	<ul style="list-style-type: none"> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 29, page 403-404)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/34373750/">https://pubmed.ncbi.nlm.nih.gov/34373750/</a></li> <li><a href="https://www.youtube.com/watch?v=vSkb0kDacjs">https://www.youtube.com/watch?v=vSkb0kDacjs</a></li> <li><a href="https://ods.od.nih.gov/factsheets/Iron-HealthProfessional/">https://ods.od.nih.gov/factsheets/Iron-HealthProfessional/</a></li> <li>Use digital library</li> </ul>

### Histology Practicals Skill Laboratory (SKL)

Topic	At the End of The Session Students Should Be Able To:	Learning Domains	Teaching Strategy	Assessment Tools
Lymph node	• Identify lymph node under microscope	P	Skill Lab	OSPE
	• Focus the slide	P		
	• Draw the histological structure of lymph node	C2		
	• Enlist two identification points of lymph node	C1		
Thymus	• Identify the slide of thymus under light microscope	P	Skill Lab	OSPE
	• Focus the slide	P		
	• Draw the histological structure of thymus	C2		
	• Enlist two identifications points of thymus	C1		
Spleen	• Identify the slide of spleen under light microscope	P	Skill Lab	OSPE
	• Focus the slide	P		
	• Draw histological structure of spleen,	C2		
	• Enlist two identification points of spleen	C1		
Tonsils	• Identify the slide of tonsils under light microscope	P	Skill Lab	OSPE
	• Focus the slide	P		
	• Draw histological structure of tonsils	C2		
	• Write two identification points of tonsils	C1		



### Physiology Practicals Skill Laboratory (SKL)

Topic	Learning Objectives	Learning Domains	Learning Strategy	Assessment Tools
Determination of Rh blood group	<ul style="list-style-type: none"> <li>• Principle</li> <li>• Procedure</li> <li>• Methods</li> <li>• Types of blood groups</li> <li>• Clinical Correlations of blood transfusion</li> </ul>	C1/C3 A3 P3	Practical/ skill lab	Viva Voce OSPE Video Assisted Assessment
Determination of Clotting time (CT)	<ul style="list-style-type: none"> <li>• Procedure</li> <li>• Clinical importance</li> <li>• Recall Normal values</li> </ul>	C1/C3 A3 P3	Practical/ skill lab	Viva Voce OSPE Video Assisted Assessment
Determination of Bleeding time (BT)	<ul style="list-style-type: none"> <li>• Procedure</li> <li>• Clinical importance</li> <li>• Recall Normal values</li> </ul>	C1/C3 A3 P3	Practical/ skill lab	Viva Voce OSPE Video Assisted Assessment
Recording of Body Temperature	<ul style="list-style-type: none"> <li>• Principle</li> <li>• Procedure</li> <li>• Methods</li> <li>• Clinical Correlations</li> </ul>	C1/C3 A3 P3	Practical/ skill lab	Viva Voce OSPE Video Assisted Assessment

### Biochemistry Practical Skill Laboratory (SKL)

Topic	At the End of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Draw of Blood Technique	<ul style="list-style-type: none"> <li>• How to draw blood</li> </ul>	P	Skill Lab	OSPE
Quantitative Estimation of Serum Total Proteins	<ul style="list-style-type: none"> <li>• Perform estimation of serum Protein</li> <li>• Describe Principal, method, normal blood level and clinical significance of S. Proteins</li> </ul>	P	Skill Lab	OSPE
Hemin crystals Technique to draw blood	<ul style="list-style-type: none"> <li>• Describe Preparation, shape and clinical significance of hemin crystals Illustrate Method and precautions to draw blood.</li> </ul>	P	Skill Lab	OSPE
Estimation of S. Bilirubin	<ul style="list-style-type: none"> <li>• Perform estimation of serum bilirubin</li> <li>• Describe Principal, method, normal blood level and clinical significance of S. Bilirubin</li> </ul>	P	Skill Lab	OSPE

## **SECTION - III**

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- **CBLs**
- **Vertical Integration LGIS**
- **Longitudinal Themes**
  - **Biomedical Ethics & Professionalism**
  - **Family Medicine**
  - **Artificial Intelligence (Innovation)**
  - **Integrated Undergraduate Research Curriculum (IUGRC)**

### Case Based Learning Objectives (CBL)

Subjects	Topics	At the end of the session the student should be able to	Learning Domains
Anatomy	• Ankle sprain	Apply basic knowledge of subject to study clinical case.	C3
	• Flat foot	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• Anemia	Apply basic knowledge of subject to study clinical case	C3
Biochemistry	• Thalassemia	Apply basic knowledge of subject to study clinical case.	C3
	• Jaundice	Apply basic knowledge of subject to study clinical case.	C3

### Vertical Integration LGIS

#### Pathology

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Mediators of Inflammation	• Define inflammation	C1	LGIS	MCQ
	• Classify inflammation	C2		
	• Classify mediators of inflammation	C2		
	• Cell derived Plasma derived			
	• Describe general features of mediators of inflammation	C1		

### Medicine

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Jaundice	• Discuss Jaundice.	C2	LGIS	MCQs
	• Discuss various Types and Subtypes of Jaundice.	C2		
	• Discuss the signs and symptoms of a patient with Jaundice due to various Causes.	C2		
	• Discuss the workup for diagnosis of different type of Jaundice	C2		
	• Discuss Treatment of Various Causes of Jaundice.	C2		
	• Discuss the diagnostic workup and treatment.	C2		
	• Define Heat Stroke.	C1		
	• Discuss the clinical Presentation of Heat Stroke.	C2		
• Discuss the diagnostic workup and management.	C2			

### Family Medicine

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Anemia	• Define Anemia.	C1	LGIS	MCQs
	• Discuss various Types and Subtypes of Anemia.	C2		
	• Discuss the signs and symptoms of a patient with Anemia.	C2		
	• Discuss the workup for diagnosis of type of anemia.	C2		
	• Discuss Treatment of Various types of anemia.	C2		

### Obstetrics & Gynecology

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Rh incompatibility and its significance	<ul style="list-style-type: none"> <li>• Know the basic pathophysiology of Rh sensitization</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>• Describe the fetal effects of Rh isoimmunization</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Understand signs of fetal anemia</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Describe role of Anti-D antibodies in prevention of Rh isoimmunization</li> </ul>	C2		

### Biomedical Ethics

Topics	At the end of session students should be able to:	Learning Domains	Teaching Strategy	Assessment Tools
Laboratory Ethics	<p>At the end of the session students should be able to;</p> <ul style="list-style-type: none"> <li>• Understand the importance of taking permission before performing procedures (drawing blood, administering injections etc.) during laboratory sessions. <b>A1</b></li> <li>• Show Respects other health professional team members and complete assigned task in professional manner. <b>A1</b></li> <li>• Employ collaborative negotiation to resolve conflict, anger, confusion and misunderstanding. <b>A2</b></li> </ul>	<p>A1</p> <p>A1</p> <p>A2</p>	<p>Short video demonstration on violation of Ethical principle of autonomy from suit CBEC Video resources</p>	<ul style="list-style-type: none"> <li>• Assignment based assessment involving real life case scenarios under aggregate Marks (Internal Assessment)</li> <li>• Assignment to be uploaded on LMS</li> </ul>

### Integrated Undergraduate Research Curriculum (IUGRC)

Topics	At the end of the session the student should be able to:	Learning Domains	Teaching Strategy	Assessment Tool
Practical session 3	<p>In supervised session, after individual work sharing (PAL) on feedback and work assigned in last session (pr. session 2) on specific areas UEIH-Poster formation, students will be educated more on retrial and review of focused scientific information and extracting the relevant material for Posters: (Los): after this student will be able to</p> <ul style="list-style-type: none"> <li>• Present the individual work assigned before whole group.</li> <li>• Understand more, the techniques used to access, retrieve and review and source of Scientific literature</li> <li>• Make search string and perform literature search using Boolean operators</li> <li>• Access scientific databases and carry out an effective literature review using a number of sources or databases (PubMed).</li> <li>• Hold discussions</li> <li>• Refine their work towards a UEIH-Poster formation</li> </ul>	C3 C3	Activity	MCQs

## SECTION - IV

### Assessment Policies

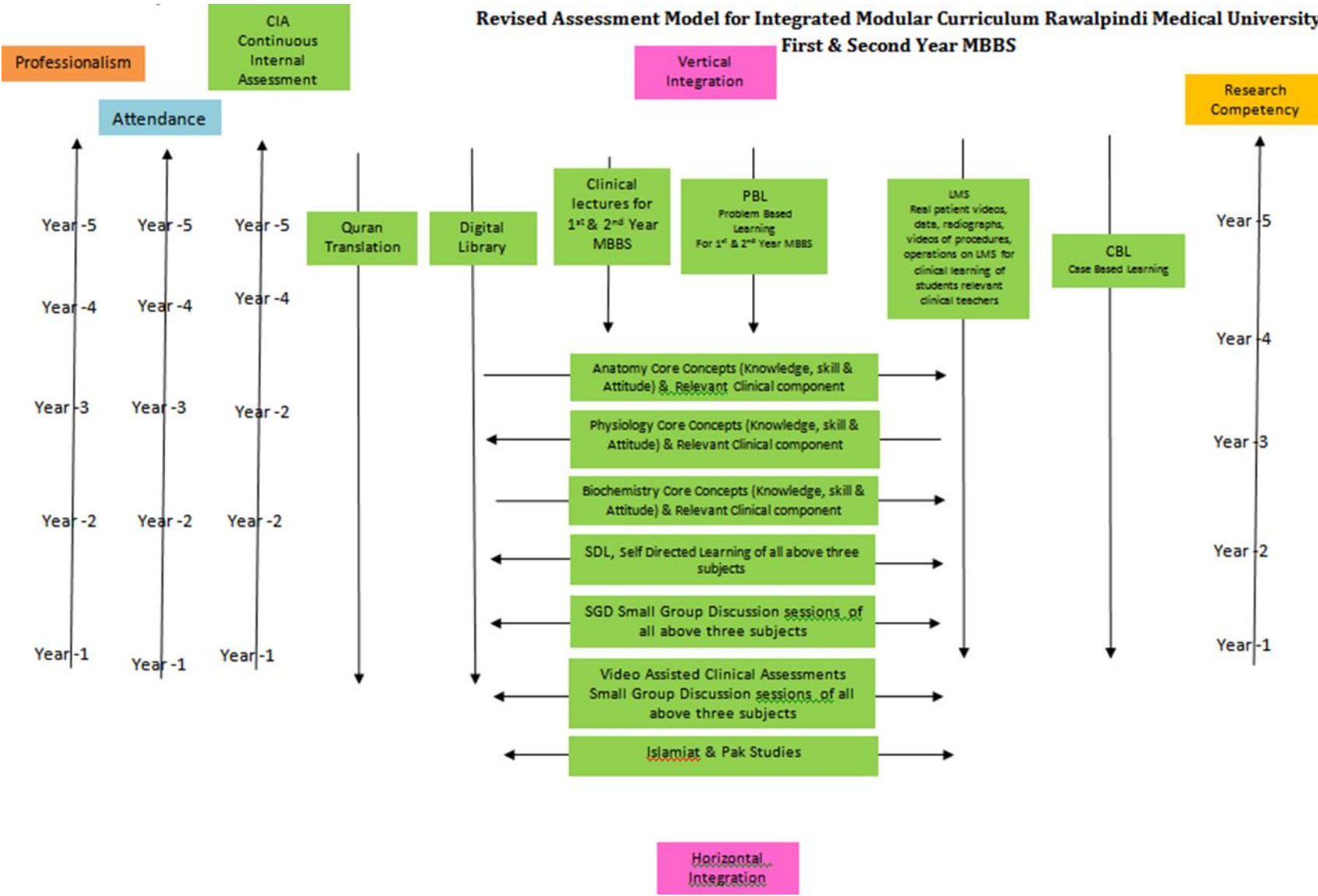
#### Contents

- **Assessment plan**
- **Types of Assessment:**
- **Modular Examinations**
- **Block Examination**
- **Table 4: Assessment Frequency & Time in Blood & Immunity Module**



# Assessment Policies

## Revised Assessment Model for Integrated Modular Curriculum Rawalpindi Medical University First & Second Year MBBS



### Gauge for Continuous Internal Assessment (CIA)

Red Zone	High Alert	Yellow Zone	Green Zone	Excellent	Extra Ordinary
0 - 25%	26 - *50%	51 - 60%	61 - 70%	71 - 80%	81 - 100%

\*50% and above is Passing Marks.

### Gauge for attendance percentage

Red Zone	High Alert	Yellow Zone-1	Yellow Zone-2	Green Zone	Excellent
0 - 25%	26 - 50%	51 - 60%	61 - 74%	*75 - 80%	81 - 100%

90% is eligibility criteria for appearing in professional examination.

## Assessment plan

University has followed the guidelines of Pakistan Medical and Dental Council for assessment. Assessment is conducted at the mid modular, modular and block levels.

### Types of Assessment:

The assessment is formative and summative.

Formative Assessment	Summative Assessment
Formative assessment is taken at modular (2/3 <sup>rd</sup> of the module is complete) level through MS Teams. Tool for this assessment is best choice questions and all subjects are given the share according to their hour percentage.	Summative assessment is taken at the mid modular (LMS Based), modular and block levels.

### Modular Assessment

Theory Paper	Viva Voce
There is a module examination at the end of first module of each block. The content of the whole teaching of the module are tested in this examination. It consists of paper with objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module. (Annexure I attached)	Structured table viva voce is conducted including the practical content of the module.

### Block Assessment

On completion of a block which consists of two modules, there is a block examination which consists of one theory paper and a structured viva with OSPE.

Theory Paper	Block OSPE
There is one written paper for each subject. The paper consists of objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module.	This covers the practical content of the whole block.

**Table 4-Assessment Frequency & Time in Blood and Immunity Module**

Block	Sr #	Module Blood and Immunity Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block-II	1	Mid Module Examinations LMS based (Anatomy, Physiology & Biochemistry)	Summative	30 Minutes	3 Hour 15 Minutes	45 Minutes	2 Formative	6 Summative
	2	Topics of SDL Examination on MS Team	Formative	30 Minutes				
	3	End Module Examinations (SEQ & MCQs Based)	Summative	2 Hours				
	4	Anatomy Structured and Clinically Oriented Viva	Summative	10 Minutes				
	5	Physiology Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	6	Assessment of Clinical Lectures	Formative	15 Minutes				
	7	Assessment of Bioethics Lectures	Summative	2 Minutes				
	8	Assessment of IUGRC Lectures	Summative	10 Minutes				

## Learning Resources

Subjects	Resources
Anatomy	<p>A. Gross Anatomy</p> <ol style="list-style-type: none"> <li>1. Gray's Anatomy by Prof. Susan Standring 42th edition, Elsevier.</li> <li>2. Clinical Anatomy for Medical Students by Richard S. Snell 10<sup>th</sup> edition.</li> <li>3. Clinically Oriented Anatomy by Keith Moore 9<sup>th</sup> edition.</li> <li>4. Cunningham's Manual of Practical Anatomy by G.J. Romanes, 16th edition, Vol-I, II and III</li> </ol> <p>B. Histology</p> <ol style="list-style-type: none"> <li>1. B. Young J. W. Health Wheather's Functional Histology 6<sup>th</sup> edition.</li> <li>2. Medical Histology by Prof. Laiq Hussain 7<sup>th</sup> edition.</li> <li>3. Junqueira's Basic Histology</li> </ol> <p>C. Embryology</p> <ol style="list-style-type: none"> <li>1. Keith L. Moore. The Developing Human 11<sup>th</sup> edition.</li> <li>2. Langman's Medical Embryology 14<sup>th</sup> edition.</li> </ol> <p>D. Website</p> <ol style="list-style-type: none"> <li>1. <a href="https://my.clevelandclinic.org/health/articles/9117-male-reproductive-system">https://my.clevelandclinic.org/health/articles/9117-male-reproductive-system</a></li> <li>2. <a href="https://teachmeanatomy.info/pelvis/female-reproductive-tract/">https://teachmeanatomy.info/pelvis/female-reproductive-tract/</a></li> <li>3. <a href="https://www.kenhub.com/en/start/pelvis-and-perineum">https://www.kenhub.com/en/start/pelvis-and-perineum</a></li> </ol> <p>E. YouTube</p> <ol style="list-style-type: none"> <li>1. <a href="https://www.youtube.com/watch?v=G0ZuCiCu3E">https://www.youtube.com/watch?v=G0ZuCiCu3E</a></li> <li>2. <a href="https://www.youtube.com/watch?v=50iuBgTQCrQ">https://www.youtube.com/watch?v=50iuBgTQCrQ</a></li> </ol> <p>F. HEC Digital Library</p> <ol style="list-style-type: none"> <li>1. <a href="https://www.sciencedirect.com/science/article/pii/S0015028220304350">https://www.sciencedirect.com/science/article/pii/S0015028220304350</a></li> <li>2. <a href="https://link.springer.com/article/10.1007/s11356-021-16581-9">https://link.springer.com/article/10.1007/s11356-021-16581-9</a></li> <li>3. <a href="https://link.springer.com/chapter/10.1007/978-3-030-30766-0_25">https://link.springer.com/chapter/10.1007/978-3-030-30766-0_25</a></li> </ol> <p><a href="https://onlinelibrary.wiley.com/doi/abs/10.1111/and.13712">https://onlinelibrary.wiley.com/doi/abs/10.1111/and.13712</a></p> <ol style="list-style-type: none"> <li>3. <a href="https://www.youtube.com/watch?v=50iuBgTQCrQ">https://www.youtube.com/watch?v=50iuBgTQCrQ</a></li> </ol>

Physiology	<p>A. Textbooks:</p> <ol style="list-style-type: none"> <li>1. Textbook of Medical Physiology by Guyton And Hall. 14th edition.</li> <li>2. Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition</li> </ol> <p>B. Reference Books:</p> <ol style="list-style-type: none"> <li>3. Human Physiology by Lauralee Sherwood 10th edition.</li> <li>4. Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.</li> <li>5. Best &amp; Taylor Physiological Basis of Medical Practice 13th edition.</li> </ol> <p>6. Berne &amp; Levy Physiology 7th edition.</p> <p>C. Website</p> <ol style="list-style-type: none"> <li>1. <a href="https://www.ncbi.nlm.nih.gov/books/NBK531504/">https://www.ncbi.nlm.nih.gov/books/NBK531504/</a></li> <li>2. <a href="https://en.wikipedia.org/wiki/Inflammation">https://en.wikipedia.org/wiki/Inflammation</a></li> <li>3. <a href="https://www.verywellhealth.com/signs-of-inflammation-4580526">https://www.verywellhealth.com/signs-of-inflammation-4580526</a></li> <li>4. <a href="https://www.hematology.org/education/patients/bleeding-disorders">https://www.hematology.org/education/patients/bleeding-disorders</a></li> </ol> <p>D. YouTube</p> <ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/cm8IK24RRvA">https://youtu.be/cm8IK24RRvA</a></li> <li>2. <a href="https://youtu.be/TelOcCkZX7c">https://youtu.be/TelOcCkZX7c</a></li> <li>3. <a href="https://youtu.be/ZLuACVIG77U">https://youtu.be/ZLuACVIG77U</a></li> <li>4. <a href="https://youtu.be/WFm9j1rNkQs">https://youtu.be/WFm9j1rNkQs</a></li> </ol> <p>E. HEC Digital Library</p> <ol style="list-style-type: none"> <li>1. <a href="https://www.sciencedirect.com/science/article/pii/S0006497121070403">https://www.sciencedirect.com/science/article/pii/S0006497121070403</a></li> <li>2. <a href="https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system">https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system</a></li> <li>3. <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/hemoglobinopathy">https://www.sciencedirect.com/topics/medicine-and-dentistry/hemoglobinopathy</a></li> <li>4. <a href="https://www.sciencedirect.com/topics/neuroscience/hemostasis">https://www.sciencedirect.com/topics/neuroscience/hemostasis</a></li> </ol> <p>F. Physiology Journals</p> <ol style="list-style-type: none"> <li>1. <a href="https://accessmedicine.mhmedical.com/content.aspx?bookid=1366&amp;sectionid=73247095">https://accessmedicine.mhmedical.com/content.aspx?bookid=1366&amp;sectionid=73247095</a></li> <li>2. <a href="https://www.msmanuals.com/professional/hematology-and-oncology/anemias-caused-by-hemolysis/overview-of-hemoglobinopathies">https://www.msmanuals.com/professional/hematology-and-oncology/anemias-caused-by-hemolysis/overview-of-hemoglobinopathies</a></li> <li>3. <a href="https://derangedphysiology.com/main/cicm-primary-exam/required-reading/haematological-system/Chapter%2012/structure-function-production-and-fate-red-blood-cells">https://derangedphysiology.com/main/cicm-primary-exam/required-reading/haematological-system/Chapter%2012/structure-function-production-and-fate-red-blood-cells</a></li> <li>4. <a href="https://www.healthline.com/health/thermoregulation">https://www.healthline.com/health/thermoregulation</a></li> </ol>
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Biochemistry	<p>Textbooks</p> <ol style="list-style-type: none"> <li>1. Harper's Illustrated Biochemistry 30th edition.</li> <li>2. Lippincott biochemistry 8<sup>th</sup> edition</li> </ol> <p>B. Reference Books</p> <ol style="list-style-type: none"> <li>1. Lehninger Principle of Biochemistry 8<sup>th</sup> edition.</li> <li>2. Biochemistry by Devlin 7<sup>th</sup> edition.</li> </ol> <p>C. Website</p> <ul style="list-style-type: none"> <li>• <a href="https://chemed.chem.purdue.edu/genchem/topicreview/bp/1biochem/blood3.html">https://chemed.chem.purdue.edu/genchem/topicreview/bp/1biochem/blood3.html</a></li> <li>• <a href="https://www.ucsfhealth.org/medical-tests/hemoglobin-electrophoresis#:~:text=Many%20different%20types%20of%20hemoglobin,have%20small%20amounts%20of%20HbF">https://www.ucsfhealth.org/medical-tests/hemoglobin-electrophoresis#:~:text=Many%20different%20types%20of%20hemoglobin,have%20small%20amounts%20of%20HbF</a></li> <li>• <a href="https://my.clevelandclinic.org/health/diseases/15367-adult-jaundice">https://my.clevelandclinic.org/health/diseases/15367-adult-jaundice</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/23016887/">https://pubmed.ncbi.nlm.nih.gov/23016887/</a></li> <li>• <a href="http://www.vivo.colostate.edu/hbooks/pathphys/topics/ferritin.html">http://www.vivo.colostate.edu/hbooks/pathphys/topics/ferritin.html</a></li> <li>• <a href="https://www.osmosis.org/learn/Oxygen-hemoglobin_dissociation_curve">https://www.osmosis.org/learn/Oxygen-hemoglobin_dissociation_curve</a></li> <li>• <a href="https://www.sciencedirect.com/science/article/pii/S0891584999002233">https://www.sciencedirect.com/science/article/pii/S0891584999002233</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/9971870/">https://pubmed.ncbi.nlm.nih.gov/9971870/</a></li> </ul> <p>D. YouTube</p> <ul style="list-style-type: none"> <li>• <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3163784/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3163784/</a></li> <li>• <a href="https://www.youtube.com/watch?v=f-0n_eOK4JE">https://www.youtube.com/watch?v=f-0n_eOK4JE</a></li> <li>• <a href="https://youtu.be/34u1sOLrgVo">https://youtu.be/34u1sOLrgVo</a></li> <li>• <a href="https://www.aacc.org/science-and-research/clinical-chemistry-trainee-council/trainee-council-in-english/pearls-of-laboratory-medicine/2012/porphyrias">https://www.aacc.org/science-and-research/clinical-chemistry-trainee-council/trainee-council-in-english/pearls-of-laboratory-medicine/2012/porphyrias</a></li> <li>• <a href="https://www.youtube.com/watch?v=gIACp5js4MU">https://www.youtube.com/watch?v=gIACp5js4MU</a></li> <li>• <a href="https://www.nottingham.ac.uk/nmp/sonet/rlos/bioproc/plasma_proteins/page_three.html">https://www.nottingham.ac.uk/nmp/sonet/rlos/bioproc/plasma_proteins/page_three.html</a></li> <li>• <a href="https://www.youtube.com/watch?v=xMSE11ad0z8">https://www.youtube.com/watch?v=xMSE11ad0z8</a></li> <li>• <a href="https://www.youtube.com/watch?v=QR_hcSow4OI">https://www.youtube.com/watch?v=QR_hcSow4OI</a></li> <li>• <a href="https://www.youtube.com/watch?v=KCh-7Ghj0jY">https://www.youtube.com/watch?v=KCh-7Ghj0jY</a></li> </ul> <p>E. HEC Digital Library</p> <ul style="list-style-type: none"> <li>• <a href="https://doi.org/10.1016/j.bcmed.2017.10.006">https://doi.org/10.1016/j.bcmed.2017.10.006</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/34200315/">https://pubmed.ncbi.nlm.nih.gov/34200315/</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/2650756/">https://pubmed.ncbi.nlm.nih.gov/2650756/</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/30193516/">https://pubmed.ncbi.nlm.nih.gov/30193516/</a></li> <li>• <a href="https://pubmed.ncbi.nlm.nih.gov/29126700/">https://pubmed.ncbi.nlm.nih.gov/29126700/</a></li> </ul>
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[https://www.mayoclinic.org/diseases-conditions/porphyria/symptoms-causes/syc-20356066#:~:text=Porphyria%20\(por%2DFEAR%2De,the%20body's%20organs%20and%20tissues.](https://www.mayoclinic.org/diseases-conditions/porphyria/symptoms-causes/syc-20356066#:~:text=Porphyria%20(por%2DFEAR%2De,the%20body's%20organs%20and%20tissues.)  
<https://pubmed.ncbi.nlm.nih.gov/14765767/>  
<http://ib.bioninja.com.au/options/option-d-human-physiology/d3-functions-of-the-liver/plasma-proteins.html>  
<https://pubmed.ncbi.nlm.nih.gov/21544836/>  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3053509/>  
<https://pubmed.ncbi.nlm.nih.gov/7027909/>  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4831249/>  
<https://pubmed.ncbi.nlm.nih.gov/12055353/>

<https://pubmed.ncbi.nlm.nih.gov/20226990/>

#### F. Biochemistry Journals

- <https://pubs.acs.org/journal/bichaw>
- <https://academic.oup.com/jb>
- <https://www.hindawi.com/journals/bri/>

**SECTION - V**

**Time Table**



**Integrated Clinically Oriented Modular Curriculum for first Year MBBS**

**Blood and Immunity Module Time Table**

**First Year MBBS**

**Session 2022-2023**

**Batch- 50**

## Blood and Immunity Module Team

Module Name : Blood and Immunity Module  
 Duration of module : 05 Weeks  
 Coordinator : Dr. Isma Riaz  
 Co-coordinator : Dr. Isma Riaz  
 Reviewed by : Module Committee

Module Committee			Module Task Force Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Isma Riaz (Senior Demonstrator of Biochemistry)
2.	Director DME	Prof. Dr. Rai Muhammad Asghar	2.	DME Focal Person	Dr. Sidra Hamid (Assistant Professor of Physiology)
3.	Convener Curriculum	Prof. Dr. Naeem Akhter	3.	Co-coordinator	Dr. Sajjad Hussain (Senior Demonstrator)
4.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	4.	Co-Coordinator	Dr. Isma Riaz (Senior Demonstrator of Biochemistry)
5.	Additional Director DME	Prof. Dr. Ifra Saeed	5.	Co-coordinator	Dr. Kamil Tahir (Senior Demonstrator of Physiology)
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar			
7.	Chairperson Biochemistry	Dr. Aneela Jamil	DME Implementation Team		
8.	Focal Person Anatomy First Year MBBS	Prof. Dr. Ayesha Yousaf	1.	Director DME	Prof. Dr. Rai Muhammad Asghar
9.	Focal Person Physiology	Dr. Sidra Hamid	2.	Implementation Incharge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
10.	Focal Person Biochemistry	Dr. Aneela Jamil	3.	Deputy Director DME	Dr Shazia Zaib
11.	Focal Person Pharmacology	Dr. Zunera Hakim	4.	Module planner & Implementation coordinator	Dr. Sidra Hamid
12.	Focal Person Pathology	Dr. Asiya Niazi	5.	Editor	Muhammad Arslan Aslam
13.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
14.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
15.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar			

## Discipline Wise Details of Modular Contents

Block	Subjects	Embryology	Histology	Gross Anatomy	CBL	SDL
II	• Anatomy	<ul style="list-style-type: none"> <li>• Development of pharyngeal arches</li> <li>• Development of spleen</li> <li>• Development of thymus</li> </ul>	<ul style="list-style-type: none"> <li>• Spleen</li> <li>• Thymus</li> <li>• Lymph nodes</li> <li>• Tonsils</li> </ul>	<p style="text-align: center;">Lower Limb</p> <ul style="list-style-type: none"> <li>• Posterior compartment of leg to foot</li> </ul>	<ul style="list-style-type: none"> <li>• Ankle sprain</li> <li>• Flat foot</li> </ul>	<ul style="list-style-type: none"> <li>• Posterior compartment of leg and flexor retinaculum</li> <li>• Neurovascular organization of posterior compartment of leg</li> <li>• Foot joints</li> <li>• Ankle joints</li> <li>• Sole of foot</li> <li>• Spleen</li> <li>• Gait cycle</li> </ul>
	• Physiology	<ul style="list-style-type: none"> <li>• Plasma Proteins</li> <li>• Stages of erythropoiesis &amp; factors affecting erythropoiesis</li> <li>• Hemoglobin &amp; Hemoglobinopathies, Iron Metabolism</li> <li>• Red cell fragility, ESR &amp; Red cell indices, Anemia &amp; polycythemia</li> <li>• Fate of RBCs &amp; Jaundice</li> <li>• Types of immunity, Physiology of innate immunity tolerance &amp; auto immunity</li> <li>• Physiology of acquired immunity B-Cells</li> <li>• Physiology of acquired immunity T-Cells. Allergy and Hypersensitivity reactions, Auto-immune diseases and AIDS</li> <li>• Composition of blood &amp; Hemopoiesis</li> <li>• WBCs classification &amp; formation. Neutrophils, Eosinophils &amp; Basophils and their properties</li> <li>• Platelet formation &amp; function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)</li> <li>• Blood coagulation</li> <li>• Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)</li> <li>• Thromboembolic condition (DVT, Pulmonary Embolism, DIC) Anticoagulant therapy (Heparin, warfarin, Prevention of blood clotting outside the body)</li> <li>• Physiological mechanism of temperature regulation</li> <li>• Role of Hypothalamus in temperature regulation</li> <li>• Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold)</li> <li>• ABO &amp; Rh Blood grouping system</li> <li>• Rh Blood grouping system and Erythroblastosis fetalis</li> <li>• Blood transfusion hazards</li> <li>• Tissue and organ transplantations</li> </ul>				
	• Biochemistry	<ul style="list-style-type: none"> <li>• Heme synthesis</li> <li>• Porphyria</li> <li>• Breakdown of hemoglobin</li> </ul>				

	<ul style="list-style-type: none"> <li>• Jaundice</li> <li>• Blood</li> <li>• Structure of hemoglobin and myoglobin</li> <li>• Types of Hemoglobin</li> <li>• Oxygen dissociation curve.</li> <li>• Abnormalities in Hemoglobin.</li> <li>• Hemoglobinopathies</li> <li>• Plasma proteins</li> <li>• Acute phase proteins &amp; Albumin</li> <li>• Haptoglobin and transferrin.</li> <li>• Ferritin and hemosiderin</li> <li>• Ceruloplasmin.</li> <li>• Antiproteases and amyloidosis</li> <li>• Immunoglobulins</li> <li>• AIDs</li> <li>• Folic acid.</li> <li>• Vitamin B12</li> <li>• Iron</li> </ul>
<ul style="list-style-type: none"> <li>• Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>• Activity I</li> <li>• Activity II</li> <li>• Activity III</li> </ul>
<ul style="list-style-type: none"> <li>• Research Club Activity (IUGRC)</li> </ul>	<ul style="list-style-type: none"> <li>• Student practical session no 3</li> </ul>
<ul style="list-style-type: none"> <li>• Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>• Approach to a Patient Aneamia</li> </ul>
<ul style="list-style-type: none"> <li>• Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>• The Holy Quran Translation Component</li> </ul>
<ul style="list-style-type: none"> <li>• Vertical Integration</li> </ul>	<p>Clinically content relevant to Blood &amp; Immunity module</p> <ul style="list-style-type: none"> <li>• Mediators of Inflammation (Pathology)</li> <li>• Anemia (Medicine)</li> <li>• Jaundice (Medicine)</li> <li>• Rh incompatibility and its significance -immune (Gynae &amp; Obs)</li> </ul>

## Categorization of Modular Contents

### Anatomy

Category A*	Category B**	Category C***			
		Demonstrations / SGD	CBL	SKL/Practical's	Self-Directed Learning (SDL)
<ul style="list-style-type: none"> <li>General Embryology</li> </ul>	<ul style="list-style-type: none"> <li>General Histology</li> </ul>	<ul style="list-style-type: none"> <li>Posterior compartment of leg and flexor retinaculum</li> <li>Posterior compartment of leg (Neurovascular organization)</li> <li>Bones of the foot</li> <li>Dorsum of foot (Muscles and Neurovascular organization)</li> <li>Ankle joint (ankle sprain)</li> <li>Joints of foot</li> <li>Sole of foot (Muscles)</li> <li>Sole of foot (Neurovascular organization)</li> <li>Arches of foot</li> <li>Spleen</li> <li>Thymus and tonsils</li> <li>Radiology and surface marking</li> </ul>	<ul style="list-style-type: none"> <li>Ankle sprain</li> <li>Flat foot</li> </ul>	<ul style="list-style-type: none"> <li>Lymph node</li> <li>Spleen</li> <li>Thymus</li> <li>Tonsil</li> </ul>	<ul style="list-style-type: none"> <li>Posterior compartment of leg and flexor retinaculum</li> <li>Neurovascular organization of posterior compartment of leg</li> <li>Foot joints</li> <li>Ankle joints</li> <li>Sole of foot</li> <li>Spleen</li> <li>Gait cycle</li> </ul>

**Category A\*:** By Professor

**Category B\*\*:** By Associate & Assistant Professors

**Category C\*\*\*:** By Senior Demonstrators & Demonstrators

### Teaching Staff / Human Resources of Department of Anatomy

Sr. #	Designation of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of Anatomy department	01
2.	Associate Professor	01
3.	Assistant professor of Anatomy department (AP)	01
4.	Demonstrators of Anatomy department	04

#### Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$2 * 04 = 08$ hours
2.	Small Group Discussions (SGD)	$2 * 16 = 32$ hours
3.	Practical / Skill Lab	$1.5 * 20 = 30$ hours

#### Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$1 * 4 = 04$ hours
2.	Small Group Discussions (SGD)	$2 * 16 = 32$ hours
3.	Practical / Skill Lab	$1.5 * 4 = 6$ hours
4.	Self-Directed Learning (SDL)	$2 * 4 = 8$ hours

## Physiology

Category A*	Category B**	Category C***				
LGIS	LGIS	PBL	CBL	Practical's	SGD	SDL
<ul style="list-style-type: none"> <li>• Monocytes - macrophage system &amp; lymphocytes</li> <li>• Process of inflammation and Lines of defense during inflammation</li> </ul>	<ul style="list-style-type: none"> <li>• Plasma Proteins</li> <li>• Stages of erythropoiesis &amp; factors affecting erythropoiesis</li> <li>• Hemoglobin &amp; Hemoglobinopathies, Iron Metabolism</li> <li>• Red cell fragility, ESR &amp; Red cell indices, Anemia &amp; polycythemia</li> <li>• Fate of RBCs &amp; Jaundice</li> <li>• Types of immunity, Physiology of innate immunity tolerance &amp; auto immunity</li> <li>• Physiology of acquired immunity B-Cells</li> <li>• Physiology of acquired immunity T-Cells. Allergy and Hypersensitivity reactions, Auto-immune diseases and AIDS</li> <li>• Composition of blood &amp; Hemopoiesis</li> <li>• WBCs classification &amp; formation. Neutrophils, Eosinophils &amp; Basophils and their properties</li> <li>• Platelet formation &amp; function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)</li> <li>• Blood coagulation</li> <li>• Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)               <ul style="list-style-type: none"> <li>• Thromboembolic condition (DVT, Pulmonary Embolism, DIC) Anticoagulant therapy</li> </ul> </li> </ul>			<ol style="list-style-type: none"> <li>1. Determination of Rh blood group</li> <li>2. Determination of Clotting time (CT)</li> <li>3. Determination of Bleeding time (BT)</li> <li>4. Recording of Body Temperature</li> </ol>	<ol style="list-style-type: none"> <li>1. Functions &amp; composition of blood, Hemopoiesis and Bone marrow</li> <li>2. Hemoglobin &amp; Hemoglobinopathies, Iron Metabolism</li> <li>3. Platelet formation &amp; function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)</li> <li>4. Physiological mechanism of temperature regulation</li> <li>5. Stages Of Erythropoiesis Factors Affecting Erythropoiesis (First week)</li> <li>6. Physiology of WBC (third week)</li> <li>7. Physiology of platelets (Fourth week)</li> <li>8. Blood transfusion hazards. Tissue and organ transplantations (Fifth week)</li> <li>9. Disorders of temperature regulation (Fever, Heat stroke,</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>SDL On Campus</b> Platelet formation &amp; function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)</li> <li>2. Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)</li> <li>3. <b>SDL Off Campus</b> Composition of blood</li> <li>4. Functions of Plasma Proteins</li> <li>5. WBCs classification &amp; formation. Neutrophils, Eosinophils &amp; Basophils and their properties</li> <li>6. Monocytes - macrophage system &amp; lymphocytes</li> <li>7. Process of inflammation and Lines of defense</li> </ol>

	<p>(Heparin, warfarin, Prevention of blood clotting outside the body)</p> <ul style="list-style-type: none"> <li>• Physiological mechanism of temperature regulation</li> <li>• Role of Hypothalamus in temperature regulation</li> <li>• Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold)</li> <li>• ABO &amp; Rh Blood grouping system</li> <li>• Rh Blood grouping system and Erythroblastosis fetalis <ul style="list-style-type: none"> <li>• Blood transfusion hazards. Tissue and organ transplantations</li> </ul> </li> </ul>				<p>Exposure of body to extreme cold) (Fifth week)</p>	<p>during inflammation</p> <ol style="list-style-type: none"> <li>8. Red cell fragility, ESR &amp; Red cell indices, Anemia &amp; polycythemia</li> <li>9. Blood coagulation</li> <li>10. ABO &amp; Rh Blood grouping system</li> </ol>
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**Category A\*:** By HOD and Associate Professor

**Category B\*\*:** By All (HOD, Associate, Assistant, Senior Demonstrators)

**Category C\*\*\*:** By Demonstrators and Residents



### Teaching Staff / Human Resource of Department of Physiology

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of physiology department	01
2.	Associate professor of physiology department	01
3.	Assistant professor of physiology department (AP)	01
4.	Demonstrators of physiology department	07
5.	Residents of physiology department (PGTs)	06

### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LECTURES)	$11 \times 2 = 22$ hours
2.	Small Group Discussions (SGD)/CBL	$20 \times 1.5$ hour = 30 hours + 6 hours = 36 hours
3.	Problem Based Learning (PBL)	---
4.	Practical / Skill Lab	$20 \times 1.5$ hour = 30 hours
5.	Self-Directed Learning (SDL)	$2 \times 1 = 2$ hours (on campus) $8 \times 1 = 8$ hours (off campus)

## Biochemistry

Category A*	Category B**	Category C***			
LGIS	LGIS	PBL	CBL	Practical's	SGD
<ul style="list-style-type: none"> <li>• Heme synthesis</li> <li>• Porphyria</li> <li>• Breakdown of hemoglobin                             <ul style="list-style-type: none"> <li>• Jaundice</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Blood</li> <li>• Structure of hemoglobin and myoglobin</li> <li>• Types of Hemoglobin</li> <li>• Oxygen dissociation curve.</li> <li>• Abnormalities in Hemoglobin.</li> <li>• Hemoglobinopathies</li> <li>• Plasma proteins</li> <li>• Acute phase proteins &amp; Albumin</li> <li>• Haptoglobin and transferrin</li> <li>• Ferritin and hemosiderin</li> <li>• Ceruloplasmin.</li> <li>• Antiproteases and amyloidosis</li>   <li>• Immunoglobulins</li>   <li>• AIDs</li>   <li>• Folic acid.</li>   <li>• Vitamin B12</li> <li>• Iron</li> </ul>		<ul style="list-style-type: none"> <li>• Thalassemia</li> <li>• Jaundice</li> </ul>	<ul style="list-style-type: none"> <li>• Estimation of Bilirubin by spectrophotometer</li> <li>• Estimation of total protein by spectrophotometer</li> <li>• How to draw blood technique</li> <li>• Haemin crystals</li> </ul>	<ul style="list-style-type: none"> <li>• Types of Hb and oxygen dissociation curve</li> <li>• Iron</li> </ul>

**Category A\*:** By HOD and Assistant Professor

**Category B\*\*:** By All (HOD, Assistant Professors, Senior Demonstrators)

**Category C\*\*\*:** (By All Demonstrators)

### Teaching Staff / Human Resource of Department of Biochemistry

Sr. #	Designation of Teaching Staff / Human Resource	Total number of teaching staff
1	Assistant professor of biochemistry department (AP)	01
2	Demonstrators of biochemistry department	07

#### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours (Faculty)	Total Hours (student)
1.	Large Group Interactive Session (LECTURES)	$2 * 12 = 24$ hours	12
2.	Small Group Discussions (SGD)	$1.5 * 5 * 4 = 30$ hours	06
3.	Problem Based Learning (PBL)	Zero	zero
4.	Practical / Skill Lab	$1.5 * 5 * 4 = 30$ hours	6
5.	Self-Directed Learning (SDL)	-----	06

## Blood and Immunity Module (First Week)

(24-07-2023 To 29-07-2023)

Date/Day	8:00am-9:00am	9:00am – 10:00am	10:00am-11:00am	11:00am-12:00pm	12:00-12:20pm	12:20pm – 2:00pm	Home Assignments (2HRS)		
24-07-23 MONDAY	SGD/DISSECTION		PBL-SESSION-I		PHYSIOLOGY (LGIS)		Break	Practical & SGD/CBL Topics & venue mentioned at the end	SDL physiology Composition of blood
	Posterior Compartment of Leg & Flexor Retinaculum		PBL Team-I		Composition of blood & Hemopoiesis	Plasma Proteins			
			(Physiology Batch Teachers of First Year MBBS)		Dr Sheena (Even)	Dr. Sidra (Odd)			
		25-07-2023 TUESDAY	SGD/DISSECTION		BIOCHEMISTRY (LGIS)			PHYSIOLOGY (LGIS)	
Posterior Compartment of Leg (Neurovascular Organization)			Types of Hb & O2 Dissociation Curve	Heme Synthesis & Porphyrin	Plasma Proteins	Composition of blood & Hemopoiesis			
				Dr. Isma (Even)	Dr. Aneela (Odd)	Dr. Sidra (Even)		Dr Sheena (Odd)	
26-07-2023 WEDNESDAY	SGD/DISSECTION			BIOCHEMISTRY (LGIS)		PHYSIOLOGY (LGIS)		Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Structure of hemoglobin, Types of Hb & O2 Dissociation Curve
	Bones of the foot		Heme Synthesis & Porphyrin	Types of Hb and structure of Hb and myoglobin	WBCs classification & formation. Neutrophils, Eosinophils & Basophils and their properties	Stages of erythropoiesis & factors affecting erythropoiesis			
			Dr. Aneela (Even)	Dr. Isma (Odd)	Dr Sheena (Even)	Dr. Sidra (Odd)			
		Ashura Holidays							
27-07-2023 THURSDAY									
28-07-2023 FRIDAY									
29-07-2023 SATURDAY	8:00 AM – 9:00 AM		9:00 AM – 10:00AM		10:00AM – 12:00 PM		12:00-12:20pm	12:20pm – 2:00pm	2HRS
	BIOCHEMISTRY (LGIS)		Practical & SGD/CBL		ANATOMY (LGIS)		PATHOLOGY (LGIS)		Break
	Types of Hb and structure of Hb and myoglobin	Heme Synthesis & Porphyrin	Practical & SGD/CBL Topics & venue mentioned at the end		Development of pharyngeal arches	Development and histology Lymph node	Mediators of inflammation		
Dr. Isma (Even)	Dr. Aneela (Odd)	Prof. Dr. Ayesha Yousaf (even)			Dr. Mohtasham Hina (Associate prof.) (odd)	Dr. Saeed (Even)	Dr. Iqbal (Odd)		

Topics for Practical with Venue						Topics for Small Group Discussion & CBLs With Venue								
<ul style="list-style-type: none"> <li>Lymph node (Anatomy Histology Practical) Venue-Histology laboratory</li> <li>Draw of blood technique (Biochemistry Practical) Venue- Biochemistry laboratory</li> <li>Determination of Rh blood group (Physiology –practical) Venue – Physiology Lecture Hall No 5</li> </ul>						<ul style="list-style-type: none"> <li>Physiology SGD - Functions &amp; composition of blood, Hemopoiesis and Bone marrow (Basement))</li> <li>Biochemistry SGD: Types of Hb and oxygen dissociation curve (Venue: Lecture Hall No 2)</li> </ul>								
Schedule for Practical / Small Group Discussion						Venue for first Year Batches for Anatomy Dissection / Small Group Discussion								
Days	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue					
Monday	C	B	E	A	D	A	01-90	Dr. Urooj Shah	Lecture Hall No. 04 Anatomy Lecture Hall					
Tuesday	D	C	A	B	E									
Wednesday	E	D	B	C	A	B	91-180	Dr. Qurat Ul Ain	Lecture Hall No. 03 Anatomy Lecture Hall					
Thursday	B	A	D	E	C	C	181- 270	Dr. Zaneera	New Lecture Theater complex no. 3					
Saturday	A	E	C	D	B	D	271 onwards	Dr. Ali Raza	New Lecture Theater complex no. 2					
Venue for first Year Batches for PBL & SGD Team-II						Sr. No	Batch	Roll no	Names of Teachers					
Batches	Roll No	Venue				Biochemistry					Physiology			
						Monday	Tuesday	Wednesday	Thursday	Saturday				
Batch-A1	(01-35)	New Lecture Hall complex no.02		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Rahat B (Practical)	Dr. Almas C (Practical)	Dr. Nayyab D (Practical)	Dr. Nayyab A (Practical)	Dr. Rahat E (Practical)	Dr. Sheena
Batch-A2	(36-70)	New Lecture Hall complex no.03		Dr. Uzma Kiani		2.	Batch –B	71-140						Dr. Uzma
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar		3.	Batch – C	141-210						Dr. Fahad
Batch-B2	(106-140)	Conference Room (Basement)		Dr. Fareedullah		4.	Batch –D	211-280	Dr. Nayyab D (SGD)	Dr. Rahat E (SGD)	Dr. Almas A (SGD)	Dr. Isma C (SGD)	Dr. Nayyab E (SGD)	Dr. Maryam Abbas
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards						Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)		Dr. Nayab (PGT Physiology)										
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)										
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shazia Noreen (SGD)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03					
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02					
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)										
Topic Details of SDL Biochemistry														
<ul style="list-style-type: none"> <li>Types of Hb</li> <li>O2 Dissociation Curve</li> </ul>														

## Blood and Immunity Module (Second Week)

### (31-07-2023 To 05-08-2023)

Date/Day	8:00am-9:00am	9:00am – 10:00am	10:00am-11:00am	11:00am-12:00pm	12:00- 12:20pm	12:20pm – 2:00pm	Home Assignments (2HRS)			
31-07-23 MONDAY	SGD/DISSECTION		ANATOMY (LGIS)		PHYSIOLOGY (LGIS)		B r e a k			
	Dorsum of Foot (Muscles and Neurovascular Organization)		Development of pharyngeal arches	Development and histology Lymph nod	Stages of Erythropoiesis Factors Affecting Erythropoiesis	WBCs classification & formation. Neutrophils, Eosinophils & Basophils and their properties		Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology WBCs classification & formation. Neutrophils, Eosinophils & Basophils and their properties	
Prof. Dr. Ayesha Yousaf (Odd)			Dr. Mohtasham Hina (Associate prof.) (Even)	Dr. Sidra (Even)	Dr. Sheena (Odd)					
01-08-2023 TUESDAY	/DISSECTION/CBL		BIOCHEMISTRY (LGIS)		PHYSIOLOGY (LGIS)					
	Ankle Joint (Ankle Sprain)		Hemoglobinopathies	Heme degradation & Jaundice	Monocytes - macrophage system & lymphocytes	Hemoglobin & Hemoglobinopathies, Iron Metabolism		Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Monocytes - macrophage system & lymphocytes	
Dr. Nayyab (Odd)			Dr. Aneela (Even)	Prof. Dr. Samia Sarwar / Dr. Sheena (Even)	Dr. Sidra (Odd)					
02-08-2023 WEDNESDAY	SGD/DISSECTION		BIOCHEMISTRY (LGIS)		PHYSIOLOGY (LGIS)					
	Joints of Foot		Aids	Plasma proteins functions, Albumin	Hemoglobin & Hemoglobinopathies, Iron Metabolism	Monocytes -macrophage system & lymphocytes	Practical & SGD/CBL Topics & venue mentioned at the end	BIOCHEMISTRY SDL Heme Synthesis & Porphyrin		
Dr. Almas (Even)			Dr. Isma (Odd)	Dr. Sidra (Even)	Prof. Dr. Samia Sarwar / Dr. Sheena (Odd)					
03-08-2023 THURSDAY	SGD/DISSECTION		PBL		PHYSIOLOGY (LGIS)					
	Dissection		PBL session 2		Process of inflammation and Lines of defense during inflammation	Red cell fragility, ESR & Red cell indices, Anemia & polycythemia	Practical & SGD/CBL Topics & venue mentioned at the end	BIOCHEMISTRY SDL Plasma proteins functions, Albumin, AIDs		
Prof. Dr. Samia Sarwar / Dr. Sheena (Even)					Dr. Sidra (Odd)					
04-08-2023 FRIDAY	8:00 AM – 9:00 AM		9:00 AM – 10:00AM		10:00AM– 11:00AM		11:00AM—12:00PM			
	Family Medicine (LGIS)		QURAN TRANSLATION		BIOCHEMISTRY (LGIS)		PHYSIOLOGY (LGIS)			
	Anemia		Muaamlaat-3	Muaasharat-1	Aids	Plasma proteins functions, Albumin	Red cell fragility, ESR & Red cell indices, Anemia & polycythemia	Process of inflammation and Lines of defense during inflammation	SDL Anatomy Neurovascular organization of posterior compartment of leg	
	Dr. Umer Daraz (Even)	Dr. Iqra (Odd)	Mufti Naeem (Even)	Abdul Wahid (Odd)	Dr. Almas (Odd)	Dr. Isma (Even)	Dr. Sidra (Even)	Prof. Dr. Samia Sarwar / Dr. Sheena (Odd)		
8:00 AM – 9:00 AM		9:00 AM – 10:00AM		10:00AM – 11:00 AM		11:00AM – 12:00 PM		12:00- 12:20pm	12:20pm – 2:00pm	2HRS
05-08-2023 SATURDAY	SGD/DISSECTION		BIOCHEMISTRY (LGIS)		PHYSIOLOGY (LGIS)		B r e a k			
	Sole of Foot (Muscles)		Vit K	Haptoglobin, ceruloplasmin	Fate of RBCs & Jaundice	Platelet formation & function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)		Practical & SGD/CBL Topics & venue mentioned at the end	SDL Anatomy joints of Foot	
Dr. Almas (Even)			Dr. Isma (Odd)	Dr. Sidra (Odd)	Dr. Fared (Even)					

Topics for Practical with Venue						Topics for Small Group Discussion & CBLs With Venue					
<ul style="list-style-type: none"> <li>Spleen (Anatomy Histology Practical) Venue-Histology Laboratory</li> <li>Estimation of bilirubin by Spectrophotometer (Biochemistry Practical) Venue- Biochemistry Laboratory</li> <li>Determination of Clotting time (CT) (Physiology Practical) Venue – Physiology Lab</li> </ul>						<ul style="list-style-type: none"> <li>Physiology SGD- Hemoglobin &amp; Hemoglobinopathies, Iron Metabolism (Venue: Lecture Hall No 5)</li> <li>Biochemistry CBL – Thalassemia (Lecture Hall No 2)</li> </ul>					
Schedule for Practical / Small Group Discussion						Venue for first Year Batches for Anatomy Dissection / Small Group Discussion					
Days	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue		
Monday	C	B	E	A	D	A	01-90	Dr. Urooj Shah	Lecture Hall No. 04 Anatomy Lecture Hall		
Tuesday	D	C	A	B	E	B	91-180	Dr. Qurat Ul Ain	Lecture Hall No. 03 Anatomy Lecture Hall		
Wednesday	E	D	B	C	A						
Thursday	B	A	D	E	C	C	181- 270	Dr. Zaneera	New Lecture Theater complex no. 3		
Saturday	A	E	C	D	B	D	271 onwards	Dr. Ali Raza	New Lecture Theater complex no. 2		
Venue for first Year Batches for PBL & SGD Team-II						Sr. No	Batch	Roll no	Names of Teachers		
Batches	Roll No	Venue				Biochemistry					Physiology
						Monday	Tuesday	Wednesday	Thursday	Saturday	
Batch-A1	(01-35)	New Lecture Hall complex no.02		Dr. Sheena Tariq		Dr. Almas B (Practical)	Dr. Almas C (Practical)	Dr. Rahat D (Practical)	Dr. Almas A (Practical)	Dr. Almas E (Practical)	Dr. Sheena
Batch-A2	(36-70)	New Lecture Hall complex no.03		Dr. Uzma Kiani							Dr. Uzma
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar		Dr. Nayyab D (SGD)	Dr. Uzma E (SGD)	Dr. Uzma A (SGD)	Dr. Uzma C (SGD)	Dr. Uzma E (SGD)	Dr. Fahad
Batch-B2	(106-140)	Conference Room (Basement)		Dr. Fareedullah							Dr. Maryam Abbas
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards			Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)		Dr. Nayab (PGT Physiology)							
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)							
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shazia Noreen (SGD)		<b>Odd Roll Numbers</b>		New Lecture Hall Complex Lecture Theater # 03			
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		<b>Even Roll Number</b>		New Lecture Hall Complex Lecture Theater # 02			
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)							
Topic Details of SDL Biochemistry											
<ul style="list-style-type: none"> <li>Structure of hemoglobin</li> <li>Types of Hb</li> <li>O<sub>2</sub> Dissociation Curve</li> </ul>											

## Blood and Immunity Module (Third Week) (07-08-2023 To 12-08-2023)

Date/Day	8:00am-9:00am	9:00am – 10:00am	10:00am-11:00am	11:00am-12:00pm	12:00-12:20pm	12:20pm – 2:00pm	Home Assignments (2HRS)		
07-08-2023 MONDAY	<b>SGD/DISSECTION</b>		<b>Biochemistry (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B r e a k</b>	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Process of inflammation and Lines of defense during inflammation
	Sole of Foot (Neurovascular Organization)		Vitamin k	Haptoglobin, ceruloplasmin	Fate of RBC & Jaundice	Platelet formation & function, hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)			
08-08-2023 TUESDAY	<b>SGD/DISSECTION</b>		<b>BIOMEDICAL ETHICS</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B r e a k</b>	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Red cell fragility, ESR & Red cell indices, Anemia & polycythemia
	Dissection		Activity 1		Blood coagulation	Types of immunity, Physiology of innate immunity tolerance & auto immunity			
09-08-2023 WEDNESDAY	<b>SGD/DISSECTION</b>		<b>ANATOMY(LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B r e a k</b>	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Structure of hemoglobin Folic acid & Vitamin B-12
	Arches of Foot		Histology of Thymus and Tonsils	Histology and Development of Spleen	Types of immunity, Physiology of innate immunity tolerance & auto immunity	Blood coagulation			
10-08-2023 THURSDAY	<b>SGD/DISSECTION</b>		<b>Physiology (LGIS)</b>		<b>Physiology (LGIS)</b>		<b>B r e a k</b>	Practical & SGD/CBL Topics & venue mentioned at the end <b>Online SDL Evaluation</b>	SDL Biochemistry Heme synthesis Vitamin K
	Gait cycle		Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)	Physiology of acquired immunity B-Cells	Physiology of acquired immunity B-Cells	Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)			
11-08-2023 FRIDAY	<b>8:00 AM – 9:00 AM</b>		<b>9:00 AM – 10:00AM</b>		<b>10:00AM– 11:00AM</b>		<b>11:00AM—12:00PM</b>		<b>B r e a k</b>
	<b>Biochemistry (LGIS)</b>		<b>QURAN TRANSLATION</b>		<b>Physiology (LGIS)</b>		<b>ANATOMY(LGIS)</b>		
	Vitamin 9 and vitamin B12	Transferrin, ferritin	Muaamlaat-3	Muaasharat-1	Thromboembolic condition (DVT, Pulmonary Embolism, DIC) Anticoagulant therapy (Heparin, warfarin, Prevention of blood clotting outside the body)	Physiology of acquired immunity T-Cells. Allergy and Hypersensitivity reactions, Auto-immune diseases and AIDS	Histology of Thymus and Tonsils	Histology and Development of Spleen	
Dr. Almas (Even)	Dr. Isma (Odd)	Mufti Naeem (Odd)	Abdul Wahid (Even)	Dr. Fareed (Even)	Dr. Sidra (Odd)	Dr. Mohtasham Hina (Associate prof.) (Odd)	Dr. Arslan (Asst. Prof (Even)		
12-08-2023 SATURDAY	<b>8:00 AM – 9:00 AM</b>		<b>9:00 AM – 10:00AM</b>		<b>10:00AM – 11:00 AM</b>		<b>11:00AM – 12:00 PM</b>		<b>B r e a k</b>
	<b>SGD/DISSECTION</b>		<b>Biochemistry (LGIS)</b>		<b>Physiology (LGIS)</b>		<b>Physiology (LGIS)</b>		
	Thymus, Tonsils and Spleen		Vitamin 9 and vitamin B12	Transferrin, ferritin		Physiology of acquired immunity T-Cells. Allergy and Hypersensitivity reactions, Auto-immune diseases and AIDS	Thromboembolic condition (DVT, Pulmonary Embolism, DIC) Anticoagulant therapy (Heparin, warfarin, Prevention of blood clotting outside the body)		
				Dr. Almas (Odd)	Dr. Isma (Even)	Dr. Sidra (Even)	Dr. Fareed (Odd)		



Topics for Practical with Venue						Topics for Small Group Discussion & CBLs With Venue								
<ul style="list-style-type: none"> <li>Thymus (Anatomy Histology Practical) Venue-Histology Laboratory</li> <li>Quantitative estimation of serum total proteins (Biochemistry Practical) Venue- Biochemistry Laboratory</li> <li>Determination of Bleeding time (BT) (Physiology Practical) Venue – Physiology Lab</li> </ul>						<ul style="list-style-type: none"> <li>Physiology SGD- Platelet formation &amp; function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR (Venue: Lecture Hall No 5)</li> <li>Biochemistry CBL – Jaundice (Lecture Hall No 2)</li> </ul>								
Schedule for Practical / Small Group Discussion						Venue for first Year Batches for Anatomy Dissection / Small Group Discussion								
Days	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue					
Monday	C	B	E	A	D	A	01-90	Dr. Urooj Shah	Lecture Hall No. 04 Anatomy Lecture Hall					
Tuesday	D	C	A	B	E	B	91-180	Dr. Qurat Ul Ain	Lecture Hall No. 03 Anatomy Lecture Hall					
Wednesday	E	D	B	C	A									
Thursday	B	A	D	E	C	C	181- 270	Dr. Zaneera	New Lecture Theater complex no. 3					
Saturday	A	E	C	D	B	D	271 onwards	Dr. Ali Raza	New Lecture Theater complex no. 2					
Venue for first Year Batches for PBL & SGD Team-II						Sr. No	Batch	Roll no	Names of Teachers					
Batches	Roll No	Venue							Biochemistry					Physiology
									Monday	Tuesday	Wednesday	Thursday	Saturday	
Batch-A1	(01-35)	New Lecture Hall complex no.02		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Rahat B (Practical)	Dr. Almas C (Practical)	Dr. Rahat D (Practical)	Dr. Almas A (Practical)	Dr. Rahat E (Practical)	Dr. Sheena
Batch-A2	(36-70)	New Lecture Hall complex no.03		Dr. Uzma Kiani		2.	Batch –B	71-140						Dr. Uzma
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar		3.	Batch – C	141-210	Dr. Uzma D (SGD)	Dr. Uzma E (SGD)	Dr. Nayyab A (SGD)	Dr. Uzma C (SGD)	Dr. Nayyab E (SGD)	Dr. Fahad
Batch-B2	(106-140)	Conference Room (Basement)		Dr. Fareedullah		4.	Batch –D	211-280						Dr. Maryam Abbas
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards						Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)		Dr. Nayab (PGT Physiology)										
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)										
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shazia Noreen (SGD)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03					
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02					
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)										
Topic Details of SDL Biochemistry														
<ul style="list-style-type: none"> <li>Structure of hemoglobin</li> <li>Types of Hb</li> <li>O2 Dissociation Curve</li> </ul>														

## Blood and Immunity Module (Fourth Week) (14-08-2023 To 19-08-2023)

Date/Day	8:00am-9:00am	9:00am – 10:00am	10:00am-11:00am	11:00am-12:00pm	12:00-12:20pm	12:20pm – 2:00pm	Home Assignments (2HRS)
14-08-2023 MONDAY	Independence Day						
15-08-2023 TUESDAY	MEDICINE (LGIS)	BIO MEDICAL ETHICS		PHYSIOLOGY (LGIS)		PHYSIOLOGY (LGIS)	
	Jaundice	(CLUB ACTIVITY 2)		ABO & Rh Blood grouping system	Physiological mechanism of temperature regulation	Physiological mechanism of temperature regulation	ABO & Rh Blood grouping system
	Dr. Umer Daraz (Even)	Dr. Iqra (Odd)	Dr. Fahad (Even)	Dr. Shazia (Odd)	Dr. Shazia (Even)	Dr. Fahad (Odd)	B r e a k
16-08-2023 WEDNESDAY	SGD/DISSECTION		Physiology (LGIS)		Physiology (LGIS)		
	Radiology and Surface Marking		Rh Blood grouping system and Erythroblastosis fetalis	Role of Hypothalamus in temperature regulation	Role of Hypothalamus in temperature regulation	Rh Blood grouping system and Erythroblastosis fetalis	
			Dr. Fahad (Even)	Dr. Shazia (Odd)	Dr. Shazia (Even)	Dr. Fahad (Odd)	Practical & SGD/CBL Topics & venue mentioned at the end
17-08-2023 THURSDAY	GYNAE OBS (LGIS)	Physiology (LGIS)		IUGRC			
	Rh incompatibility and its significance	Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold)	Blood transfusion hazards. Tissue and organ transplantations	Student practical session no 3			
	Dr. Shama (Even)	Dr. Ruqqia (Odd)	Dr. Shazia (Odd)	Dr. Fahad (Even)			Practical & SGD/CBL Topics & venue mentioned at the end
18-08-2023 FRIDAY	8:00 AM – 9:00 AM	9:00 AM – 10:00AM		10:00AM – 11:00AM	11:00AM – 12:00PM		
	BIO MEDICAL ETHICS	QURAN TRANSLATION		Physiology (LGIS)		Biochemistry (LGIS)	
	(CLUB ACTIVITY-3)	Muaasharat-2	Muaamlaat-4	Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold)	Blood transfusion hazards. Tissue and organ transplantations	Immunoglobulins	Iron
		Abdul Wahid (Even)	Mufti Naeem (Odd)	Dr. Shazia (Even)	Dr. Fahad (Odd)	Dr. Uzma (Even)	Dr. Isma Riaz (Odd)
	8:00 AM – 9:00 AM	9:00 AM – 10:00AM	10:00AM – 11:00 AM	11:00AM – 12:00 PM	12:00-12:20pm	12:20pm – 2:00pm	2HRS
19-08-2023 SATURDAY	SGD/DISSECTION		Biochemistry (LGIS)		Practical & SGD/CBL		
	Dissection		Immunoglobulins	Iron	Practical & SGD// CBLof 14 <sup>th</sup> August batch		
			Dr. Uzma (Odd)	Dr. Isma (Even)	Topics & venue mentioned at the end		
					B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Anatomy Gait Cycle

Topics for Practical with Venue						Topics for Small Group Discussion & CBLs With Venue					
<ul style="list-style-type: none"> <li>Tonsils (Anatomy Histology Practical) Venue-Histology Laboratory</li> <li>Haemin crystals (Biochemistry Practical) Venue- Biochemistry Laboratory</li> <li>Recording of Body temperature (BT) (Physiology Practical) Venue – Physiology Lab</li> </ul>						<ul style="list-style-type: none"> <li>Physiology SGD- Physiological mechanism of temperature regulation (Venue: Lecture Hall No 5)</li> <li>Biochemistry CBL – iron (Lecture Hall No 2)</li> </ul>					
Schedule for Practical / Small Group Discussion						Venue for first Year Batches for Anatomy Dissection / Small Group Discussion					
Days	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue		
Monday	C	B	E	A	D	A	01-90	Dr. Urooj Shah	Lecture Hall No. 04 Anatomy Lecture Hall		
Tuesday	D	C	A	B	E						
Wednesday	E	D	B	C	A	B	91-180	Dr. Qurat Ul Ain	Lecture Hall No. 03 Anatomy Lecture Hall		
Thursday	B	A	D	E	C	C	181- 270	Dr. Zaneera	New Lecture Theater complex no. 3		
Saturday	A	E	C	D	B	D	271 onwards	Dr. Ali Raza	New Lecture Theater complex no. 2		
Venue for first Year Batches for PBL & SGD Team-II						Sr. No	Batch	Roll no	Names of Teachers		
Batches	Roll No	Venue				Biochemistry					Physiology
						Monday	Tuesday	Wednesday	Thursday	Saturday	
Batch-A1	(01-35)	New Lecture Hall complex no.02		Dr. Sheena Tariq		Dr. Almas B (Practical)	Dr. Rahat C (Practical)	Dr. Almas D (Practical)	Dr. Almas A (Practical)	Dr. Rahat E (Practical)	Dr. Sheena
Batch-A2	(36-70)	New Lecture Hall complex no.03		Dr. Uzma Kiani							Dr. Uzma
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)		Dr. Fahd Anwar		Dr. Uzma D (SGD)	Dr. Nayyab E (SGD)	Dr. Uzma A (SGD)	Dr. Isma C (SGD)	Dr. Nayyab E (SGD)	Dr. Fahad
Batch-B2	(106-140)	Conference Room (Basement)		Dr. Fareedullah							Dr. Maryam Abbas
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)		Dr. Maryam Abbas (PGT Physiology)							Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)		Dr. Nayab (PGT Physiology)							
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)							
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shazia Noreen (SGD)		<b>Odd Roll Numbers</b>		New Lecture Hall Complex Lecture Theater # 03			
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		<b>Even Roll Number</b>		New Lecture Hall Complex Lecture Theater # 02			
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)							
Topic Details of SDL Biochemistry											
<ul style="list-style-type: none"> <li>Structure of hemoglobin</li> <li>Types of Hb</li> <li>O2 Dissociation Curve</li> </ul>											

**Blood and Immunity Module (Fifth Week)**  
**(21-08-2023 To 26-08-2023)**

<b>Date/time</b>	<b>9:00am - 12:00pm</b>	<b>12:00-02:00pm</b>
21-08-2023 MONDAY	Anatomy Theory Paper	
22-08-2023 TUESDAY	Physiology Theory Paper & Video Assisted Quiz	
23-08-2023 WEDNESDAY	Biochemistry Theory Paper & Allied	
24-08-2023 THURSDAY	Anatomy /Physiology Viva Voce	
25-08-2023 FRIDAY	Anatomy /Physiology Viva Voce	
26-08-2023 SATURDAY	SDL For Upcoming Module	

Note: Timetable Subject to Change According To The Current Circumstances

(Logistic details of Assessments will be notified separately)

## SECTION VI

**Table of Specification (TOS) For Blood & Immunity Module Examination for First Year MBBS**

Sr. #	Discipline	No. of MCQs (%)	No. of MCQs according to cognitive domain			No. of SEQs (%)		No. of SEQs according to cognitive domain			Viva voce	Integrated OSPE	Total Marks
			C1	C2	C3	No. of items	Marks	C1	C2	C3			
1.	Anatomy	20	10	5	5	4	20	1	1	2	60	45 (15 Stations)	145
2.	Physiology	30	18	9	3	4	20	1	2	1	50	18	118
3.	Biochemistry	13	5	4	1	3	10	0.5	1.5	-	-	10	33
Total Marks												296	
<b>Table of Specification for Clinical Subjects</b>													
1.	Quran translation	10 (2SEQs)										10	
2.	Research, Artificial Intelilience & Innovation	5										5	
3.	Family Medicine	2										2	
5.	Medicine	5										5	
6.	Pathology	5										5	
7.	Gynae/ Obs	5										5	
8.	Bioethics & Professionalism	2										2	
Grand Total												34	
Grand Total											330		

**Table of Specification for Gross OSPE**  
**Anatomy**

Block II- Lower Limb					
1	Bones and Joints of Hip and thigh Region	30%	50%	20%	3
2	Muscles and Neurovascular of Hip				3
3	Muscles and Neurovascular of Anterior and medial Compartment of Thigh				3
4	Muscles and Neurovascular of Posterior Compartment of Thigh				3
5	Bones and Joints of knee and leg				3
6	Muscles and Neurovascular of Anterior Compartment of Leg				3
7	Muscles and Neurovascular of Lateral and Posterior Compartment				3
8	Bones and Joints of ankle and Foot				3
9	Muscles and Neurovascular of Foot				3
10	Radiology of Lower Limb				3
<b>Total</b>					<b>30</b>

**Table of Specification for Integrated OSPE**  
**Anatomy**

Block II- MSK-II and Blood & Immunity					
Development of Musculoskeletal System, vertebral column, and limbs					3
Development of Lymphoid Organs		30%	50%	20%	3
Microscopic anatomy of muscle and skin					3
Microscopic anatomy of Lymphoid Organs					3
Practical Copy					3
<b>Total</b>					<b>15</b>

## Physiology

Block – II (MSK-II & Blood Module)							
1.	Block – II (MSK-II & Blood Module)	Determination of Total leukocyte Count (TLC)				1 A	1
2.		Estimation of Red Blood Cell (RBC) count				1 B	1
3.		Determination of platelet count				1 C	1
4.		Determination of Differentiate leukocyte Count (DLC)	30%	50%	20%	2	3
5.		Determination of ABO blood groups				3 A	1.5
6.		Determination of Rh blood groups				3 B	1.5
7.		Determination of Clotting Time (CT)				4 A	1.5
8.		Determination of Bleeding Time (BT)				4 B	1.5
9.		Recording of body temperature				5 A	1.5
10.		Demonstration of Triple response				5 B	1.5
11.		Practical notebook / sketch copy				6	3
						<b>Total</b>	<b>18</b>

## Biochemistry

Block – II (MSK-II & Blood Module)		Color test for amino acids(observed)	90%	10%	1	2	
1.	Block – II (MSK-II & Blood Module)	Biuret test and ninhydrin	100%		2	2	
2.		Quantitative estimation of serum total proteins			1B	1	
3.		Heat coagulation	100%		2A	1	
4.		Paper chromatography			2B	1	
5.		Blood draw technique	100%		3	2	
6.		Quantitative estimation of serum bilirubin	100%		4	2	
7.		Hemin crystal					
8.		instruments		90%	10%	4	2
9.		Practical notebook		80%	20%	5	2
						<b>Total</b>	<b>10</b>

## **Annexure I**

**(Sample MCQ, SEQ & OSPE Papers)**



**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**ANATOMY DEPARTMENT**  
**1<sup>st</sup> Year MBBS MCQs Module Exam (BLOOD & IMMUNITY)**

1. A 21-year-old boy had a motorcycle accident. On x-ray groove in the lower surface of the cuboid bone was destroyed. Which of the following muscle tendons is most likely damaged?

- a. Flexor hallucis longus
- b. Peroneus brevis
- c. Peroneus longus
- d. Tibialis anterior
- e. Tibialis posterior

3. A patient reported to hospital with the complaint of difficulty in walking and pain in the left leg. He gave history of an audible snap during a forceful push-off emergency car breaks (plantarflexion with the knee extended). It was followed immediately by sudden calf pain and dorsiflexion of the foot. He might be suffering from?

- a. Calcaneal tendinitis
- b. Ruptured calcaneal tendon
- c. Gastrocnemius strain
- d. Common peron

5. Student of first year was asked to auscultate the posterior tibial pulse during assessment. While auscultating which landmarks are important?

- a. Between lateral malleolus and medial border of calcaneal tendon
- b. Between medial malleolus and medial border of calcaneal tendon
- c. Between lateral malleolus and lateral border of calcaneal tendon
- d. Between 1st and 2nd metatarsals
- e. Between 2nd and 3rd metatarsals

2. A professional runner without any history of trauma complaint of pain in the sole of foot and heel. The pain was aggravated during start of walk and after sitting but relieved after 5-10 minutes of activity. His condition could be due to

- a. Deep infection of the foot
- b. Plantar fasciitis
- c. Fatigue
- d. Arthritis of ankle joint
- e. Sprain of the ankle joint

4. During medical examination, students were asked to examine patient with “tarsal tunnel syndrome”. Which of the following symptoms are commonly associated with this?

- a. Sharp pain radiating down the front of the thigh.
- b. Tingling and numbness along the lateral side of the foot.
- c. Weakness during ankle joint extension
- d. Burning sensation along the inner side of leg and sole of the foot.
- e. Flattening of lateral arch of the foot

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>st</sup> Year MBBS MCQs Module Exam (BLOOD & IMMUNITY)**

1. Maintenance of blood viscosity is mainly a function of :

- a. Plasma proteins
- b. Erythrocytes
- c. Thrombocytes
- d. Albumin
- e. Gamma globulins

3. A Rh-negative mother having her second pregnancy terminated because of fetal death due to Rh-incompatibility, the type of agglutinin involved in this case would be:

- a. IgM
- b. IgG
- c. IgE
- d. IgA
- e. IgD

5. When blood is allowed to clot, the fluid left behind is known as :

- a. Plasma
- b. Lymph
- c. Tissue fluid
- d. Tissue gel
- e. Serum

2. The HIV virus mainly targets the immune cells which are back bone of cell mediated immunity , these cells are:

- a. B-cells
- b. Cytotoxic T cells
- c. Helper T cells
- d. Memory cells
- e. Suppressor T cells

4. Thalasemic children usually suffer from iron over load. Insoluble storage form of iron secondary to iron-overload is termed as:

- a. Ferritin
- b. Apoferritin
- c. Hemopexin
- d. Hemosiderin
- e. Ferroheme

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>st</sup> Year MBBS SEQs Module Exam (BLOOD & IMMUNITY)**

- Q.1 Discuss three different causes of anemia and what is obligatory degradation of proteins and how it can be prevented? (3,2)
- Q.2 Define Immunity. What are different classifications of granulocytes (write any two). Write four causes of neutrophilia? (1,2,2)
- Q.3 Define Land Steiners Law, Secretors and non- Secretors. Write down briefly on Incompatible blood transfusion, stating two complications of incompatible blood transfusion. (3,2)

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**BIOCHEMISTRY DEPARTMENT**  
**1<sup>st</sup> Year MBBS SEQs Module Exam (BLOOD & IMMUNITY)**

1. Iron is transported in the body in the form of:
  - a. Ferritin
  - b. Hemosiderin
  - c. Transferrin
  - d. Hemoglobin
  - e. Myoglobin
2. The normal serum value for total bilirubin is up to:
  - a. 10mg/dl
  - b. 5mg/dl
  - c. 50mg/dl
  - d. 1mg/dl
  - e. 15mg/dl
3. Chocolate cyanosis is a classic presentation of
  - a. Thalassemia
  - b. Hemoglobin SC disease
  - c. Hemoglobin C disease
  - d. Sickle cell anemia
  - e. Methemoglobinemia
4. Vitamin K is required for
  - a. Change of prothrombin into thrombin
  - b. Synthesis of prothrombin
  - c. Change of fibrinogen into fibrin
  - d. Formation of thromboplastin
  - e. Fibrinolysis

**SEQ**

- Q. a. Explain the functions and clinical significance of Albumin. 2.5
- b. Describe pathway of synthesis of heme. 2.5

1. ---Includes rules of conduct that may be used to regulate our activities concerning the biological world.

- a. Bio-piracy
- b. Biosafety
- c. Bioethics
- d. Bio-patents
- e. Bio-logistic

3. Following is not code of ethics.

- a. Integrity
- b. Objectivity
- c. Confidentiality
- d. Behaviour
- e. Autonomy

5. -----Principle requiring that physicians provide, positive benefits

- a. Justice
- b. Autonomy
- c. Beneficence
- d. Veracity
- e. Fidelity

2. The right of patients having self-decision is called.

- a. Justice
- b. Autonomy
- c. Beneficence
- d. Veracity
- e. Fidelity

4. -----in the context of medical ethics, if it's fair and balanced

- a. Justice
- b. Autonomy
- c. Beneficence
- d. Veracity
- e. Fidelity

**Rawalpindi Medical University Department of Anatomy**  
**Block-II OSPE 1<sup>st</sup> Year MBBS**

**Station No. 1 (Observed Station)**

Histology sketch copy will be assessed for

- a. Complete index (1)
- b. Complete and signed diagrams (1)
- c. 2 ID points mentioned with each diagram (1)
- d. Punctuality (1)
- e. Neatness (1)

**Station No. 2 (Gross Anatomy)**

Core Concept - Learning Domain (C2)

- I. On the cadaver/model,
  - a. Identify Red (1)
  - b. Identify Yellow (1)
  - c. Identify Green (1)

**Rawalpindi Medical University Department of Physiology**  
**Block-II OSPE 1<sup>st</sup> Year MBBS**

**Station No.1** Time Allowed: 2 Minutes

- a. What is the preferred dilution ratio for RBC count & platelet count? (0.5, 0.5)
- b. Write the composition of Hayem's Fluid. (1)
- c. How would you interpret a platelet count of 80,000 /mm<sup>3</sup>? (1)

**Station No.2** Time Allowed: 2 Minutes

- a. Identify the cells labeled A & B. (0.5)
- b. Points of Identification. (1.5)
- c. What is the power of objective lens used for identifying the cells and how much (0.5, 0.5)  
was the total magnification achieved?

**Rawalpindi Medical University Department of Biochemistry**  
**Block-II OSPE 1<sup>st</sup> Year MBBS**

**Station No. 2**

Time Allowed: 2 Mins

**Observed station**

Perform Biuret test 03

**Station No. 1**

Time Allowed: 2 Mins

**Observed Station**

Perform Lead Sulfide test. 03



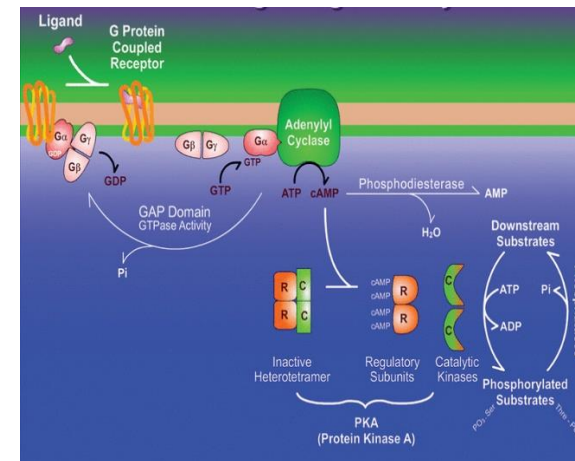
**Rawalpindi Medical University Department of Anatomy**  
**Block-II Video Assisted Quiz 1<sup>st</sup> Year MBBS**

- I. What is this clinical condition? (1)
- II. Describe its features with the muscle affected (4)



**Rawalpindi Medical University Department of Biochemistry**  
**Block-II Video Assisted Quiz 1<sup>st</sup> Year MBBS**

1. Name this signaling pathway and ligands that bind to GPCR. (2)
2. What is the mechanism of action of G proteins? (2)
3. Name the drugs/compounds that inhibit phosphodiesterase (1)





## Cardiovascular System Module

### Study Guide

First Year MBBS 2022 - 2023





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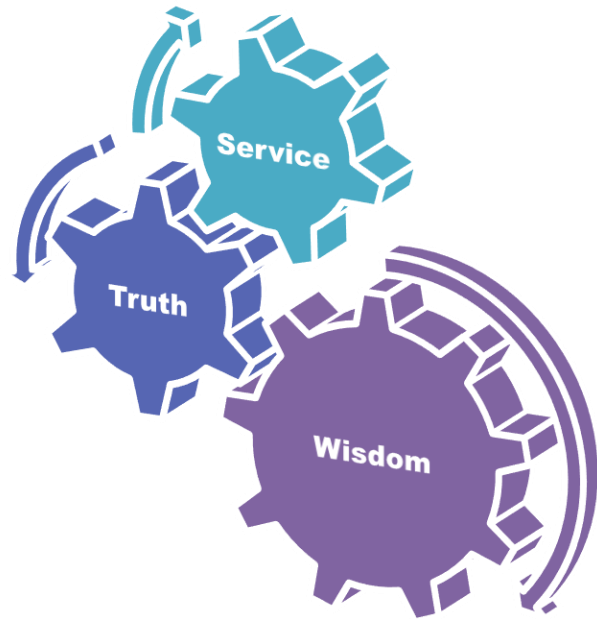
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## University Moto, Vision, Values & Goals

### RMU Motto



### Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

### Vision and Values

Highly recognized and accredited centre of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

### Goals of the Undergraduate Integrated Modular Curriculum

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the Health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of knowledge to help you attain personal and professional growth & excellence.

**First Year MBBS 2023**

**Study Guide**

**CVS Module**

## Discipline wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
III1	<ul style="list-style-type: none"> <li>Anatomy</li> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>Heart &amp; Vessels</li> </ul>	<ul style="list-style-type: none"> <li>Cardiovascular System</li> </ul>	<ul style="list-style-type: none"> <li>Heart &amp; Vessels</li> </ul>	Mediastinum, Heart, Great Vessels
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>Carbohydrate chemistry, Lipid chemistry</li> <li>The Heart as a Pump and Function of the Heart Valves &amp; regulation of heart pumping, cardiac cycle</li> <li>Rhythmical Excitation of the Hear &amp; Specialized excitatory &amp; conductive system of the heart &amp; its control (revisit)</li> <li>Electrocardiogram, its interpretation &amp; its abnormalities</li> <li>Medical Physics of Pressure, Flow, and Resistance, Vascular Distensibility and Functions of the Arterial and Venous Systems</li> <li>Microcirculation and the Lymphatic System, Local and Humoral Control of Blood Flow by the Tissues</li> <li>Nervous Regulation of the Circulation, and Rapid &amp; Long-Term Control of Arterial Pressure, hypertension</li> <li>Cardiac Output, Venous Return, and Their Regulation</li> <li>Muscle Blood Flow and Cardiac Output During Exercise; the Coronary &amp; regional circulation</li> <li>Cardiac Failure, Circulatory Shock</li> <li>Heart Valves and Heart Sounds; Dynamics of Valvular and Congenital Heart Defects</li> </ul>			
	<ul style="list-style-type: none"> <li>Behavioural Sciences, Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>Breaking the bad news</li> <li>Stigma to mental illness</li> </ul>			
	<ul style="list-style-type: none"> <li>Radiology, Artificial Inteligence &amp; Innovation</li> </ul>	<ul style="list-style-type: none"> <li>Chest radiograph with perspective of cardiovascular system</li> <li>Radiology with perspective of Artificial Intelligence &amp; Innovation.</li> </ul>			
	<ul style="list-style-type: none"> <li>Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>Approach to a patient with chest pain</li> </ul>			
	<ul style="list-style-type: none"> <li>Research</li> <li>Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>Research Club Activity (Synopsis writing)</li> <li>The Holy Quran Translation Component</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical Integration</li> </ul>	Clinically content relevant to CVS module <ul style="list-style-type: none"> <li>Risk factors of coronary vascular disease (Community Medicine)</li> <li>Breaking bad news (Behavior Sciences)</li> <li>DME orientation/paper discussion (DME)</li> <li>Thrombosis &amp; Infarction (Pathology)</li> <li>Approach to a patient with chest pain (Family Medicine)</li> <li>Hypertensive retinopathy (Eye)</li> <li>ECG Changes (MI, Electrical Imbalance, Myocardial hypertrophy) (Medicine)</li> <li>Overview of acute coronary syndrome &amp; management of heart failure &amp; management of shock (Medicine)</li> <li>Hypertension (Medicine)</li> <li>Clinical pharmacology of antihypertensive drugs (Pharmacology)</li> <li>Cardiovascular changes in pregnancy (Gynae &amp; Obs)</li> </ul>			

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## CVS Module Team

Module Name	:	CVS Module
Duration of module	:	05 Weeks
Coordinator	:	Dr. Aneela Yasmeen
Co-Coordinator	:	Dr. Sheena Tariq
Reviewed by	:	Module Committee

Module Committee			Module Task Force Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Aneela Yasmeen Senior demonstrator physiology
2.	Director DME	Prof. Dr. Rai Muhammad Asghar	2.	Co-coordinator	Dr. Kashif Senior Demonstrator of Biochemistry
3.	Convener Curriculum	Prof. Dr. Naeem Akhter	3.	DME Focal person	Dr. Sidra Hamid Assistant Professor Physiology
4.	Dean basic sciences and Chairperson Anatomy	Prof Dr. Ayesha Yousaf	4.	Co-coordinator	Dr. Ali Raza Demonstrator of Anatomy
5.	Additional Director DME	Prof. Dr. Ifra Saeed	5.	Co-coordinator	Dr. Sheena Tariq APWMO of Physiology
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar	<b>DME Implementation Team</b>		
7.	Chairperson Biochemistry	Dr. Aneela Jamil	1.	Director DME	Dr. Rai Muhammad Asghar
8.	Focal Person Anatomy	Prof Dr. Ayesha Yousaf	2.	Deputy Director DME	Dr. Shazia Zeb
9.	Focal Person Physiology	Dr. Sidra Hamid	3.	Implementation Incharge 1st&2 <sup>nd</sup> Year MBBS	Prof. Dr. Ifra Saeed
10.	Focal Person Biochemistry	Dr. Aneela Jamil	4.	Module planner & implementation coordinator	Dr. Sidra Hamid
11.	Focal Person Pharmacology	Dr. Zunera Hakim	5.	Editor	Muhammad Arslan Aslam
12.	Focal Person Medicine	Dr Madiha Nazar			
13.	Focal Person Pathology	Dr. Asiya Niazi			
14.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
15.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
16.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar			

## Module V – CVS Module

**Rationale:** The main role of the cardiovascular system in the body is to transport oxygen to all tissues in the body and for removing, from these same tissues, metabolic waste products. The system itself consists of the blood, the medium for exchanging oxygen, nutrients and waste products throughout the body, the blood vessels, the pipes through which the blood flows and the heart, the pump which forces blood to flow through the blood vessels.

Cardiovascular health is important in maintaining overall health and wellness. This module will teach how heart and cardiovascular system work when healthy, and what happens when diseased. We will explore through lectures, SGDs and skill lab normal anatomy, physiology, biochemistry of CVS. This module will briefly discuss the common CVS diseases & their prevention, therapeutic drug treatment, behavioral aspects, radiological findings.

### Module Outcomes

At the end of this module the student should be able to:

#### Knowledge:

1. Explain the structural & developmental organization of CVS.
2. Explain different waves, segment and intervals of ECG and apply it to the interpretation of ECG.
3. Use technology based medical education including **Artificial Intelligence.**
4. Appreciate concepts & importance of **Family Medicine**  
**Biomedical Ethics**  
**Research**

#### Skill:

1. Understand the physiology of conductive system of heart, cardiac cycle.
2. Must understand the pathophysiology of edema, infarction, shock and thrombosis.

#### Attitude:

- Demonstrate **Professional Attitude, Team-Building Spirit and Good Communication Specially in Small Group Discussions.**



## SECTION - I

### Terms & Abbreviations

#### Contents

- Domains of Learning
- Teaching and Learning

#### Methodologies/Strategies

- Large Group Interactive Session (LGIS)
- Small Group Discussion (SGD)
- Self-Directed Learning (SDL)
- Case Based Learning (CBL)
- Problem- Based Learning (PBL)
- Skill Labs/Practicals (SKL)

#### Tables & Figures

- Table1. Domains of learning according to Blooms Taxonomy
- Figure 1. Prof Umar's Model of Integrated Lecture
- Table2. Standardization of teaching content in Small Group Discussions
- Table 3. Steps of taking Small Group Discussions
- Figure 2. PBL 7 Jumps Model

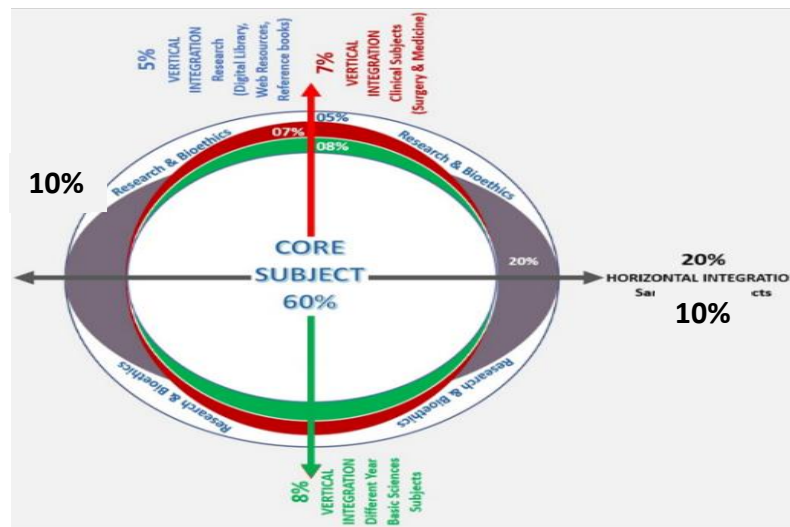
**Table1. Domains of Learning According to Blooms Taxonomy**

Sr. #	Abbreviation	Domains of learning
1.	C	<b>Cognitive Domain:</b> knowledge and mental skills.
	• C1	Remembering
	• C2	Understanding
	• C3	Applying
	• C4	Analyzing
	• C5	Evaluating
	• C6	Creating
2.	P	<b>Psychomotor Domain:</b> motor skills.
	• P1	Imitation
	• P2	Manipulation
	• P3	Precision
	• P4	Articulation
	• P5	Naturalization
3.	A	<b>Affective Domain:</b> feelings, values, dispositions, attitudes, etc
	• A1	Receive
	• A2	Respond
	• A3	Value
	• A4	Organize
	• A5	Internalize

## Teaching and Learning Methodologies / Strategies

### Large Group Interactive Session (LGIS)

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will be followed for delivery of all LGIS. The lecturer will introduce a topic or common clinical condition and explain the underlying phenomena through questions, pictures, videos of patients, interviews and exercises, etc. Students are actively involved in the learning process.



**Figure 1. Prof Umar's Model of Integrated Lecture**

## Small Group Discussion (SGD)

This format helps students to clarify concepts acquire skills and attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics or power point presentations. Students exchange opinions and apply knowledge gained from lectures, SGDs and self study. The facilitator role is to ask probing questions, summarize and help to clarify the concepts.

**Table 2. Standardization of teaching content in Small Group Discussions**

S. No	Topics	Approximate %
1	Title Of SGD	
2	Learning Objectives from Study Guides	
3	Horizontal Integration	5%+5%=10%
4	Core Concepts of the topic	60%
5	Vertical Integration	20%
6	Related Advance Research points	3%
7	Related Ethical points	2%

**Table 3. Steps of Implementaion of Small Group Discussions**

Step 1	Sharing of Learning objectives by using students Study guides	First 5 minutes
Step 2	Asking students pre-planned questions from previous teaching session to develop co-relation (these questions will be standardized)	5minutes
Step 3	Students divided into groups of three and allocation of learning objectives	5minutes
Step 4	ACTIVITY: Students will discuss the learning objectives among themselves	15 minutes
Step 5	Each group of students will present its learning objectives	20 min
Step 6	Discussion of learning content in the main group	30min
Step 7	Clarification of concept by the facilitator by asking structured questions from learning content	15 min
Step 8	Questions on core concepts	
Step 9	Questions on horizontal integration	
Step 10	Questions on vertical integration	
Step 11	Questions on related research article	
Step 12	Questions on related ethics content	
Step 13	Students Assessment on online MS teams (5 MCQs)	5 min
Step 14	Summarization of main points by the facilitator	5 min
Step 15	Students feedback on the SGD and entry into log book	5 min
Step 16	Ending remarks	

### Self Directed Learning (SDL)

- Self- directed learning is a process where students take primary charge of planning, continuing, and evaluating their learning experiences.
- Time Home assignment
- Learning objectives will be defined
- Learning resources will be given to students = Textbook (page no), web site
- Assessment:
  - i Will be online on LMS (Mid module/ end of Module)
  - ii.OSPE station

### Case Based Learning (CBL)

- It's a learner centered model which engages students in discussion of specific scenarios that typically resemble real world examples.
- Case scenario will be given to the students
- Will engage students in discussion of specific scenarios that resemble or typically are real-world examples.
- Learning objectives will be given to the students and will be based on
  - i. To provide students with a relevant opportunity to see theory in practice
  - ii. Require students to analyze data in order to reach a conclusion.
  - iii. Develop analytic, communicative, and collaborative skills along with content knowledge.

### Problem Based Learning (PBL)

- Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.
- This problem is what drives the motivation and the learning.

The 7- Jump-Format of PBL (Mastricht Medical School)	
Step 7	Synthese & Report
Step 6	Collect Information from outside
Step 5	Generate learning Issues
Step 4	Discuss and Organise Ideas
Step 3	Brainstorming to Identify Explanations
Step 2	Define the Problem
Step 1	Clarify the Terms and Concepts of the Problem Scenario
	Problem- Scenario

**Figure 2. PBL 7 Jumps Model**

## Practical Sessions/Skill Lab (SKL)

Practical Session/ Skill Lab (SKL)	
Demonstration/ power point presentation 4-5 slide	10-15 minutes
Practical work	25-30 minutes
Write/ draw and get it checked by teacher	20-25 minutes
05 mcqs at the end of the practical	10 minutes
At the end of module practical copy will be signed by head of department	
At the end of block the practical copy will be signed by	
Head of Department	
Dean	
Medical education department	
QEC	

## SECTION – II

### Learning Objectives, Teaching Strategies & Assessments

#### Contents

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



## Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

### Anatomy Large Group Interactive Session (LGIS)

Topic	Learning Objectives At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
<b>General Anatomy</b>				
General Anatomy of CVS (General Organization)	• Describe general organization of cardiovascular system	C2	LGIS	MCQ SAQ VIVA
	• Describe different types of circulations	C2		
	• Discuss general structural patterns of arteries and veins	C2		
	• Classify capillaries	C1		
	• Explain bio - functional importance and location of continuous, fenestrated and sinusoidal capillaries	C2		
	• Discuss related clinicals	C3		
	• How to access HEC digital library	C3		
• How to read relevant research article	C3			
General Anatomy of CVS (Classification of vessels)	• Classify arteries on the basis of function and size	C1	LGIS	MCQ SAQ VIVA
	• Classify veins on the basis of function and size	C1		
	• Describe differences between arteries and veins	C2		
	• Define anastomosis and discuss different types of arterial and venous anastomosis	C2		
	• Differentiate between anatomic end arteries and functional end arteries giving example	C2		
	• Discuss related clinicals	C3		
	• How to access HEC digital library	C3		
• How to read relevant research article	C3			
<b>Histology</b>				
Histology of CVS (Arteries and Veins)	• Describe general histological structure of arteries and veins	C2	LGIS	MCQ SAQ VIVA
	• Tabulate histological differences between arterioles, medium sized arteries, and large arteries	C2		
	• Discuss related clinicals	C3		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Histology of CVS	• Differentiate between continuous, fenestrated and sinusoidal capillaries	C2	LGIS	MCQ
	• Enlist bio functions of endothelium	C2		

(Capillaries)	• Discuss related clinicals	C2		SAQ VIVA
	• How to access How to access HEC digital library	C3		
	• How to Read How to read relevant research article	C3		
Histology of CVS (Tunics of Heart & Lymphatic System)	• Describe histological details of endocardium, myocardium and epicardium	C3	LGIS	MCQ SAQ VIVA
	• Tabulate differences between blood capillaries and lymphatic capillaries	C2		
	• How to access How to access HEC digital library	C3		
	• How to Read How to read relevant research article	C3		
<b>Embryological Development</b>				
Development of CVS (Development of Veins)	• Recall the process of vasculogenesis	C2	LGIS	MCQ SAQ VIVA
	• Describe venous drainage of embryo	C2		
	• Enlist derivatives of vitelline veins	C1		
	• Discuss role cardinal veins	C2		
	• Describe Development of inferior vena cava	C2		
	• Discuss related Congenital abnormalities	C3		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Development of CVS (Aortic Arches and derivatives)	• Describe development and transformation of aortic arches	C2	LGIS	MCQ SAQ VIVA
	• Enlist derivatives of 1-6th aortic arches	C1		
	• Discuss formation of intersegmental arteries	C2		
	• Describe sources and formation of coronary arteries	C2		
	• Discuss development of aorta Related Congenital abnormalities	C3		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Development of CVS (Formation, Position and Partitioning of heart tube)	• Discuss establishment of cardiogenin field	C2	LGIS	MCQ SAQ VIVA
	• Describe formation and position of heart tube in developing embryo	C2		
	• Discuss formation of cardiac loop	C2		
	• Describe development of sinus venosus	C2		
	• Explain importance of septum spurium	C2		
	• Describe development of cardiac septa	C2		
	• Discuss different methods of septum formation	C2		
	• Explain septum formation in right atrium	C2		
• Describe development and differentiation of atria	C2			

	<ul style="list-style-type: none"> <li>• Discuss related congenital abnormalities</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• How to access HEC digital library</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• How to read relevant research article</li> </ul>	C3		
Development of CVS (Formation and partitioning of Ventricles)	<ul style="list-style-type: none"> <li>• Discuss formation of septum in atrioventricular canal</li> </ul>	C2	LGIS	MCQ SAQ VIVA
	<ul style="list-style-type: none"> <li>• Describe formation of atrioventricular valves</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Explain septum formation in truncus arteriosus &amp; conus cordis</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Describe septum formation in ventricles Discuss formation of semilunar valves</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss development of conducting system of heart</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss related Congenital abnormalities</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• How to access HEC digital library</li> </ul>	C3		
Development of CVS (Fetal circulation)	<ul style="list-style-type: none"> <li>• Describe fetal circulation in detail</li> </ul>	C2	LGIS	MCQ SAQ VIVA
	<ul style="list-style-type: none"> <li>• Discuss role of foramen ovale, ductus arteriosus and ductus venosus in fetal circulation and their fate</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Differentiate between fetal and postnatal circulation</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss related Congenital abnormalities</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• How to access HEC digital library</li> </ul>	C3		

### Physiology Large Group Interactive Session (LGIS)

Topics	Learning Objectives	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Introduction to CVS	1. Describe scheme of circulation through the heart and body	<ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Cardiovascular Physiology (Chapter 14, Page 469)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cardiovascular Physiology (Chapter 4, Page 117)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. Section 02, (Chapter 05, Page 101)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/28CYhgjrBLA">https://youtu.be/28CYhgjrBLA</a></li> <li>2. <a href="https://training.seer.cancer.gov/anatomy/cardiovascular/#:~:text=The%20cardiovascular%20system%20is%20sometimes,arteries%2C%20veins%2C%20and%20capillaries.">https://training.seer.cancer.gov/anatomy/cardiovascular/#:~:text=The%20cardiovascular%20system%20is%20sometimes,arteries%2C%20veins%2C%20and%20capillaries.</a></li> </ol>	1.C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Classification of blood vessels & Biophysical considerations	1.Enumerate Classification of blood vessels. 2.Explain structure and functions of types of blood vessels	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05, Cardiovascular Physiology (Chapter 31, Page 567,571)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 15, Page 513)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4, Page 119)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 04 (Chapter 15, Page 183)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/ar2_UPiGzmU">https://youtu.be/ar2_UPiGzmU</a></li> <li><a href="https://training.seer.cancer.gov/anatomy/cardiovascular/blood/classification.html">https://training.seer.cancer.gov/anatomy/cardiovascular/blood/classification.html</a></li> </ol>	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Heart Sounds	Describe four heart sound and differences between 1st and 2nd heart sounds	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05, Cardiovascular Physiology (Chapter 30, Page 542)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Section 04. (Chapter 23, Page 283)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/dBwr2GZCmQM">https://youtu.be/dBwr2GZCmQM</a></li> <li><a href="https://www.utmb.edu/pedi_ed/CoreV2/Cardiology/cardiolog yV2/cardiologyV23.html">https://www.utmb.edu/pedi_ed/CoreV2/Cardiology/cardiolog yV2/cardiologyV23.html</a></li> </ol>	C1/C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Regulation of blood flow	Define and describe Resistance to Blood flow Describe regulation of Blood pressure and Poiseuilles law Describe factors related with Blood viscosity and its role in regulation	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05, Cardiovascular Physiology (Chapter 31, Page 575)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 02(Chapter 5, Page 107) (Chapter 6,page 110)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/cocB-M3h9k0">https://youtu.be/cocB-M3h9k0</a></li> <li><a href="https://journals.physiology.org/doi/full/10.1152/advan.00074.2010">https://journals.physiology.org/doi/full/10.1152/advan.00074.2010</a></li> </ol>	C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

		<ul style="list-style-type: none"> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Section 04. (Chapter 14, Page 173) (Chapter 17, Page 205)</li> </ul>				
Capillary circulation, Concept of vasomotion and starling forces	<p>Explain the details of types of starling forces .</p> <p>Expalin role of starling forces in different pathological conditions</p>	<ul style="list-style-type: none"> <li>Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 31, Page 577)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 170)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor’s.13<sup>th</sup> Edition.Section 02(Chapter 6,Page 119)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 04. (Chapter 16, Page 193)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/YNROPnYy1tc">https://youtu.be/YNROPnYy1tc</a></li> <li><a href="https://www.osmosis.org/learn/Microcirculation_and_Starling_forces">https://www.osmosis.org/learn/Microcirculation_and_Starling_forces</a></li> </ol>	C2 C2	LGIS	<p>MCQ</p> <p>SEQ</p> <p>VIVA VOCE</p> <p>MCQ (LMS based Aseessment, MST based Assessment)</p> <p>OSPE</p>
Functions of veins, Venous return and factors affecting venous return	<p>Describe how veins are different from arteries</p> <p>Explain Various factors that affect venous return</p>	<ul style="list-style-type: none"> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 158)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Section 4. (Chapter 15, Page 188)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/FKJr5uqPv5s">https://youtu.be/FKJr5uqPv5s</a></li> <li><a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/venous-return">https://www.sciencedirect.com/topics/medicine-and-dentistry/venous-return</a></li> </ol>	C1 C2	LGIS	<p>MCQ</p> <p>SEQ</p> <p>VIVA VOCE</p> <p>MCQ (LMS based Aseessment, MST based Assessment)</p> <p>OSPE</p>
Introduction to ECG & its clinical importance	<p>Enumerate and describe normal components of ECG</p> <p>Draw normal ECG</p> <p>Describe the method of recording ECG</p> <p>Describe the following. Bipolar limb leads.</p>	<ul style="list-style-type: none"> <li>Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition.Section 01,Immunity,Infection and Inflammation(Chapter 29, Page 522)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/SEFhbK8ZCgk">https://youtu.be/SEFhbK8ZCgk</a></li> <li><a href="https://my.clevelandclinic.org/health/diagnostics/16953-electrocardiogram-ekg">https://my.clevelandclinic.org/health/diagnostics/16953-electrocardiogram-ekg</a></li> </ol>	C1 C1 C1 C1 C1 C1 C1	LGIS	<p>MCQ</p> <p>SEQ</p> <p>VIVA VOCE</p> <p>MCQ (LMS based Aseessment, MST</p>

	Describe Einthovians law and Enthovian triangle. Describe Chest leads and Augmented unipolar limb leads Describe how to read normal ECG Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG	<ul style="list-style-type: none"> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 491)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Chapter 09,Page 170)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 11, Page 135)</li> </ul>		C1		based Assessment) OSPE
Cardiac output & its control, measurement of cardiac output, pathologically high and low cardiac output	Explain cardiac output Understand various method to measure cardiac output Explain various factor which help in regulation of heart rate and stroke volume	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 30, Page 543)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 500-507)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 149,154-158)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 04. (Chapter 20, Page 245)((Chapter 22, Page 280)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/WuGMqezV3e">https://youtu.be/WuGMqezV3e</a></li> <li><a href="https://teachmephysiology.com/cardiovascular-system/cardiac-output/">https://teachmephysiology.com/cardiovascular-system/cardiac-output/</a></li> </ol>	C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Vectorial analysis & arrhythmias I	Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG Define arrhythmia Describe abnormal sinus rhythms	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 29, Page 526)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 09,Page 179,180-189)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03.</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/">https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/</a></li> <li><a href="https://youtu.be/6LrptveKYus">https://youtu.be/6LrptveKYus</a></li> <li><a href="https://www.medicalnewstoday.com/articles/8887#definition">https://www.medicalnewstoday.com/articles/8887#definition</a></li> </ol>	C1 C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)

		(Chapter 12, Page 143)((Chapter 13, Page 157)				OSPE
Cardiac cycle - I, Events of cardiac cycle and its graphical representation	Describe the cardiac cycle in detail Enumerate and explain its events Explain the events of cardiac cycle	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 05, (Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14, Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cardiovascular Physiology (Chapter 4, Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Section 03. (Chapter 9, Page 117)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/XbivIaFPoQI">https://youtu.be/XbivIaFPoQI</a></li> <li><a href="https://www.sciencedirect.com/science/article/pii/S0010027721003309">https://www.sciencedirect.com/science/article/pii/S0010027721003309</a></li> <li><a href="https://youtu.be/sLLLOaZ85Lk">https://youtu.be/sLLLOaZ85Lk</a></li> <li><a href="https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/">https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/</a></li> <li><a href="https://youtu.be/HNkwXZSSsU">https://youtu.be/HNkwXZSSsU</a></li> </ol>	C1 C1, C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Arrhythmias II	Describe abnormal rhythms resulting from the block of heart signals within the intra cardiac conduction pathways Define ectopic beats Explain the following with the help of relevant ECGs. Premature contractions. Paroxysmal tachycardia. Ventricular fibrillation. Atrial fibrillation. Atrial flutter. Cardiac arrest. Describe different degrees of heart block and ECG changes Explain atrial and ventricular flutter and fibrillation	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 05 (Chapter 29, Page 527)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. (Chapter 09, Page 180-189)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Section 03. (Chapter 13, Page 157)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/6LrptveKYus">https://youtu.be/6LrptveKYus</a></li> <li><a href="https://www.medicalnewstoday.com/articles/8887#definition">https://www.medicalnewstoday.com/articles/8887#definition</a></li> </ol>	C1 C1 C2 C2 C2 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

<p>Cardiac cycle – II, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping</p>	<p>Draw various events during cardiac cycle Explain regulation of heart pumping</p>	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 30, Page 537)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 495-500)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 9, Page 117-126)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/dmPtaJxgRQU">https://youtu.be/dmPtaJxgRQU</a></li> <li>2. <a href="https://youtu.be/VI9zo_CzQ9g">https://youtu.be/VI9zo_CzQ9g</a></li> <li>3. <a href="https://youtu.be/pli2zs8Kekw">https://youtu.be/pli2zs8Kekw</a></li> <li>4. <a href="https://youtu.be/kMJ-US6Qfqc">https://youtu.be/kMJ-US6Qfqc</a></li> <li>5. <a href="https://youtu.be/qhtAhbyBSfs">https://youtu.be/qhtAhbyBSfs</a></li> <li>6. <a href="https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/">https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/</a></li> </ol>	<p>C1 C2</p>	<p>LGIS</p>	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE</p>
<p>ECG changes in myocardial hypertrophies, ischemic heart disease</p>	<p>Discuss ECG changes in different diseases</p>	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 29, Page 532)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor’s.13<sup>th</sup> Edition.(Chapter 12,Page 151)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://youtu.be/SEFhbK8ZCgk">https://youtu.be/SEFhbK8ZCgk</a></li> <li>• <a href="https://youtu.be/D0V_aQXtRSw">https://youtu.be/D0V_aQXtRSw</a></li> <li>• <a href="https://www.msmanuals.com/home/heart-and-blood-vessel-disorders/diagnosis-of-heart-and-blood-vessel-disorders/electrocardiography">https://www.msmanuals.com/home/heart-and-blood-vessel-disorders/diagnosis-of-heart-and-blood-vessel-disorders/electrocardiography</a></li> </ul>	<p>1.C2</p>	<p>LGIS</p>	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE</p>
<p>Short term regulation of blood pressure</p>	<p>Explain short term regulation of blood pressure Explain central nervous system ischemic response &amp; cushing reaction</p>	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 32, Page 585,590)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 15,Page 517,528)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/HUf1LtkPj1k">https://youtu.be/HUf1LtkPj1k</a></li> <li>2. <a href="https://www.sciencedirect.com/topics/nursing-and-health-professions/blood-pressure-regulation">https://www.sciencedirect.com/topics/nursing-and-health-professions/blood-pressure-regulation</a></li> <li>3. <a href="https://www.cliffsnotes.com/study-guides/anatomy-and-physiology/the-cardiovascular-">https://www.cliffsnotes.com/study-guides/anatomy-and-physiology/the-cardiovascular-</a></li> </ol>	<p>C2 C2</p>	<p>LGIS</p>	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE</p>



		<ul style="list-style-type: none"> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 18,Page 217)</li> </ul>	<a href="#">system/control-of-blood-pressure</a>			
Congestive cardiac failure	<p>Define cardiac failure. Classify cardiac failure</p> <p>Enumerate the causes of cardiac failure and discuss in detail.</p> <p>Discuss and differentiate between compensated heart failure and decompensated heart failure</p> <p>Discuss and differentiate between Low and high output cardiac failure</p> <p>Define Cardiac reserve.</p>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 30, Page 538)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 22,Page 271)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://www.webmd.com/heart-disease/guide-heart-failure">https://www.webmd.com/heart-disease/guide-heart-failure</a></li> <li><a href="https://youtu.be/EDCaFKgtXks">https://youtu.be/EDCaFKgtXks</a></li> <li><a href="https://www.healthline.com/health/congestive-heart-failure">https://www.healthline.com/health/congestive-heart-failure</a></li> </ol>	C1/C2 C1 C2 C2 C1	LGIS	<p>MCQ</p> <p>SEQ</p> <p>VIVA VOCE</p> <p>MCQ (LMS based Aseessment, MST based Assessment)</p> <p>OSPE</p>
Long term regulation of blood pressure	<p>Explain the role of kidneys in long term regulation of blood pressure</p>	<ul style="list-style-type: none"> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 16,page 282)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 19, Page 229)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/5S9xEpAdAgA">https://youtu.be/5S9xEpAdAgA</a></li> <li><a href="https://jps.biomedcentral.com/articles/10.1007/s12576-012-0192-0">https://jps.biomedcentral.com/articles/10.1007/s12576-012-0192-0</a></li> <li><a href="https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x">https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x</a></li> </ol>	C2	LGIS	<p>MCQ</p> <p>SEQ</p> <p>VIVA VOCE</p> <p>MCQ (LMS based Aseessment, MST based Assessment)</p> <p>OSPE</p>
Splanchnic circulation, cutaneous circulation	<p>Describe the Physiologic anatomy of cerebral blood flow</p> <p>Describe the blood flow in normal state and local control of blood flow</p>	<ul style="list-style-type: none"> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 173)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 7,page 146)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/hr6oGuW7mVA">https://youtu.be/hr6oGuW7mVA</a></li> <li><a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/splanchnic-blood-flow">https://www.sciencedirect.com/topics/medicine-and-dentistry/splanchnic-blood-flow</a></li> </ol>	C2 C2	LGIS	<p>MCQ</p> <p>SEQ</p> <p>VIVA VOCE</p> <p>MCQ (LMS based Aseessment, MST based Assessment)</p>

			3. <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2999290/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2999290/</a>			OSPE
Skeletal muscle blood flow, Cardiovascular changes during exercise	Discuss the blood flow regulation in skeletal muscle at rest and during exercise.	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 05(Chapter 30, Page 549) Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 178) Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition.(Chapter 07,Page 148) Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition.. (Chapter 18, Page 226)(Chapter 21,Page 259)	1. <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/muscle-blood-flow">https://www.sciencedirect.com/topics/medicine-and-dentistry/muscle-blood-flow</a> 2. <a href="https://youtu.be/H6Fd8sfE2eQ">https://youtu.be/H6Fd8sfE2eQ</a>	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Fetal circulation & cardiac abnormalities in fetal circulation	Describe the fetal circulation Discuss the pathophysiology of cardiac abnormalities related to it	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 33, Page 614)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 4(Chapter 23,Page 288)</li> </ul>	1. <a href="https://youtu.be/rYVGjzbmAtg">https://youtu.be/rYVGjzbmAtg</a> 2. <a href="https://www.sciencedirect.com/science/article/abs/pii/0033062072900151">https://www.sciencedirect.com/science/article/abs/pii/0033062072900151</a> 3. <a href="https://myhealth.ucsd.edu/Conditions/Heart/Congenital/90,P01790">https://myhealth.ucsd.edu/Conditions/Heart/Congenital/90,P01790</a>	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Circulatory Shock	Define shock. Describe the physiologic causes of shock. Enumerate various types of shock. Describe the stages of shock Describe the following types of shock in detail.	<ul style="list-style-type: none"> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 4(Chapter 24,Page 293)</li> </ul>	1. <a href="https://youtu.be/VZtBOaAMG9w">https://youtu.be/VZtBOaAMG9w</a> 2. <a href="https://my.clevelandclinic.org/health/diseases/17837-cardiogenic-shock">https://my.clevelandclinic.org/health/diseases/17837-cardiogenic-shock</a>	1.C1 2.C1 3.C1 4.C1 5.C1 6.C1 7.C1 8.C1 9.C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST

	Describe Circulatory shock and Hypovolemic shock. Describe Neurogenic shock. Describe Septic shock. Describe Anaphylactic shock					based Assessment) OSPE
Coronary circulation, Atherosclerosis & acute coronary occlusion	Understand the physiologic anatomy of coronary blood supply and normal coronary blood flow Discuss the control of coronary blood flow	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 05(Chapter 33, Page 610) Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition.(Chapter 15,Page 265) Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition.. (Chapter 21, Page 262)	1. <a href="https://www.msmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/overview-of-coronary-artery-disease">https://www.msmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/overview-of-coronary-artery-disease</a> 2. <a href="https://youtu.be/WKrVxKJVh00">https://youtu.be/WKrVxKJVh00</a> 3. <a href="https://www.uptodate.com/contents/mechanisms-of-acute-coronary-syndromes-related-to-atherosclerosis">https://www.uptodate.com/contents/mechanisms-of-acute-coronary-syndromes-related-to-atherosclerosis</a>	1.C2 2.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Cardiac cycle, Events of cardiac cycle and its graphical representation, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping (SDL)	Describe the cardiac cycle in detail Enumerate and explain its events Explain the events of cardiac cycle	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 9, Page 117)</li> </ul>	1. <a href="https://youtu.be/XbivIaFPoQI">https://youtu.be/XbivIaFPoQI</a> 2. <a href="https://www.sciencedirect.com/science/article/pii/S0010027721003309">https://www.sciencedirect.com/science/article/pii/S0010027721003309</a> 3. <a href="https://youtu.be/sLLLOaZ85Lk">https://youtu.be/sLLLOaZ85Lk</a> 4. <a href="https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/">https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/</a> 5. <a href="https://youtu.be/HNkwXZSSsU">https://youtu.be/HNkwXZSSsU</a>	C1 C1/C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

## Biochemistry Large Group Interactive Session (LGIS)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Definition and Biological importance of lipids.	• Define lipids	C1	LGIS	MCQs
	• Classify lipids	C2		SAQs
	• Describe Biomedical significance of lipids	C2		Viva
Fatty acids	• Classify fatty acids	C1	LGIS	MCQs
	• Describe physical and chemical properties of fatty acids	C2		SAQs Viva
Simple lipids	• Elaborate Structure and physical properties of Triglycerides	C2	LGIS	MCQs
	• Discuss Chemical properties of Triglycerides and their clinical significance	C2		SAQs Viva
Compound lipids (Phospholipids, glycolipids, lipoproteins)	• Classify compound lipids	C2	LGIS	MCQs
	• Discuss structure and functions of compound lipids	C2		SAQs
	• Interpret the clinical role of compound lipids	C3		Viva
Derived lipids	• Describe derived lipids	C2	LGIS	MCQs SAQs Viva
Cholesterol	• Describe Structure and physical properties of Cholesterol	C2	LGIS	MCQs
	• Discuss Chemical properties and functions	C2		SAQs
	• Interpret clinical findings of hypercholesterolemia	C3		Viva
Prostaglandins	• Classify Prostaglandins	C2	LGIS	MCQs
	• Describe functions and clinical significance of Prostaglandins.	C2		SAQs
	• Interpret the role of drugs in prostaglandin synthesis	C3		Viva
<b>Carbohydrate Chemistry</b>				
Introduction and classification of carbohydrates	• Classify carbohydrates	C2	LGIS	MCQs
	• Explain different types of carbohydrates and their clinical significance	C2		SAQs Viva
Isomerism, optical activity and mutarotation	• Discuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)	C2	LGIS	MCQs SAQs Viva
Monosaccharide	• Classify monosaccharide	C2	LGIS	MCQs
	• Describe chemical properties of monosaccharide	C2		SAQs
	• Interpret the clinical role of sorbitol, mannitol and cardiac glycosides	C3		Viva

Disaccharides	<ul style="list-style-type: none"> <li>Describe Structure and functions of Individual sugars</li> </ul>	C2	LGIS	MCQs SAQs Viva
Homopolyssacharides	<ul style="list-style-type: none"> <li>Explain Structure, physical and chemical properties of homopolyssacharide and their biological importance.</li> </ul>	C2	LGIS	MCQs SAQs Viva
Heteropolysaccharides	<ul style="list-style-type: none"> <li>Explain Structure, physical and chemical properties of heteropolysaccharides and their biological importance.</li> <li>Apply the role of heteropolysaccharides in clinical cases</li> </ul>	C2 C3	LGIS	MCQs SAQs Viva

### Anatomy Small Group Discussion (SGDs)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Thoracic Wall / Thoracic Vertebra	• Define thorax	C1	SGD, Skills Lab	MCQ SAQ VIVA OSPE
	• Discuss components and shape of thoracic cavity.	C2		
	• Discuss the applied and the related clinical anatomy	C2		
	• Classify Ribs	C1		
	• Describe ribs (side determination, features, attachments, relations, types and ossification.	C2		
	• Discuss the applied and the related clinical anatomy	C3		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Mediastinum	• Discuss the boundaries and division of mediastinum	C2	SGD Skills lab	MCQ SAQ VIVA OSPE
	• Enumerate the contents of anterior mediastinum.	C1		
	• Discuss related clinicals	C3		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Pericardium	• Describe the gross features of fibrous pericardium with its blood and nerve supply	C2	SGD Skills lab	MCQ SAQ VIVA OSPE
	• Describe the gross features of serous pericardium with its blood and nerve supply	C2		
	• Describe transverse and oblique pericardial sinus	C2		
	• Describe the Clinical Significance of the Transverse Pericardial Sinus	C3		
	• Define Pericarditis and Pericardial Effusion	C1		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Heart (External features)	• Demonstrate Position and orientation of heart.	P	SGD, Skills lab	MCQ SAQ VIVA OSPE
	• Describe borders and surfaces of the heart.	C2		
	• Demonstrate the external features of the heart	C2		
	• Discuss related clinicals	C3		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
	• Differentiate between muscular and smooth part.	C2		

Heart (Internal features)	• Identify the various openings, important features in inter-atrial septum.	C2	SGD, Skills lab	MCQ SAQ VIVA OSPE
	• Identify S.A node	C2		
	• Discuss internal features of left atrium, inter atrial septum, mitral valve and pulmonary veins.	C1		
	• Discuss importance of modulator band.	C2		
	• Identify mitral valve, interventricular septum, aortic vestibule, aortic valve.	C3		
	• Discuss related clinicals	C3		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Heart (Clinical Correlations)	•	C1	SGD, Skills lab	MCQ SAQ VIVA OSPE
	•			
	•			
	• How to access HEC digital library			
	• How to read relevant research article	C3		
Vasculature of heart	• Describe the origin of coronary arteries	C2	SGD, Skills lab	MCQ SAQ VIVA OSPE
	• Identify course branches and distribution of right coronary arteries and left coronary artery,	C2		
	• Discuss the concept of right and left dominance.	C2		
	• Describe the venous drainage of heart.	C2		
	• Discuss the related applied and clinical anatomy	C3		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Innervation of Heart	• Describe the formation of superficial and deep cardiac plexus.	C2	SGD, Skills lab	MCQ SAQ VIVA OSPE
	• Discuss related clinicals	C3		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Superior mediastinum (Trachea, Esophagus, Ascending Aorta)	• Enumerate the structure of superior mediastinum	C1	SGD Skills lab	MCQ SAQ VIVA OSPE
	• Describe great vessels in superior mediastinum	C2		
	• How to access HEC digital library	C3		
	• Discuss related clinicals	C3		

	• How to read relevant research article	C3		
Posterior mediastinum (Boundaries and Structures)	• Identify structures in posterior mediastinum	C2	SGD, Skills lab	MCQ SAQ VIVA OSPE
	• Describe anatomy of structure in Posterior mediastinum	C1		
	• Identify course, relations and branches of descending aorta.	C2		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Posterior mediastinum (Azygos system)	• Describe formation, course and clinical importance of azygos system of veins	C3	SGD, Skills lab	MCQ SAQ VIVA OSPE
	• Describe formation and importance of hemiazygos vein	C1		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Surface anatomy / Radiology	• Demonstrate surface projection and radiological aspects of heart, great vessels, trachea, oesophagus, position of heart valves	P	SGD, Skills lab	MCQ SAQ VIVA OSPE
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		

### Physiology Small Group Discussion (SGDs)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Discussion regarding previous module	• Difficulties regarding questions, MCQs	C1	SGD	MCQs SEQS, Viva OSPE
	• MCQ paper discussion	C2		
Excitation contraction coupling Cardiac action potential	• Describe the mechanism of production of action potential and its propagation in cardiac muscle	C1	SGD	MCQs SEQS Viva OSPE
Cardiac cycle	• Explain events of cardiac cycle	C1	SGD	MCQs SEQS, Viva OSPE
	• Draw various events during cardiac cycle	C1		
ECG	• Define arrhythmia	C1	SGD	MCQs



	<ul style="list-style-type: none"> <li>Describe abnormal rhythm</li> </ul>	C1		SEQS Viva OSPE
Venous return	<ul style="list-style-type: none"> <li>Describe how veins are different from arteries</li> </ul>	C1	SGD	MCQs SEQS Viva OSPE
	<ul style="list-style-type: none"> <li>Various factors affecting venous return</li> </ul>	C1		
Long term regulation of blood pressure	<ul style="list-style-type: none"> <li>Explain the role of kidney in long term regulation</li> </ul>	C1	SGD	MCQs SEQS Viva OSPE
CCF HTN	<ul style="list-style-type: none"> <li>Describe cardiac failure</li> </ul>	C1	SGD	MCQs SEQS Viva OSPE
	<ul style="list-style-type: none"> <li>Classify cardiac failure</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>HTN</li> </ul>	C2		

### Biochemistry Small Group Discussion (SGDs)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction of lipids and carbohydrates	<ul style="list-style-type: none"> <li>Classify lipids and carbohydrates</li> </ul>	C1	SGD	MCQs, SAQs Viva
	<ul style="list-style-type: none"> <li>Discuss importance of lipids and carbohydrates</li> </ul>	C2		
Fatty acids	<ul style="list-style-type: none"> <li>Classify fatty acids</li> </ul>	C1	SGD	MCQs SAQs Viva
	<ul style="list-style-type: none"> <li>Describe physical and chemical properties of fatty acids</li> </ul>	C2		
Cholesterol	<ul style="list-style-type: none"> <li>Describe Structure and physical properties of Cholesterol</li> </ul>	C2	SGD	MCQs SAQs Viva
	<ul style="list-style-type: none"> <li>Discuss Chemical properties and functions</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Interpret clinical findings of hypercholesterolemia</li> </ul>	C3		
Heteropolysaccharides	<ul style="list-style-type: none"> <li>Explain Structure, physical and chemical properties of heteropolysaccharides and their biological importance.</li> </ul>	C2	SGD	MCQs SAQs Viva
	<ul style="list-style-type: none"> <li>Apply the role of heteropolysaccharides in clinical cases</li> </ul>	C3		

## Anatomy Self Directed Learning (SDL)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Resources
Thoracic Wall / Thoracic Vertebra	• Define thorax	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, Pg no.73,77, 78-79, 84,89,93,95,98,446,454 <a href="https://youtu.be/PoA-Uq9w-7s">https://youtu.be/PoA-Uq9w-7s</a> <a href="https://youtu.be/Ok8-nwVLysM">https://youtu.be/Ok8-nwVLysM</a> <a href="https://www.sciencedirect.com/science/article/pii/S0161475415000639">https://www.sciencedirect.com/science/article/pii/S0161475415000639</a></li> </ul>
	• Discuss components and shape of thoracic cavity.	
	• Discuss the applied and the related clinical anatomy	
	• Classify Ribs	
	• Describe ribs (side determination, features, attachments, relations, types and ossification.	
	• Discuss the applied and the related clinical anatomy	
	• How to access HEC digital library	
	• How to read relevant research article	
Mediastinum	• Discuss the boundaries and division of mediastinum	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no.107,110,118,127,128,132-133,160-168,171 <a href="https://youtu.be/oBR9p_UDTuo">https://youtu.be/oBR9p_UDTuo</a> <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5111324/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5111324/</a></li> </ul>
	• Enumerate the contents of anterior mediastinum.	
	• How to access HEC digital library	
	• How to read relevant research article	
Pericardium	• Describe the gross features of fibrous pericardium with its blood and nerve supply	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no.111,128-129,133-134 <a href="https://youtu.be/5RMeCgJn730">https://youtu.be/5RMeCgJn730</a> <a href="https://www.sciencedirect.com/science/article/abs/pii/S1054880721000302">https://www.sciencedirect.com/science/article/abs/pii/S1054880721000302</a></li> </ul>
	• Describe the gross features of serous pericardium with its blood and nerve supply	
	• Describe transverse and oblique pericardial sinus	
	• Describe the Clinical Significance of the Transverse Pericardial Sinus	
	• Define Pericarditis and Pericardial Effusion	
	• How to access HEC digital library	
	• How to read relevant research article	
	• Demonstrate Position and orientation of heart.	
• Describe borders and surfaces of the heart.		
• Demonstrate the external features of the heart		
• How to access HEC digital library		

	<ul style="list-style-type: none"> <li>• How to read relevant research article</li> </ul>	<a href="https://youtu.be/uhSBFOTwzDQ">https://youtu.be/uhSBFOTwzDQ</a> <a href="https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014">https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014</a>
Heart II Internal features	<ul style="list-style-type: none"> <li>• Differentiate between muscular and smooth part.</li> </ul>	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no.129,135-137,144-149,153-159,171-172 <a href="https://youtu.be/uhSBFOTwzDQ">https://youtu.be/uhSBFOTwzDQ</a> <a href="https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014">https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014</a></li> </ul>
	<ul style="list-style-type: none"> <li>• Identify the various openings, important features in inter-atrial septum.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Identify S.A node</li> </ul>	
	<ul style="list-style-type: none"> <li>• How to access HEC digital library</li> </ul>	
	<ul style="list-style-type: none"> <li>• How to read relevant research article</li> </ul>	
Heart III Clinical Co-Relation	<ul style="list-style-type: none"> <li>• Discuss internal features of left atrium, inter atrial septum, mitral valve and pulmonary veins.</li> </ul>	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no.129,135-137,144-149,153-159,171-172 <a href="https://youtu.be/uhSBFOTwzDQ">https://youtu.be/uhSBFOTwzDQ</a> <a href="https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014">https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014</a></li> </ul>
	<ul style="list-style-type: none"> <li>• Discuss importance of modulator band.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Identify mitral valve, interventricular septum, aortic vestibule, aortic valve.</li> </ul>	
	<ul style="list-style-type: none"> <li>• How to access HEC digital library</li> </ul>	
	<ul style="list-style-type: none"> <li>• How to read relevant research article</li> </ul>	
Vasculature of heart	<ul style="list-style-type: none"> <li>• Describe the origin of coronary arteries</li> </ul>	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no.129,135-137,144-149,153-159,171-172 <a href="https://youtu.be/uhSBFOTwzDQ">https://youtu.be/uhSBFOTwzDQ</a> <a href="https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028475">https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028475</a></li> </ul>
	<ul style="list-style-type: none"> <li>• Identify course branches and distribution of right coronary arteries and left coronary artery,</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss the concept of right and left dominance.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Describe the venous drainage of heart.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss the related applied and clinical anatomy</li> </ul>	
	<ul style="list-style-type: none"> <li>• How to access HEC digital library</li> </ul>	
	<ul style="list-style-type: none"> <li>• How to read relevant research article</li> </ul>	
Innervation of Heart	<ul style="list-style-type: none"> <li>• Describe the formation of superficial and deep cardiac plexus.</li> </ul>	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no.129,135-137,144-149,153-159,171-172 <a href="https://youtu.be/uhSBFOTwzDQ">https://youtu.be/uhSBFOTwzDQ</a> <a href="https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028932">https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028932</a></li> </ul>
	<ul style="list-style-type: none"> <li>• How to access HEC digital library</li> </ul>	
	<ul style="list-style-type: none"> <li>• How to read relevant research article</li> </ul>	

Superior mediastinum (Trachea, Esophagus, Ascending Aorta)	• Enumerate the structure of superior mediastinum	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no.127-128,132,160-166,179 <a href="https://youtu.be/2POIIBe2xR4">https://youtu.be/2POIIBe2xR4</a></li> <li><a href="https://www.sciencedirect.com/science/article/abs/pii/S1472029906000336">https://www.sciencedirect.com/science/article/abs/pii/S1472029906000336</a></li> </ul>
	• Describe great vessels in superior mediastinum	
	• How to access HEC digital library	
	• How to read relevant research article	
Posterior mediastinum I	• Identify structures in posterior mediastinum	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no. 128, 168-172, 179 <a href="https://youtu.be/2POIIBe2xR4">https://youtu.be/2POIIBe2xR4</a> <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9792830/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9792830/</a></li> </ul>
	• Describe anatomy of structure in Posterior mediastinum	
	• Identify course, relations and branches of descending aorta.	
	• How to access HEC digital library	
	• How to read relevant research article	
Posterior mediastinum II	• Describe formation, course and clinical importance of azygos system of veins	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no. 128, 168-172, 179 <a href="https://youtu.be/2POIIBe2xR4">https://youtu.be/2POIIBe2xR4</a></li> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9792830/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9792830/</a></li> </ul>
	• Describe formation and importance of hemiazygos vein	
	• How to access HEC digital library	
	• How to read relevant research article	
Surface anatomy / Radiology	• Demonstrate surface projection and radiological aspects of heart, great vessels, trachea, oesphagus, position of heart valves	<ul style="list-style-type: none"> <li>• ClinicallyOriented Anatomy 6th Edition, P no.129,135-137,144-149,153-159,171-172 <a href="https://youtu.be/wqiK-8nZEgk">https://youtu.be/wqiK-8nZEgk</a> <a href="https://pubs.rsna.org/doi/10.1148/ryct.220047">https://pubs.rsna.org/doi/10.1148/ryct.220047</a></li> </ul>
	• How to access HEC digital library	
	• How to read relevant research article	

### Physiology Self Directed Learning (SDL)

Topics Of SDL	Learning Objective	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
<b>ON CAMPUS:</b> Heart Sounds	1. Describe four heart sound and differences between 1st and 2nd heart sounds	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05, Cardiovascular Physiology (Chapter 30, Page 542)</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Section 04. (Chapter 23, Page 283)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/dBwr2GZCmQM">https://youtu.be/dBwr2GZCmQM</a></li> <li><a href="https://www.utmb.edu/pediatrics/CoreV2/Cardiology/cardiologyV2/cardiologyV23.html">https://www.utmb.edu/pediatrics/CoreV2/Cardiology/cardiologyV2/cardiologyV23.html</a></li> </ol>	C1/C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
Capillary circulation, Concept of vasomotion and starling forces	<ol style="list-style-type: none"> <li>Explain the details of types of starling forces.</li> <li>Expalin role of starling forces in different pathological conditions</li> </ol>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 31, Page 577)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 170)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 02(Chapter 6,Page 119)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 04. (Chapter 16, Page 193)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/YNROPnYy1tc">https://youtu.be/YNROPnYy1tc</a></li> <li><a href="https://www.osmosis.org/learn/Microcirculation_and_Starling_forces">https://www.osmosis.org/learn/Microcirculation_and_Starling_forces</a></li> </ol>	1.C2 2.C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
Introduction to ECG & its clinical importance	<ul style="list-style-type: none"> <li>Enumerate and describe normal components of ECG</li> <li>Draw normal ECG</li> <li>Describe the method of recording ECG</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 01,Immunity,Infection and Inflammation(Chapter 29, Page 522)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/SEFhbK8ZCgk">https://youtu.be/SEFhbK8ZCgk</a></li> <li><a href="https://my.clevelandclinic.org/health/diagnostics/16953-electrocardiogram-ekg">https://my.clevelandclinic.org/health/diagnostics/16953-electrocardiogram-ekg</a></li> </ol>	C1 C1 C1 C1 C1 C1	SDL	MCQ SEQ VIVA VOCE

	<ul style="list-style-type: none"> <li>Describe the following. Bipolar limb leads.</li> <li>Describe Einthovians law and Enthovian triangle.</li> <li>Describe Chest leads and Augmented unipolar limb leads</li> <li>Describe how to read normal ECG</li> <li>Describe the principles of vectorial analysis of ECG.</li> <li>Describe the vectorial analysis of normal ECG</li> </ul>	<ul style="list-style-type: none"> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 491)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Chapter 09,Page 170)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 11, Page 135)</li> </ul>		<p>C1 C1 C1 C1</p> <p>C1 C1 C1 C1 C1</p>		<p>MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation</p>
Cardiac cycle - I, Events of cardiac cycle and its graphical representation	<ul style="list-style-type: none"> <li>Describe the cardiac cycle in detail</li> <li>Enumerate and explain its events Explain the events of cardiac cycle</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> </ul> <p>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 9, Page 117)</p>	<p>1.<a href="https://youtu.be/XbivIaF PoQI">https://youtu.be/XbivIaF PoQI</a></p> <p>1. <a href="https://www.sciencedirect.com/science/article/pii/S0010027721003309">https://www.sciencedirect.com/science/article/pii/S0010027721003309</a></p> <p>2. <a href="https://youtu.be/sLLLOaZ85Lk">https://youtu.be/sLLLOaZ85Lk</a></p> <p>3. <a href="https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/">https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/</a></p> <p>4. <a href="https://youtu.be/HNkwXZS SssU">https://youtu.be/HNkwXZS SssU</a></p>	<p>1. C1 2. C1/C2 3. C2</p>	SDL	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation</p>
Arrhythmias	<ul style="list-style-type: none"> <li>Describe the principles of vectorial analysis of ECG.</li> <li>Describe the vectorial analysis of normal ECG</li> <li>Define arrhythmia</li> <li>Describe abnormal sinus rhythms</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 29, Page 526)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup></li> </ul>	<p>1.<a href="https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/">https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/</a></p> <p>2.<a href="https://youtu.be/6Lrptve KYus">https://youtu.be/6Lrptve KYus</a></p>	<p>1. C1 2. C1 3. C1 4. C1</p>	SDL	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE</p>

		Edition.(Chapter 09,Page 179,180-189)  Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. Section 03. (Chapter 12, Page 143)((Chapter 13, Page 157)	4. <a href="https://www.medicalnewstoday.com/articles/8887#definition">https://www.medicalnewstoday.com/articles/8887#definition</a>			SDL Evaluation
Congestive cardiac failure	<p>Explain the characteristics and functions of monocytes.</p> <ul style="list-style-type: none"> <li>• Explain monocyte-macrophge system; importance</li> </ul>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 01,Immunity,Infection and Inflammation(Chapter 03, Page 67)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 03, Blood(Chapter 21,Page 371)(Chapter 22,Page 387)</li> </ul> <p>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 450-452)</p>	<p>1. <a href="https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system">https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system</a></p> <p>2.<a href="https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4">https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4</a></p>	1.C2 2.C2	SDL	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation</p>
Long term regulation of blood pressure	1. Explain the role of kidneys in long term regulation of blood pressure	<ul style="list-style-type: none"> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 16,page 282)</li> </ul> <p>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 19, Page 229)</p>	<p>1. <a href="https://youtu.be/5S9xEpAdAgA">https://youtu.be/5S9xEpAdAgA</a></p> <p>2. <a href="https://jps.biomedcentral.com/articles/10.1007/s12576-012-0192-0">https://jps.biomedcentral.com/articles/10.1007/s12576-012-0192-0</a></p> <p>3. <a href="https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x">https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x</a></p>	C2	SDL	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation</p>
Skeletal muscle blood flow,	1. Discuss the blood flow regulation in skeletal	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 05(Chapter 30, Page 549)	1. <a href="https://www.sciencedirect.com/topics/medicine-and-">https://www.sciencedirect.com/topics/medicine-and-</a>	C2	SDL	<p>MCQ SEQ</p>

Cardiovascular changes during exercise	muscle at rest and during exercise.	Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition. Cardiovascular Physiology (Chapter 4, Page 178) Physiological Basis of Medical Practice by Best & Taylor's. 13 <sup>th</sup> Edition. (Chapter 07, Page 148) Textbook of Medical Physiology by Guyton & Hall. 14 <sup>th</sup> Edition. (Chapter 18, Page 226) (Chapter 21, Page 259)	1. <a href="#">dentistry/muscle-blood-flow</a> 2. <a href="https://youtu.be/H6Fd8sfE2eQ">https://youtu.be/H6Fd8sfE2eQ</a>			VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
(OFF CAMPUS): Introduction to CVS	<ul style="list-style-type: none"> <li>1. Describe scheme of circulation through the heart and body</li> </ul>	<ul style="list-style-type: none"> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Cardiovascular Physiology (Chapter 14, Page 469)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cardiovascular Physiology (Chapter 4, Page 117)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. Section 02, (Chapter 05, Page 101)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/28CYhgjrBLA">https://youtu.be/28CYhgjrBLA</a></li> <li><a href="https://training.seer.cancer.gov/anatomy/cardiovascular/#:~:text=The%20cardiovascular%20system%20is%20sometimes,arteries%2C%20veins%2C%20and%20capillaries.">https://training.seer.cancer.gov/anatomy/cardiovascular/#:~:text=The%20cardiovascular%20system%20is%20sometimes,arteries%2C%20veins%2C%20and%20capillaries.</a></li> </ol>	1.C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
Classification of blood vessels & Biophysical considerations	<ol style="list-style-type: none"> <li>1. Enumerate Classification of blood vessels.</li> <li>2. Explain structure and functions of types of blood vessels</li> </ol> <ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 05, Cardiovascular Physiology (Chapter 31, Page 567, 571)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 15, Page 513)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cardiovascular Physiology (Chapter 4, Page 119)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/ar2_UPIGzmU">https://youtu.be/ar2_UPIGzmU</a></li> <li><a href="https://training.seer.cancer.gov/anatomy/cardiovascular/blood/classification.html">https://training.seer.cancer.gov/anatomy/cardiovascular/blood/classification.html</a></li> </ol>	1.C1 2. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation



		<ul style="list-style-type: none"> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 04 (Chapter 15,Page 183)</li> </ul>				
Regulation of blood flow	<p>1.Define and describe Resistance to Blood flow</p> <p>3. Describe regulation of Blood pressure and Poiseuilles law</p> <ul style="list-style-type: none"> <li>Describe factors related with Blood viscosity and its role in regulation</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,Cardiovascular Physiology (Chapter 31, Page 575)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 02(Chapter 5,Page 107)(Chapter 6,page 110)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition..Section 04. (Chapter 14, Page 173) (Chapter 17, Page 205)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/cocB-M3h9k0">https://youtu.be/cocB-M3h9k0</a></li> <li><a href="https://journals.physiology.org/doi/full/10.1152/advan.00074.2010">https://journals.physiology.org/doi/full/10.1152/advan.00074.2010</a></li> </ol>	1.C1 2.C1 3.C1	SDL	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation</p>
Introduction to ECG & its clinical importance	<ul style="list-style-type: none"> <li>Enumerate and describe normal components of ECG</li> <li>Draw normal ECG</li> <li>Describe the method of recording ECG</li> <li>Describe the following. Bipolar limb leads.</li> <li>Describe Einthovians law and Enthovian triangle.</li> <li>Describe Chest leads and Augmented unipolar limb leads</li> <li>Describe how to read normal ECG</li> <li>Describe the principles of vectorial analysis of ECG.</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 01,Immunity,Infection and Inflammation(Chapter 29, Page 522)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 491)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Chapter 09,Page 170)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 11, Page 135)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/SEFhbK8ZCgk">https://youtu.be/SEFhbK8ZCgk</a></li> <li><a href="https://my.clevelandclinic.org/health/diagnostics/16953-electrocardiogram-ekg">https://my.clevelandclinic.org/health/diagnostics/16953-electrocardiogram-ekg</a></li> </ol>	C1 C1 C1 C1 C1	SDL	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation</p>

	<ul style="list-style-type: none"> <li>Describe the vectorial analysis of normal ECG</li> </ul>					
Vectorial analysis & arrhythmias	<ul style="list-style-type: none"> <li>Describe the principles of vectorial analysis of ECG.</li> <li>Describe the vectorial analysis of normal ECG</li> <li>Define arrhythmia</li> <li>Describe abnormal sinus rhythms</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 29, Page 526)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 09,Page 179,180-189)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 12, Page 143)((Chapter 13, Page 157)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/">https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/</a></li> <li><a href="https://www.medicalnewstoday.com/articles/8887#definition">https://www.medicalnewstoday.com/articles/8887#definition</a></li> <li><a href="https://youtu.be/6LrptveKYus">https://youtu.be/6LrptveKYus</a></li> </ol>	C1 C1 C1 C1	SDL	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation</p>
Ca cycle	<ul style="list-style-type: none"> <li>Describe the cardiac cycle in detail</li> <li>Enumerate and explain its events</li> <li>Explain the events of cardiac cycle</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 9, Page 117)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/XbivIaFPoQI">https://youtu.be/XbivIaFPoQI</a></li> <li><a href="https://www.sciencedirect.com/science/article/pii/S0010027721003309">https://www.sciencedirect.com/science/article/pii/S0010027721003309</a></li> <li><a href="https://youtu.be/sLLLOaZ85Lk">https://youtu.be/sLLLOaZ85Lk</a></li> <li><a href="https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/">https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/</a></li> <li><a href="https://youtu.be/HNkwXZSSsU">https://youtu.be/HNkwXZSSsU</a></li> </ol>	C1 C1/C2 C2	SDL	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation</p>
Splanchnic circulation, cutaneous circulation	<ul style="list-style-type: none"> <li>Describe the Physiologic anatomy of cerebral blood flow</li> <li>Describe the blood flow in normal state and local control of blood flow</li> </ul>	<ul style="list-style-type: none"> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 173)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/hr6oGuW7mVA">https://youtu.be/hr6oGuW7mVA</a></li> <li><a href="https://www.sciencedirect.com/topics/medicine-and-">https://www.sciencedirect.com/topics/medicine-and-</a></li> </ol>	1.C2 2. C2	SDL	<p>MCQ SEQ VIVA VOCE</p>

		<ul style="list-style-type: none"> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 7,page 146)</li> </ul>	<a href="#">dentistry/splanchnic-blood-flow</a> 3. <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2999290/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2999290/</a>			MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Regulation of blood pressure	1. Explain short term regulation of blood pressure  <ul style="list-style-type: none"> <li>Explain central nervous system ischemic response &amp; cushing reaction</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 32, Page 585,590)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 15,Page 517,528)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 18,Page 217)</li> </ul>	1. <a href="https://youtu.be/HUf1LtkPj1k">https://youtu.be/HUf1LtkPj1k</a> 2. <a href="https://www.sciencedirect.com/topics/nursing-and-health-professions/blood-pressure-regulation">https://www.sciencedirect.com/topics/nursing-and-health-professions/blood-pressure-regulation</a> 3. <a href="https://www.cliffsnotes.com/study-guides/anatomy-and-physiology/the-cardiovascular-system/control-of-blood-pressure">https://www.cliffsnotes.com/study-guides/anatomy-and-physiology/the-cardiovascular-system/control-of-blood-pressure</a>	1.C2 2. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

## Biochemistry Self Directed Learning (SDL)

Topic	Learning Objectives At the end of lecture students should be able to	References
<b>Protein chemistry</b>		
Classifications and functions of carbohydrates	<ul style="list-style-type: none"> <li>• Classify carbohydrates</li> <li>• Explain different types of carbohydrates and their clinical significance</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No.7 pg 92,93</li> <li>• Text Book of Harper 32 S T Edition chap No. 15 pg 141, 142 ,144 ,147</li> </ul>
Classifications and functions of lipids	<ul style="list-style-type: none"> <li>• Define lipids</li> <li>• Classify lipids</li> <li>• Describe Biomedical significance of lipids</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Harper 32 S T Edition Chapter No.21 pg 196</li> </ul>
Fatty acids and simple lipids	<ul style="list-style-type: none"> <li>• Classify fatty acids</li> <li>• Describe physical and chemical properties of fatty acids</li> <li>• Elaborate Structure and physical properties of Triglycerides</li> <li>• Discuss Chemical properties of Triglycerides and their clinical significance</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No.15 pg 196 -199</li> </ul>
Classification and Chemical reactions of monosaccharide	<ul style="list-style-type: none"> <li>• Classify monosaccharide</li> <li>• Describe chemical properties of monosaccharide</li> <li>• Interpret the clinical role of sorbitol, mannitol and cardiac glycosides</li> </ul>	<ul style="list-style-type: none"> <li>• Text Book of Harper 32 S T Edition chap No.15 pg 142, 145</li> </ul>
Disaccharides	<ul style="list-style-type: none"> <li>• Describe Structure and functions of Individual sugars</li> </ul>	<ul style="list-style-type: none"> <li>• Text book of Harper 32 S T Edition Chap No.15 pg 145, 156</li> </ul>
Compound lipids	<ul style="list-style-type: none"> <li>• Classify compound lipids</li> <li>• Discuss structure and functions of compound lipids</li> <li>• Interpret the clinical role of compound lipids</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No. 21 pg 199-202</li> </ul>
Prostaglandins	<ul style="list-style-type: none"> <li>• Classify Prostaglandins</li> <li>• Describe functions and clinical significance of Prostaglandins.</li> <li>• Interpret the role of drugs in prostaglandin synthesis</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No. 17 pg 236</li> <li>• Text Book of Lehninger 7<sup>th</sup> Edition chap No. 10.3 pg 375,376</li> </ul>
Heteropolysaccharides	<ul style="list-style-type: none"> <li>• Explain Structure, physical and chemical properties of heteropolysaccharides and their biological importance.</li> <li>• Apply the role of heteropolysaccharides in clinical cases</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook of Lippincott 8<sup>th</sup> Edition Chapter No. 14 pg 173-175</li> <li>• Text Book of Harper 32 S T Edition Chap No.15 pg 147 ,148</li> </ul>

### Histology Practicals Skill Laboratory (SKL)

Topic	Learning Objectives At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Elastic Arteries	• identify characteristic histological features of tunica intima, tunica media and tunica adventitia of elastic arteries under microscope	P1	Skill lab	OSPE
	• Illustrate histological structure of elastic artery	C1		
	• Write two points of identification	C1		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Muscular Arteries Small Arteries	• identify characteristic histological features of tunica intima, tunica media and tunica adventitia of muscular and small sized arteries under microscope	P1	Skill lab	OSPE
	• Illustrate histological structure of Muscular and small sized artery	C1		
	• Write two points of identification	C1		
	• Differentiate between three types of arteries on histology slides	C1		
	• How to access HEC digital library	C3		
Large Vein	• Identify characteristic histological features of tunica intima, tunica media and tunica adventitia of large vein under microscope	P1	Skill lab	OSPE
	• Illustrate histological structure of large vein	C1		
	• Write two points of identification	C1		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Medium and small sized vein	• Identify characteristic histological features of tunica intima, tunica media and tunica adventitia of medium and small sized vein under microscope	P1	Skill lab	OSPE
	• Illustrate histological structure of medium and small sized vein	C1		
	• Write two points of identification Differentiate between three types of veins on histology slides	C1		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		
Capillaries	• Classify capillaries on the basis of histological structure and function	C1	Skill lab	OSPE
	• Enlist sites of continuous, fenestrated and sinusoidal capillaries	C1		

	• Elaborate characteristic histological features of tunica intima, tunica media and tunica adventitia of capillaries	C1		
	• Draw and label histological structure of each type of capillaries	C1		
	• Write two points of identification	C1		
	• How to access HEC digital library	C3		
	• How to read relevant research article	C3		

### Physiology Practicals Skill Laboratory (SKL)

Topic	Learning Objectives At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Blood Pressure at rest and during exercise	• Define B. P	P	Skill Lab	OSPE Viva
	• Detail study of apparatus	P		
	• How to use apparatus	P		
	• Identify changes in blood pressure during exercise	P		
Examination of arterial pulse and JVP	• Importance of radial pulse & JVP	P	Skill Lab	OSPE Viva
	• Procedure	P		
	• Various characteristic of pulse	P		
Examination of arterial pulse and JVP	• Importance of radial pulse & JVP	P	Skill Lab	OSPE Viva
	• Procedure	P		
	• Various characteristic of pulse	P		
ECG	• Detail study of ECG leads	P	Skill Lab	OSPE Viva
	• How to apply leads	P		
	• Recording	P		
	• Discussion about normal ECG	P		
	• Clinical importance	P		
Clinical examination of chest (Heart sounds)	• Inspection	P	Skill Lab	OSPE Viva
	• Palpation	P		
	• Auscultation of all areas of heart	P		
	• Locate apex beat	P		

### Biochemistry Practicals Skill Laboratory (SKL)

Topic	Learning Objectives At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Lipids	<ul style="list-style-type: none"> <li>Describe Physical and chemical properties of lipids (solubility, saponification, Emulsification and Acrolein test)</li> </ul>	P	Skill lab	OSPE
Carbohydrates	<ul style="list-style-type: none"> <li>Perform Tests for the detection of carbohydrates and reducing sugars (Molisch's and Benedict's tests)</li> </ul>	P	Skill lab	OSPE
Carbohydrates	Perform Tests for differentiation between Mono and disaccharides; Aldo and keto sugars (Barford's and Salvinoff's test)	P	Skill lab	OSPE
Carbohydrates	<ul style="list-style-type: none"> <li>Perform Iodine test</li> </ul>	P	Skill lab	OSPE

## **SECTION - III**

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- **CBLs**
- **Vertical Integration LGIS**
- **Longitudinal Themes**
  - **Biomedical Ethics & Professionalism**
  - **Family Medicine**
  - **Artificial Intelligence (Innovation)**
  - **Integrated Undergraduate Research Curriculum (IUGRC)**



## Basic and Clinical Sciences (Vertical Integration)

### Case Based Learning (CBL)

Subject	Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain
Anatomy	• Cardiac Tamponade	Apply basic knowledge of subject to study clinical case.	C3
	• Coarctation of Aorta	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• Pitting edema	Apply basic knowledge of subject to study clinical case.	C3
	• Palpitations / Tachycardia	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• Atherosclerosis	Apply basic knowledge of subject to study clinical case.	C3
	• Heparin/dextran	Apply basic knowledge of subject to study clinical case.	C3

### Large Group Interactive Sessions (LGIS)

#### Pathology

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Edema	• Define edema	C1	LGIS	MCQ
	• Classify edema	C2		
	• Discuss pathophysiology of edema with clinical correlation	C2		
Thrombosis	• Define embolus	C1	LGIS	MCQ
	• Describe different types of emboli with clinical context <ul style="list-style-type: none"> <li>○ Thrombotic</li> <li>○ Fat and marrow</li> <li>○ Cholesterol</li> <li>○ Air</li> <li>○ Fat</li> </ul>	C1		
	• Differentiate between pulmonary and systemic thrombo-embolism with clinical relevance	C2		
	• Describe the Patho-genetic mechanism of infarction	C1		

Infarction	<ul style="list-style-type: none"> <li>Describe commonly occurring infarcts in different clinical settings</li> </ul>	C1	LGIS	MCQ
Shock	<ul style="list-style-type: none"> <li>Define shock</li> </ul>	C1	LGIS	MCQ
	<ul style="list-style-type: none"> <li>Enumerate Types with clinical examples</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe pathogenesis of shock</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe stages of shock with clinical examples</li> </ul>	C1		

### Medicine

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Ecg changes	<ul style="list-style-type: none"> <li>Discuss normal ECG and its various components.</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>Explain important ECGs seen in emergency department.</li> </ul>	C2		
Hypertension	<ul style="list-style-type: none"> <li>Define Hypertension</li> </ul>	C1	LGIS	MCQs
	<ul style="list-style-type: none"> <li>Discuss various causes and grades.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Explain the clinical presentation.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Compare between primary and secondary hypertension.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Enlist the lab investigations to be done for hypertension.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Discuss the treatment plan of hypertension.</li> </ul>	C2		
Overview of acute coronary syndrome	<ul style="list-style-type: none"> <li>Discuss ACS and its various causes.</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>Illustrate the clinical presentation of ACS.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Explain the workshop to be done in E.R for ACS</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Discuss the treatment of ACS</li> </ul>	C2		
Management of heart failure	<ul style="list-style-type: none"> <li>Discuss the stepwise management of heart failure.</li> </ul>	C2	LGIS	MCQs
Management of shock	<ul style="list-style-type: none"> <li>Discuss the management according to various types of shock.</li> </ul>	C2	LGIS	MCQs

## Surgery

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Congenital cardiac anomalies	<ul style="list-style-type: none"> <li>• Describe:</li> <li>• Various cardiac deformities</li> <li>• &amp; congenital malformations</li> </ul>	C1	LGIS, CBL	MCQs
	<ul style="list-style-type: none"> <li>• Significance of deformities</li> <li>• General and operative management outline</li> </ul>	C1		
Introduction to Cardiac Surgery	<ul style="list-style-type: none"> <li>• To outline basics of Cardiac surgery</li> </ul>	C1	LGIS	MCQs
	<ul style="list-style-type: none"> <li>• Differentiate from other subspecialties</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Basic cardiac patient management</li> </ul>	C2		
Ectopia Cordis & Dextrocardia	<ul style="list-style-type: none"> <li>• Describe:</li> <li>• Various cardiac abnormalities with significance</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>• General and operative management outline</li> </ul>	C2		
Congenital cardiac anomalies	<ul style="list-style-type: none"> <li>• Describe:</li> <li>• Various cardiac deformities</li> <li>• &amp; congenital malformations</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>• Significance of deformities</li> <li>• General and operative management outline</li> </ul>	C2		
Introduction to Cardiac Surgery	<ul style="list-style-type: none"> <li>• To outline basics of Cardiac surgery</li> </ul>	C1	LGIS	MCQs
	<ul style="list-style-type: none"> <li>• Differentiate from other subspecialties</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Basic cardiac patient management</li> </ul>	C2		

## Obstetrics & Gynaecology

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Cardiovascular changes in pregnancy, common cardiac diseases	<ul style="list-style-type: none"> <li>Understand physiological changes in cardiovascular system during pregnancy (incl. plasma volume, stroke volume, cardiac output, blood pressure)</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>Know physiological versus pathological symptoms related to CVS</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Briefly describe clinical presentations of common cardiac diseases during pregnancy (rheumatic heart disease, cardiomyopathy, cardiac failure)</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>The effect of cardiac disease on fetus and the mother</li> </ul>	C2		
Hypertensive disorders in pregnancy (gestational hypertension, pre-eclampsia)	<ul style="list-style-type: none"> <li>Define gestational hypertension</li> </ul>	C1	LGIS	MCQs
	<ul style="list-style-type: none"> <li>Describe the spectrum of hypertensive disorders during pregnancy with proper definitions</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Comprehend pathophysiology of these disorders</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Know clinical presentation of hypertensive disorders</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Justify relevant laboratory investigations</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Understand principles of management</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Enlist maternal and fetal complications</li> </ul>	C2		
Obstetric shock	<ul style="list-style-type: none"> <li>Define circulatory shock</li> </ul>	C1	LGIS	MCQs
	<ul style="list-style-type: none"> <li>Differentiate between different types of shock in pregnancy according to their pathophysiology</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Appreciate clinical features of shock</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Enumerate common causes of hypovolemic shock in pregnancy</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Outline management of hypovolemic shock</li> </ul>	C2		

### Pediatrics

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Murmurs	<ul style="list-style-type: none"> <li>Differentiate between cyanotic and acyanotic congenital heart diseases on the basis of clinical features</li> </ul>	C2	LGIS	MCQs

### Eye

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Retinal changes in hypertension	<ul style="list-style-type: none"> <li>Define hypertensive retinopathy</li> </ul>	C1	LGIS CBL	MCQs
	<ul style="list-style-type: none"> <li>Describe stages of hypertensive retinopathy</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>Explain pathophysiology of hypertensive retinopathy</li> </ul>	C2		

### Behavioral Sciences & Biomedical Ethics

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Breaking bad news	<ul style="list-style-type: none"> <li>To be able to break bad news to the patient or their families in clinical settings and dealing with emotions arising</li> </ul>	C2	LGIS CBL	MCQS
Stress and its management	<ul style="list-style-type: none"> <li>To be able to define types of stress, its causes and management of stress</li> </ul>	C2	LGIS CBL	MCQS

## Radiology

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Radiology of hip bone & Lower Limb	• Interpret normal x-rays of Hip bone & Lower Limb	C2	LGIS	MCQs
	• Discuss features of different Fractures of Hip Bone & Lower Limb	C2		

## Integrated Undergraduate Research Curriculum (IUGRC)

Session	Learning Objectives
Students Practical Session 5: (placement in 5 <sup>th</sup> Module) (work track & assessment by Logbook)	<p>In supervised session, at the end of the session, participants would be able to; <b>(Los)</b></p> <ol style="list-style-type: none"> <li>1. Write the scientific references under some format.</li> <li>2. Explain the Underlying areas of human health pertaining to topic of their individual group poster (clinical or basic science) at their level.</li> <li>3. Relate their clinical or basic poster relevant learning with their formal learning during 1<sup>st</sup> year MBBS.</li> <li>4. Write the scientific references under some format.</li> <li>5. Explain the Underlying areas of human health pertaining to topic of their individual group poster (clinical or basic science) at their level.</li> <li>6. Relate their clinical or basic poster relevant learning with their formal learning during 1<sup>st</sup> year MBBS.</li> </ol>

## Family Medicine

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Approach to a patient with chest pain	• Describe chest pain	C1	LGIS	MCQs
	• Discuss various causes	C2		
	• Explain the clinical presentation.	C2		
	• Enlist the lab investigations	C2		
	• Decision for referral of patient	C2		

## **SECTION - IV**

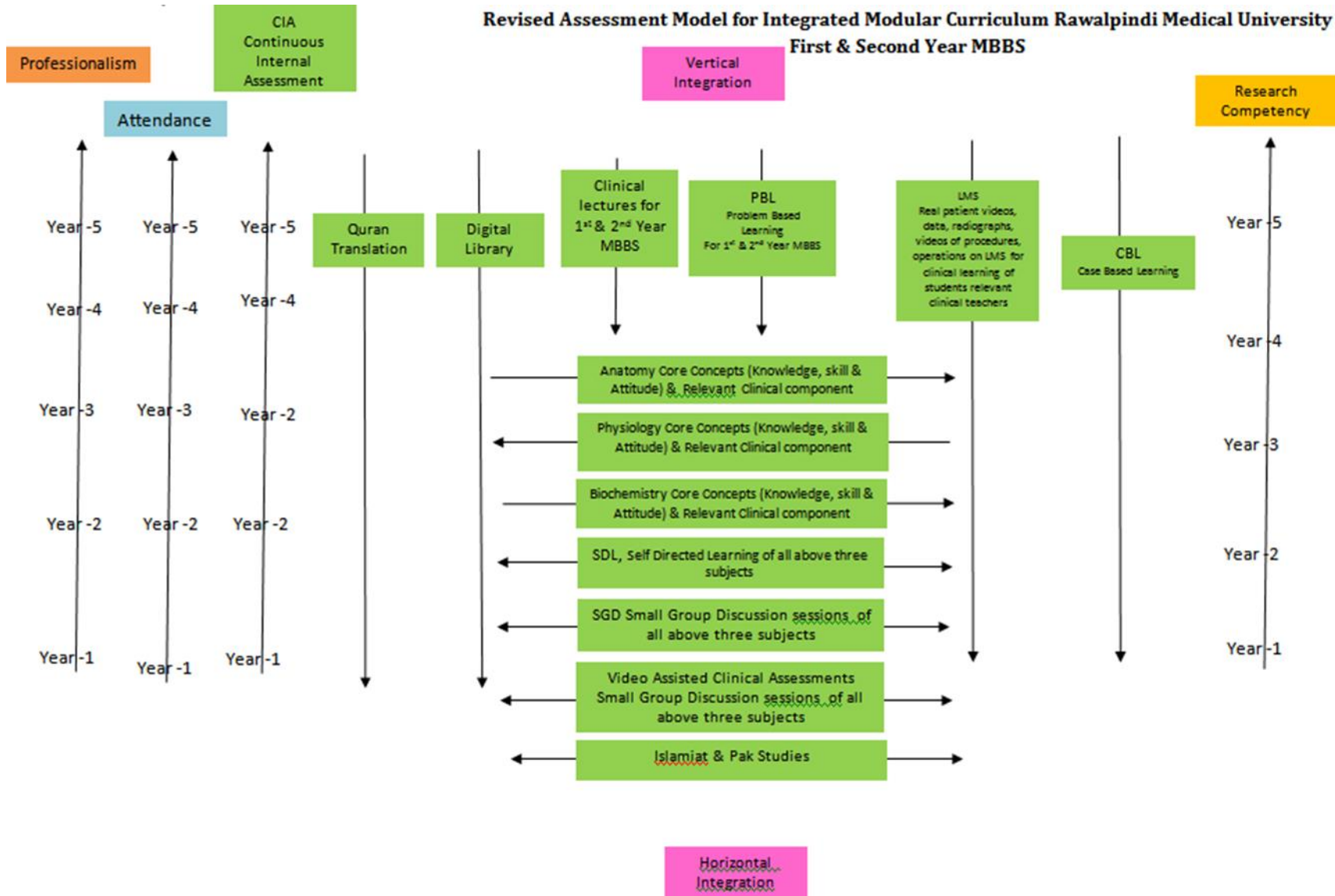
### **Assessment Policies**

#### **Contents**

- **Assessment plan**
- **Types of Assessment:**
- **Modular Examinations**
- **Block Examination**
- **Table 4: Assessment Frequency & Time in CVS Module**



## Revised Assessment Model for Integrated Modular Curriculum Rawalpindi Medical University First & Second Year MBBS



**Gauge for Continuous Internal Assessment (CIA)**

Red Zone	High Alert	Yellow Zone	Green Zone	Excellent	Extra Ordinary
0 - 25%	26 - *50%	51 - 60%	61 - 70%	71 - 80%	81 - 100%

\*50% and above is Passing Marks.

**Gauge for attendance percentage**

Red Zone	High Alert	Yellow Zone-1	Yellow Zone-2	Green Zone	Excellent
0 - 25%	26 - 50%	51 - 60%	61 - 74%	*75 - 80%	81 - 100%

90% is eligibility criteria for appearing in professional examination.

## Assessment plan

University has followed the guidelines of Pakistan Medical and Dental Council for assessment. Assessment is conducted at the mid modular, modular and block levels.

### Types of Assessment:

The assessment is formative and summative.

Formative Assessment	Summative Assessment
Formative assessment is taken at modular (2/3 <sup>rd</sup> of the module is complete) level through MS Teams. Tool for this assessment is best choice questions and all subjects are given the share according to their hour percentage.	Summative assessment is taken at the mid modular (LMS Based), modular and block levels.

### Modular Assessment

Theory Paper	Viva Voce
There is a module examination at the end of first module of each block. The content of the whole teaching of the module are tested in this examination. It consists of paper with objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module. (Annexure I attached)	Structured table viva voce is conducted including the practical content of the module.

### Block Assessment

On completion of a block which consists of two modules, there is a block examination which consists of one theory paper and a structured viva with OSPE.

Theory Paper	Block OSPE
There is one written paper for each subject. The paper consists of objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module.	This covers the practical content of the whole block.

**Table 4-Assessment Frequency & Time in CVS Module**

Block	Sr #	Module – 1 CVS Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block-I	1	Mid Module Examinations LMS based (Anatomy, Physiology & Biochemistry)	Summative	30 Minutes	3 Hour 15 Minutes	45 Minutes	2 Formative	6 Summative
	2	Topics of SDL Examination on MS Team	Formative	30 Minutes				
	3	End Module Examinations (SEQ & MCQs Based)	Summative	2 Hours				
	4	Anatomy Structured and Clinically Oriented Viva	Summative	10 Minutes				
	5	Physiology Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	6	Assessment of Clinical Lectures	Formative	15 Minutes				
	7	Assessment of Bioethics Lectures	Summative	2 Minutes				
	8	Assessment of IUGRC Lectures	Summative	10 Minutes				

## Learning Resources

Subject	Resources
Anatomy	<p><b>A. Gross Anatomy</b></p> <ol style="list-style-type: none"> <li>1. Gray's Anatomy by Prof. Susan Standing 42th edition, Elsevier.</li> <li>2. Clinical Anatomy for Medical Students by Richard S. Snell 10<sup>th</sup> edition.</li> <li>3. Clinically Oriented Anatomy by Keith Moore 9<sup>th</sup> edition.</li> <li>4. Cunningham's Manual of Practical Anatomy by G.J. Romanes, 16th edition, Vol-I, II and III</li> </ol> <p><b>B. Histology</b></p> <ol style="list-style-type: none"> <li>1. B. Young J. W. Health Wheather's Functional Histology 6<sup>th</sup> edition.</li> <li>2. Medical Histology by Prof. Laiq Hussain 7<sup>th</sup> edition.</li> </ol> <p><b>C. Embryology</b></p> <ol style="list-style-type: none"> <li>1. Keith L. Moore. The Developing Human 11<sup>th</sup> edition.</li> <li>2. Langman's Medical Embryology 14<sup>th</sup> edition.</li> </ol>
Physiology	<p><b>A. Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Textbook Of Medical Physiology by Guyton And Hall 14<sup>th</sup> edition.</li> <li>2. Ganong ' S Review of Medical Physiology 26<sup>th</sup> edition.</li> </ol> <p><b>B. Reference Books</b></p> <ol style="list-style-type: none"> <li>1. Human Physiology by Lauralee Sherwood 10<sup>th</sup> edition.</li> <li>2. Berne &amp; Levy Physiology 7<sup>th</sup> edition.</li> <li>3. Best &amp; Taylor Physiological Basis of Medical Practice 13<sup>th</sup> edition.</li> <li>4. Guyton &amp; Hall Physiological Review 3<sup>rd</sup> edition.</li> </ol>
Biochemistry	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Harper's Illustrated Biochemistry 32th edition.</li> <li>2. Lehninger Principle of Biochemistry 8<sup>th</sup> edition.</li> <li>3. Lippincott Biochemistry 8<sup>th</sup> edition.</li> </ol>
Community Medicine	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Community Medicine by Parikh 25<sup>th</sup> edition.</li> <li>2. Community Medicine by M Illyas 8<sup>th</sup> edition.</li> <li>3. Basic Statistics for the Health Sciences by Jan W Kuzma 5<sup>th</sup> edition.</li> </ol>
Pathology/Microbiology	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Robbins &amp; Cotran, Pathologic Basis of Disease, 10<sup>th</sup> edition.</li> <li>2. Rapid Review Pathology, 5<sup>th</sup> edition by Edward F. Goljan MD.</li> <li>3. <a href="http://library.med.utah.edu/WebPath/webpath.html">http://library.med.utah.edu/WebPath/webpath.html</a></li> </ol>
Pharmacology	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Lippincot Illustrated Pharmacology 9<sup>th</sup> edition.</li> <li>2. Basic and Clinical Pharmacology by Katzung 5<sup>th</sup> edition.</li> </ol>

## **SECTION - V**

### **Time Table**

**Integrated Clinically Oriented Modular Curriculum for first Year MBBS**

**CVS Module Time Table**

**First Year MBBS**

**Session 2022-2023**

**Batch- 50**

## CVS Module Team

Module Name	:	CVS Module
Duration of module	:	05 Weeks
Coordinator	:	Dr. Aneela Yasmeen
Co-Coordinator	:	Dr. Sheena Tariq
Reviewed by	:	Module Committee

Module Committee			Module Task Force Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Aneela Yasmeen Senior demonstrator physiology
2.	Director DME	Prof. Dr. Rai Muhammad Asghar	2.	Co-coordinator	Dr. Kashif Senior Demonstrator of Biochemistry
3.	Convener Curriculum	Prof. Dr. Naeem Akhter	3.	DME Focal person	Dr. Sidra Hamid Assistant Professor Physiology
4.	Dean basic sciences and Chairperson Anatomy	Prof Dr. Ayesha Yousaf	4.	Co-coordinator	Dr. Ali Raza Demonstrator of Anatomy
5.	Additional Director DME	Prof. Dr. Ifra Saeed	5.	Co-coordinator	Dr. Sheena Tariq APWMO of Physiology
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar	<b>DME Implementation Team</b>		
7.	Chairperson Biochemistry	Dr. Aneela Jamil	1.	Director DME	Dr. Rai Muhammad Asghar
8.	Focal Person Anatomy	Prof Dr. Ayesha Yousaf	2.	Deputy Director DME	Dr. Shazia Zeb
9.	Focal Person Physiology	Dr. Sidra Hamid	3.	Implementation Incharge 1st&2 <sup>nd</sup> Year MBBS	Prof. Dr. Ifra Saeed
10.	Focal Person Biochemistry	Dr. Aneela Jamil	4.	Module planner & implementation coordinator	Dr. Sidra Hamid
11.	Focal Person Pharmacology	Dr. Zunera Hakim	5.	Editor	Muhammad Arslan Aslam
12.	Focal Person Medicine	Dr Madiha Nazar			
13.	Focal Person Pathology	Dr. Asiya Niazi			
14.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
15.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
16.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar			

## Discipline Wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
III	<ul style="list-style-type: none"> <li>Anatomy</li> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>Heart &amp; Vessels</li> </ul>	<ul style="list-style-type: none"> <li>Cardiovascular System</li> </ul>	<ul style="list-style-type: none"> <li>Heart &amp; Vessels</li> </ul>	<ul style="list-style-type: none"> <li>Mediastinum, Heart, Great Vessels</li> </ul>
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>Carbohydrate chemistry, Lipid chemistry</li> <li>The Heart as a Pump and Function of the Heart Valves &amp; regulation of heart pumping, cardiac cycle</li> <li>Rhythmical Excitation of the Heart &amp; Specialized excitatory &amp; conductive system of the heart &amp; its control (revisit)</li> <li>Electrocardiogram, its interpretation &amp; its abnormalities</li> <li>Medical Physics of Pressure, Flow, and Resistance, Vascular Distensibility and Functions of the Arterial and Venous Systems</li> <li>Microcirculation and the Lymphatic System, Local and Humoral Control of Blood Flow by the Tissues</li> <li>Nervous Regulation of the Circulation, and Rapid &amp; Long-Term Control of Arterial Pressure, hypertension</li> <li>Cardiac Output, Venous Return, and Their Regulation</li> <li>Muscle Blood Flow and Cardiac Output During Exercise; the Coronary &amp; regional circulation</li> <li>Cardiac Failure, Circulatory Shock</li> <li>Heart Valves and Heart Sounds; Dynamics of Valvular and Congenital Heart Defects</li> </ul>			
	<ul style="list-style-type: none"> <li>Behavioural Sciences, Bioethics &amp; Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>Breaking the bad news</li> <li>Stigma to mental illness</li> </ul>			
	<ul style="list-style-type: none"> <li>Radiology, Artificial Intelligence &amp; Innovation</li> </ul>	<ul style="list-style-type: none"> <li>Chest radiograph with perspective of cardiovascular system</li> <li>Radiology with perspective of Artificial Intelligence &amp; Innovation.</li> </ul>			
	<ul style="list-style-type: none"> <li>Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>Approach to a patient with chest pain</li> </ul>			
	<ul style="list-style-type: none"> <li>Research</li> </ul>	<ul style="list-style-type: none"> <li>Research Club Activity (Synopsis writing)</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>The Holy Quran Translation Component</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical Integration</li> </ul>	<ul style="list-style-type: none"> <li>Clinically content relevant to CVS module</li> <li>Risk factors of coronary vascular disease (Community Medicine)</li> <li>Breaking bad news (Behavior Sciences)</li> <li>DME orientation/paper discussion (DME)</li> <li>Thrombosis &amp; Infarction (Pathology)</li> <li>Approach to a patient with chest pain (Family Medicine)</li> <li>Hypertensive retinopathy (Eye)</li> <li>ECG Changes (MI, Electrical Imbalance, Myocardial hypertrophy) (Medicine)</li> <li>Overview of acute coronary syndrome &amp; management of heart failure &amp; management of shock (Medicine)</li> <li>Hypertension (Medicine)</li> <li>Clinical pharmacology of antihypertensive drugs (Pharmacology)</li> <li>Cardiovascular changes in pregnancy (Gynae &amp; Obs)</li> </ul>			



## Categorization of Modular Contents

### Anatomy

Category A*	Category B**	Category C***			
		Demonstrations / SGD	CBL	SKL/Practical's	Self-Directed Learning (SDL)
<ul style="list-style-type: none"> <li>Embryology</li> </ul>	<ul style="list-style-type: none"> <li>Histology</li> </ul>	<ul style="list-style-type: none"> <li>Thoracic Wall / Thoracic Vertebra</li> <li>Mediastinum</li> <li>Pericardium</li> <li>Heart (External Features)</li> <li>Heart (Internal Features)</li> <li>Heart (Clinical Correlations)</li> <li>Vasculature of heart</li> <li>Innervation of heart</li> <li>Superior mediastinum</li> <li>Posterior mediastinum (Contents)</li> <li>Posterior mediastinum (Azygous system of veins)</li> <li>Surface marking / Radiology</li> </ul>	<ul style="list-style-type: none"> <li>Cardiac tamponade</li> <li>Coarctation of aorta</li> </ul>	<ul style="list-style-type: none"> <li>Elastic arteries</li> <li>Medium and small sized arteries</li> <li>Large veins</li> <li>Medium and small sized veins</li> </ul>	<ul style="list-style-type: none"> <li>Thoracic Wall / Thoracic Vertebra</li> <li>Pericardium</li> <li>Mediastinum</li> <li>Vasculature of heart</li> <li>Superior mediastinum</li> <li>Azygous system of veins</li> </ul>

**Category A\*:** By Professor

**Category B\*\*:** By Associate & Assistant Professors

**Category C\*\*\*:** By Senior Demonstrators & Demonstrators

### Teaching Staff / Human Resources of Department of Anatomy

Sr. #	Designation of Teaching Staff / Human Resource	Total Number of Teaching Staff
1.	Professor of Anatomy department	01
2.	Associate Professor	01
3.	Demonstrators of Anatomy department	04

#### Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$2 * 10 = 20$ hours
2.	Small Group Discussions (SGD)	$2 * 13 = 26$ hours
3.	Practical / Skill Lab	$1.5 * 20 = 30$ hours

#### Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$1 * 10 = 10$ hours
2.	Small Group Discussions (SGD)	$2 * 13 = 26$ hours
3.	Practical / Skill Lab	$1.5 * 4 = 6$ hours
4.	Self-Directed Learning (SDL)	$2 * 4 = 08$ hours

## Physiology

Category A*	Category B**	Category C***				
LGIS	LGIS	PBL	CBL	Practical's	SGD	SDL
<ul style="list-style-type: none"> <li>• Short term regulation of blood pressure (<b>Prof. Dr. Samia Sarwar/Dr Fahad</b>)</li> <li>• Long term regulation of blood pressure (<b>Prof. Dr. Samia Sarwar/Dr Fahad</b>)</li> <li>• Circulatory Shock (<b>Prof. Dr. Samia Sarwar/Dr Fareed</b>)</li> <li>• Coronary circulation, Atherosclerosis &amp; acute coronary occlusion</li> <li>• <b>Prof. Dr. Samia Sarwar/Dr Fahad</b></li> </ul>	<ul style="list-style-type: none"> <li>• Cardiac output &amp; its control, measurement of cardiac output, pathologically high and low cardiac output (<b>By Dr Sidra</b>)</li> <li>• Cardiac cycle - I, Events of cardiac cycle and its graphical representation (<b>By Dr Sidra</b>)</li> <li>• Cardiac cycle – II, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping (<b>By Dr Sidra</b>)</li> <li>• Cardiac cycle, Events of cardiac cycle and its graphical representation, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping (SDL) <b>By Dr Sidra</b></li> <li>• Introduction to CVS (<b>By Dr Fahad</b>)</li> <li>• Classification of blood vessels &amp; Biophysical considerations (<b>By</b></li> </ul>	<p>One PBL In two sessions</p>	<ul style="list-style-type: none"> <li>• Pitting edema</li> <li>• Palpitations/Tachycardia</li> </ul>	<ul style="list-style-type: none"> <li>• Examination of arterial pulse</li> <li>• Determination of Jugular Venous Pressure (JVP)</li> <li>• Clinical examination of chest for CVS</li> <li>• Determination of Blood Pressure (BP)</li> <li>• Effect of exercise &amp; posture on arterial blood pressure</li> <li>• Recording of Electrocardiography (ECG)</li> <li>• Cardiopulmonary resuscitation (CPR) Demonstration of Triple Response</li> </ul>	<ol style="list-style-type: none"> <li>1. Concept of vasomotion and starling forces</li> <li>2. Regulation of blood pressure</li> <li>3. Cardiac output and Venous return (second week)</li> <li>4. ECG &amp; its clinical importance (second week)</li> <li>5. Arrhythmias (third week)</li> <li>6. Short term regulation of blood pressure (fourth week)</li> <li>7. Long term regulation of blood pressure (fourth week)</li> <li>8. Coronary circulation, Atherosclerosis &amp; acute coronary occlusion (fourth week) Cardiac cycle (fourth week)</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>SDL On Campus</b> Heart Sounds</li> <li>2. Capillary circulation, Concept of vasomotion and starling forces</li> <li>3. Introduction to ECG &amp; its clinical importance</li> <li>4. Cardiac cycle - I, Events of cardiac cycle and its graphical representation</li> <li>5. Arrhythmias</li> <li>6. Congestive cardiac failure</li> <li>7. Long term regulation of blood pressure</li> <li>1. Skeletal muscle blood flow, Cardiovascular changes during exercise</li> <li>1. <b>SDL Off Campus</b> Introduction to CVS</li> <li>2. Classification of blood vessels &amp; Biophysical considerations</li> <li>3. Regulation of</li> </ol>

	<ul style="list-style-type: none"> <li>• <b>Dr Aneela)</b></li> <li>• Heart Sounds (By <b>Dr Uzma)</b></li> <li>• Regulation of blood flow (By <b>Dr Aneela)</b></li> <li>• Capillary circulation, Concept of vasomotion and Starling forces (By <b>Dr Fahad)</b></li> <li>• Functions of veins, Venous return and factors affecting venous return (By <b>Dr Kamil)</b></li> <li>• Introduction to ECG &amp; its clinical importance (By <b>Dr Fahad)</b></li> <li>• Vectorial analysis &amp; arrhythmias I (By <b>Dr Fahad)</b></li> <li>• Arrhythmias II (By <b>Dr Fahad)</b></li> <li>• ECG changes in myocardial hypertrophies, ischemic heart disease (By <b>Dr Fahad)</b></li> <li>• Congestive cardiac failure (By <b>Dr Fareed)</b> <ul style="list-style-type: none"> <li>• Splanchnic circulation, cutaneous circulation (By <b>Dr Fareed)</b></li> </ul> </li> <li>• Skeletal muscle blood flow, Cardiovascular</li> </ul>					<p style="text-align: right;">blood flow</p> <ol style="list-style-type: none"> <li>4. Introduction to ECG &amp; its clinical importance</li> <li>5. Vectorial analysis &amp; arrhythmias</li> <li>6. Cardiac cycle</li> <li>7. Splanchnic circulation, cutaneous circulation</li> </ol> <p style="text-align: right;">Regulation of blood pressure</p>
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	<p>changes during exercise</p> <ul style="list-style-type: none"> <li>• <b>(By Dr Uzma)</b></li> <li>• Fetal circulation &amp; cardiac abnormalities in fetal circulation</li> <li>• <b>(By Dr Fahad)</b></li> </ul>					
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**Category A\*:** By HOD and Associate Professor

**Category B\*\*:** By All (HOD, Associate, Assistant, Senior Demonstrators)

**Category C\*\*\*:** By Demonstrators and Residents

### Teaching Staff / Human Resource of Department of Physiology

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of physiology department	01
2.	Associate professor of physiology department	01
3.	Assistant professor of physiology department (AP)	01
4.	Demonstrators of physiology department	07
5.	Residents of physiology department (PGTs)	06

### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LECTURES)	$22 \times 1 = 22$ Hours
2.	Small Group Discussions (SGD)/CBL	$1.5 \times 4 = 6$ Hours + 8 Hours (2nd, 3rd, 4th week) = 14 Hours
3.	Problem Based Learning (PBL)	---
4.	Practical / Skill Lab	$1.5 \times 4 = 6$ Hours
5.	Self-Directed Learning (SDL)	$8 \times 1 = 8$ Hours (On Campus) $8 \times 1 = 8$ Hours (Off Campus)

## Biochemistry

Category A*	Category B**				
LGIS	LGIS	PBL	CBL	Practical's	SGD
<ul style="list-style-type: none"> <li>• Simple Lipids</li> <li>• Compound Lipids (phospholipids, glycolipids, lipoproteins)</li> <li>• Prostaglandins</li> </ul>	<ul style="list-style-type: none"> <li>• Definition and Biological importance of Lipids</li> <li>• Fatty acids</li> <li>• Derived lipids</li> <li>• Cholesterol</li> <li>• Introduction and classification of carbohydrates</li> <li>• Isomerism, optical activity and mutarotation</li> <li>• Monosaccharide</li> <li>• Disaccharides</li> <li>• Homopolysaccharides</li> <li>• Heteropolysaccharides</li> </ul>		<ul style="list-style-type: none"> <li>• Atherosclerosis</li> <li>• Heteropolysaccharides</li> </ul>	<ul style="list-style-type: none"> <li>• Lipid solubility</li> <li>• Benedict's test and Molisch's test</li> <li>• Barfoed's Test and Selivanoff's test</li> <li>• Iodine Test</li> </ul>	<ul style="list-style-type: none"> <li>• Classification of carbohydrates and lipids</li> <li>• Classification and properties of fatty acids</li> </ul>

**Category A\*:** By HOD and Assistant Professor

**Category B\*\*:** By All (HOD, Assistant Professors, Senior Demonstrators)

**Category C\*\*\*:** (By All Demonstrators)

### Teaching Staff / Human Resource of Department of Biochemistry

Sr. #	Designation of Teaching Staff / Human Resource	Total number of teaching staff
1	Assistant professor of biochemistry department (AP)	01
2	Demonstrators of biochemistry department	07

#### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours (Faculty)	Total Hours (student)
1.	Large Group Interactive Session (LECTURES)	$2 * 8 = 16$ hours	08
2.	Small Group Discussions (SGD)	$1.5 * 5 = 7.5$ hours	06
3.	Problem Based Learning (PBL)	Zero	zero
4.	Practical / Skill Lab	$1.5 * 5 = 7.5$ hours	6
5.	Self-Directed Learning (SDL)	-----	08



## Timetable For CVS Module 28-08-2023 TO 02-09-2023 (First Week)

DAY/ TIME	8:00AM-9:00AM	09:00AM-10:00AM	10:00AM-11:00AM	11:00AM-12:00 PM	12:00PM-12:20PM	12:20PM-02:00PM	Home Assignment ( 2 Hours)				
28-08-2023 MONDAY	<b>DISSECTION/SGD</b>		<b>COMMUNITY MEDICINE (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B R E A K</b>	Practical &CBL Topics mentioned at the end	SDL Physiology  Introduction to CVS		
	Thoracic Wall / Thoracic Vertebra		Risk factors of coronary vascular disease		Introduction to CVS	Classification of Blood vessels & Biophysical considerations					
			Dr Rizwana (Even)	Dr Asif (Odd)	Dr Fahad (Even)	Dr. Aneela (Odd)					
29-08-2023 TUESDAY	<b>Behavioural Sciences</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B R E A K</b>	Practical &CBL Topics mentioned at the end	SDL Physiology Classification of Blood vessels & Biophysical considerations
	Breaking the bad news		Introduction and classification of carbohydrates & Isomerism	Introduction and classification of lipids &Fatty acids	Development of CVS (Development of Veins)	General Anatomy of CVS (General Organization)	Classification of Blood vessels & Biophysical considerations	Introduction to CVS			
	Dr. Sadia Yasir (Even)	Dr. Zarnain (Odd)	Dr. Isma (Even)	Dr. Uzma Zafar (Odd)	Prof. Dr. Ayesha (Even)	Assist. Prof. Dr. Arsalan (Odd)	Dr. Aneela (Even)	Dr Fahad (Odd)			
30-08-2023 WEDNESDAY	<b>BIOCHEMISTRY (LGIS)</b>		<b>PHYYSICAL ACTIVITY</b>		<b>ANATOMY (LGIS)</b>		<b>DME ORIENTATION SESSION</b>		<b>B R E A K</b>	Practical &CBL Topics mentioned at the end	SDL Biochemistry Classification & functions of carbohydrates
	Introduction and classification of lipids &Fatty acids	Introduction and classification of carbohydrates & Isomerism			General Anatomy of CVS (General Organization)	Development of CVS (Development of Veins)	Paper discussion	Module orientation & discussion on feedback			
	Dr. Uzma Zafar (Even)	Dr. Isma (Odd)			Assist. Prof. Dr. Arsalan (Even)	Prof. Dr. Ayesha (Odd)	All departments (Even)	Dr Sidra / Dr. Saira			
31-08-2023 THURSDAY	<b>DISSECTION/SGD</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY SDL No. 01</b>		<b>B R E A K</b>	Practical &CBL Topics mentioned at the end	SDL Biochemistry Classification & functions of lipids
	Mediastinum (General Features & Divisions)		Heart sounds	Regulation of blood flow	General Anatomy of CVS (Classification of	Development of CVS (Aortic Arches and	Heart sounds				
			Dr. Uzma(even)	Dr. Aneela (Odd)	Assist. Prof. Dr. Arsalan (Even)	Prof. Dr. Ayesha (Odd)	Dr. Uzma (even)	Dr. Iqra (Odd)			
01-09-2023 FRIDAY	<b>QURAN TRANSLATION-I</b>		<b>QURAN TRANSLATION-II</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>DME ORIENTATION SESSION</b>		<b>B R E A K</b>	SDL Anatomy Thoracic Wall / Thoracic Vertebrae	
	Mumamat-I	muashrat-II	muashrat-II	Mumamat-I	Regulation of blood flow	Heart sounds	Module orientation & discussion on feedback	Paper discussion			
	Mufti Naeem (Even)	Molana Abdul Wahid (Odd)	Molana Abdul Wahid (Even)	Mufti Naeem (Odd)	Dr. Aneela (even)	Dr. Uzma (Odd)	Dr Sidra / Dr. Saira	All departments (Odd)			
02-09-2023 SATURDAY	<b>DISSECTION/CBL</b>			<b>RADIOLOGY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B R E A K</b>	Practical &CBL Topics mentioned at the end	SDL Anatomy Pericardium/ Mediastinum	
	Pericardium / CBL			Chest radiograph with perspective of cardiovascular system		Capillary circulation, Concept of vasomotion and starling forces	Functions of veins, Venous return and factors affecting venous return				
					Dr Aniqua (even)	Dr. Fiza (even)	Dr. Fahad (Even)	Dr. Kamil (Odd)			

Topics for Practical with Venue						Topics for Small Group Discussion& CBLs				
<ul style="list-style-type: none"> <li>Elastic Arteries (Anatomy/ Histology-practical) venue Histology Laboratory</li> <li>Lipid solubility (Biochemistry practical) venue- Biochemistry Laboratory</li> <li>Examination of arterial pulse (Physiology –practical) Physiology Laboratory</li> <li>Determination of Jugular Venous Pressure (JVP) (Physiology –practical) Physiology Laboratory</li> </ul>						<ul style="list-style-type: none"> <li>Biochemistry tutorial – classification of carbohydrates and lipids</li> <li>Concept of vasomotion and starling forces. (SGD) (Physiology Lecture Hall No.05)</li> </ul>				
Schedule for Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	1-90	Dr Ali Raza	Lecture Hall No.04 (Anatomy)	
Tuesday	D	C	A	B	E	B	91-180	Dr. Quratulain Shareef	Lecture Theatre Complex No.03	
Wednesday	E	D	B	C	A	C	180-270	Dr. Zaneera Saqib	Lecture Theatre Complex No.02	
Thursday	B	A	D	E	C	D	271 onwards	Dr Urooj Shah	Lecture Hall No. 03 (Anatomy)	
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL &SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2.	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar		3.	Batch –C	141-210	Dr. Romessa Naeem	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah		4.	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards	Dr. Nayab	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Romesa (PBL)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03	
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Afsheen (pgt physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02	
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						
<b>Venues for Large Group Interactive Session (LGIS) and SDL</b>										

**Timetable For CVS Module**  
**04-09-2023 TO 09-09-2023 (Second Week)**

DAY/ TIME	8:00AM-9:00AM	09:00AM-10:00AM	10:00AM-11:00AM	11:00AM-12:00 PM	12:00PM-12:20PM	12:20PM-02:00PM	Home Assignment (2 Hours)		
04-09-2023 MONDAY	<b>DISSECTION/CBL</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B R E A K</b>	Practical & CBL Topics mentioned at the end  SDL Physiology Regulation of blood flow	
	Heart (External Features)		Development of CVS (Aortic Arches and derivatives)  Prof. Dr. Ayesha (Even)	General Anatomy of CVS (Classification of vessels)  Assist. Prof. Dr. Arsalan (Odd)	Functions of veins, Venous return and factors affecting venous return  Dr Kamil (Even)	Capillary circulation, Concept of vasomotion and starling forces  Dr Fahad (Odd)			
05-09-2023 TUESDAY	<b>DISSECTION/SGD</b>		<b>PATHOLOGY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B R E A K</b>	Practical & CBL Topics mentioned at the end  SDL Physiology Introduction to ECG & its clinical importance	
	Heart (Internal Features)		Edema  Dr Fariha (Even)      Dr Rabia (Odd)		Capillary circulation, Concept of vasomotion and starling forces (SDL)  Dr Maryam (Even)	Cardiac output & its control, measurement of cardiac output, pathologically high and low cardiac output-I  Dr Sidra (Odd)			
06-09-2023 WEDNESDAY	<b>DISSECTION/SGD</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B R E A K</b>	Practical & CBL Topics mentioned at the end  SDL Biochemistry Fatty acids & Simple lipids	
	Heart (Clinical Correlations of Heart)		Histology of CVS (Arteries and Veins)  Assoc. Prof. Dr. Mothashim (Even)	Development of CVS (Formation, Position and Partitioning of heart tube)  Prof. Dr. Ayesha (Odd)	Cardiac output & its control, measurement of cardiac output, pathologically high and low cardiac output-II  Dr. Sidra (Odd)	Introduction to ECG & its clinical importance  Dr Fahd (Even)			
07-09-2023 THURSDAY	<b>HOLIDAY</b>							<b>B R E A K</b>	Practical & CBL Topics mentioned at the end  SDL Biochemistry Classification and Chemical reactions of Monosaccharides
08-09-2023 FRIDAY	<b>QURAN TRANSLATION -III</b>		<b>QURAN TRANSLATION -IV</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>BIOCHEMISTRY (LGIS)</b>		
	Mumamalat -II	Ekhlaqiaat-I	Ekhlaqiaat-I	Mumamalat-II	Vectorial analysis & arrhythmias I  Dr. Fahad (even)	Cardiac cycle - I, Events of cardiac cycle and its graphical representation  Dr Sidra (Odd)	Mutarotation & Monosaccharides & their chemical reaction  Dr. Isma (even)	Simple lipids & Compound lipids  Dr. Aneela (Odd)	SDL Anatomy Heart
09-09-2023 SATURDAY	<b>BEHAVIOUR SCIENCES</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>B R E A K</b>	Practical & CBL Topics mentioned at the end  SDL Anatomy Vassculture of Heart	
	Stigma to mental illness  Dr. Azeem Rao (Even)	Dr. Quratulain (Odd)	Simple lipids & Compound lipids  Dr. Aneela (even)	Mutarotation & Monosaccharides & their chemical reaction  Dr. Isma (Odd)	Cardiac cycle - I, Events of cardiac cycle and its graphical representation  Dr Sidra (even)	Vectorial analysis & arrhythmias I  Dr.Fahd (Odd)			

Topics For Practical With Venue						Topics For Small Group Discussion& CBLs With Venue				
<ul style="list-style-type: none"> <li>• Medium &amp; Small Sized Arteries (Anatomy/ Histology-practical) venue Histology Laboratory</li> <li>• Molisch's Test &amp; Benedict's Test (Biochemistry practical) venue- Biochemistry Laboratory</li> <li>• Clinical examination of chest for CVS (Physiology –practical) Physiology Laboratory</li> <li>• Determination of Blood Pressure (BP) (Physiology –practical) Physiology Laboratory</li> </ul>						<ul style="list-style-type: none"> <li>• Biochemistry tutorial – Classification &amp; Properties of Fatty Acids. (Biochemistry Basement demo room)</li> <li>• Physiology CBL- Pitting edema (Physiology Lecture Hall No.05)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	1-90	Dr Ali Raza	Lecture Hall No.04 (Anatomy)	
Tuesday	D	C	A	B	E	B	91-180	Dr. Quratulain Shareef	Lecture Theatre Complex No.03	
Wednesday	E	D	B	C	A	C	180-270	Dr. Zaneera Saqib	Lecture Theatre Complex No.02	
Thursday	B	A	D	E	C	D	271 onwards	Dr Urooj Shah	Lecture Hall No. 03 (Anatomy)	
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL &SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2.	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar		3.	Batch –C	141-210	Dr. Romessa Naeem	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah		4.	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards	Dr. Nayab	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)		Venues for Large Group Interactive Session (LGIS) and SDL				
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Romesa (PBL)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03	
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Afsheen (PGT Physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02	
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

## Timetable For CVS Module 11-09-2023 TO 15-09-2023 (Third Week)

DAY/ TIME	8:00AM-9:00AM	09:00AM-10:00AM	10:00AM-11:00AM	11:00AM-12:00 PM	12:00PM-12:20PM	12:20PM-02:00PM	Home Assignment ( 2 Hours)		
11-09-2023 MONDAY	<b>DISSECTION/CBL</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>				
	Vassculature of Heart / CBL		Development of CVS (Formation, Position and Partitioning of heart tube)	Histology of CVS (Arteries and Veins)	Arrhythmias II	Cardiac cycle – II, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping		Practical &CBL Topics mentioned at the end	SDL Physiology Regulation of BP
12-09-2023 TUESDAY	<b>DISSECTION/SGD</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>				
	Innervation of Heart		Development of CVS (Formation and partitioning of Ventricles)	Histology of CVS (Capillaries)	Cardiac cycle – II, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping	Arrhythmias II		Practical CBL Topics mentioned at the end	SDL Physiology Regulation of BP
13-09-2023 WEDNESDAY	<b>BIOCHEMISTRY (LGIS)</b>		<b>FAMILY MEDICINE</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		
	Derived lipids	Disaccharides &homopolysaccharides	Approach to a patient with chest pain		Histology of CVS (Capillaries)	Development of CVS (Formation and partitioning of Ventricles)	ECG changes in myocardial hypertrophies, ischemic heart disease	Short term regulation of blood pressure	Practical &CBL Topics mentioned at the end
14-09-2023 THURSDAY	<b>ANATOMY (SGD)</b>		<b>ARTIFICIAL INTELLIGENCE</b>		<b>PHYSIOLOGY (LGIS)</b>				
	Superior Mediastinum (Trachea, Esophagus Ascending Aorta)		Guest Lecture		Short term regulation of blood pressure	ECG changes in myocardial hypertrophies, ischemic heart disease		Practical &CBL Topics mentioned at the end	SDL Biochemistry Compound lipids
15-09-2023 FRIDAY	<b>EYE (LGIS)</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		
	Hypertensive Retinopathy		Disaccharides &homopolysaccharides	Derived lipids	Development of CVS (Fetal Circulation)	Histology of CVS (Tunics of heart & Lyphatic System)	Congestive cardiac failure	Long term regulation of blood pressure	SDL Anatomy Innervation of Heart
16-09-2023 SATURDAY	<b>DISSECTION/SGD</b>		<b>RESEARCH CLUB ACTIVITY</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>BREAK</b>		
	Posterior mediastinum (Contents)		IUGRC		Long term regulation of blood pressure	Congestive cardiac failure		Practical &CBL Topics mentioned at the end	SDL Anatomy Superior Mediastinum

BREAK

Topics For Practical With Venue						Topics For Small Group Discussion& CBLs With Venue				
<ul style="list-style-type: none"> <li>• Large Veins (Anatomy/ Histology-practical) venue Histology Laboratory</li> <li>• Selivanoff's Test &amp; Barfoed's Test (Biochemistry practical) venue- Biochemistry Laboratory</li> <li>• Effect of exercise and posture on arterial blood pressure (Physiology –practical) Physiology Laboratory</li> <li>• Recording of Electrocardiography (ECG) (Physiology –practical). Physiology Laboratory</li> </ul>						<ul style="list-style-type: none"> <li>• Biochemistry CBL- Atherosclerosis.</li> <li>• Physiology CBL Palpitations / Tachycardia (Physiology Lecture Hall No.05)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	1-90	Dr Ali Raza	Lecture Hall No.04 (Anatomy)	
Tuesday	D	C	A	B	E	B	91-180	Dr. Quratulain Shareef	Lecture Theatre Complex No.03	
Wednesday	E	D	B	C	A	C	180-270	Dr. Zaneera Saqib	Lecture Theatre Complex No.02	
Thursday	B	A	D	E	C	D	271 onwards	Dr Urooj Shah	Lecture Hall No. 03 (Anatomy)	
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL &SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2.	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar		3.	Batch –C	141-210	Dr. Romessa Naeem	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah		4.	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards	Dr. Nayab	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)		Venues for Large Group Interactive Session (LGIS) and SDL				
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh (PBL)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03	
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Afsheen (PGT Physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02	
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Timetable For CVS Module**  
**18-09-2023 TO 22-09-2023 (Fourth Week)**

DAY/ TIME	8:00AM-9:00AM	09:00AM-10:00AM	10:00AM-11:00AM	11:00AM-12:00 PM	12:00PM-12:20PM	12:20PM-02:00PM	Home Assignment ( 2 Hours)			
18-09-2023 MONDAY	<b>MEDICINE</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		Practical &CBL Topics mentioned at the end	SDL Physiology Vectorial analysis & arrhythmias		
	Overview of acute coronary syndrome & Management of heart failure & Management of shock		Splanchnic circulation, cutaneous circulation	Skeletal muscle blood flow, Cardiovascular changes during exercise	Practical (Skill Lab) / SGD(CBL) Dated 23-09-2023 Saturday batches	Fetal circulation & cardiac abnormalities in fetal circulation			Circulatory shock	
	Dr. Asad cardiologist (Even)	Dr. Hasnain (Odd)	Dr.Fareed(Even)	Dr Uzma (Odd)			Dr.Fahad (Even)	Prof. Dr. Samia Sarwar / Dr. Fareed (Odd)		
19-09-2023 TUESDAY	<b>MEDICINE(LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>			
	Hypertension		Skeletal muscle blood flow, Cardiovascular changes during exercise	Splanchnic circulation, cutaneous circulation	Histology of CVS (Tunics of heart & Lymphatic System)	Development of CVS (Fetal Circulation)	Circulatory shock	Fetal circulation & cardiac abnormalities in fetal circulation	Practical &CBL Topics mentioned at the end	SDL Physiology Cardiac cycle Online Clinical Evaluation
	Dr. Asad cardiologist (Even)	Dr. Hasnain (Odd)	Dr.Uzma( Even)	Dr. Fareed (Odd)	Assoc. Prof. Dr. Mothashim (Even)	Prof. Dr. Ayesha (Odd)	Prof. Dr. Samia Sarwar / Dr. Fareed (Even)	Dr.Fahad (Odd)		
20-09-2023 WEDNESDAY	<b>PHARMACOLOGY</b>		<b>BIOCHEMISTRY(LGIS)</b>		<b>GYNAE &amp; OBS (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>			
	Clinical Pharmacology of Anti hypertensive drugs		Heteropolysaccharides	Prostaglandins	Hypertensive disorders in pregnancy (gestational hypertension, pre-eclampsia)		Coronary circulation, Atherosclerosis & acute coronary occlusion	Long & Short term regulation of blood pressure	Practical &CBL Topics mentioned at the end	SDL Biochemistry Prostaglandins
	(Even)	(Odd)	Dr. Isma (even)	Dr. Aneela (Odd)	Dr. Saima Khan(Even )	Dr. Sadia Bano (Odd)	Prof..Dr. Samia/ Dr. kamil (Even)	Dr. Najam SDL (Odd)		
21-09-2023 THURSDAY	<b>DISSECTION/SGD</b>				<b>BIOCHEMISTRY(LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>			
	Posterior Mediastinum (Azygous system of Veins)				Prostaglandins	Heteropolysaccharides	Long & Short term regulation of blood pressure	Coronary circulation, Atherosclerosis & acute coronary occlusion	Practical &CBL Topics mentioned at the end	SDL Biochemistry Heteropoly saccharides
				Dr. Aneela (even)	Dr. Isma (Odd)	Dr. Najam SDL (Even)	Prof. Dr. Samia/ Dr.Kamil (Odd)			
22-09-2023 FRIDAY	<b>PHYSIOLOGY (SDL)</b>		<b>Physical Activity</b>		<b>DISSECTION/SGD</b>					
	Skeletal muscle blood flow, Cardiovascular changes during exercise				Surface Marking / Radiology					
	Dr. Uzma								SDL Anatomy Posterior Mediastinum	SDL PATHOLOGY Shock
23-09-2023 SATURDAY	SDL				Break					

**B R E A K**

Topics For Practical With Venue						Topics For Small Group Discussion& CBLs With Venue				
<ul style="list-style-type: none"> <li>• Medium &amp; Small Sized Veins (Anatomy/ Histology-practical) venue Histology Laboratory</li> <li>• Iodine Test (Biochemistry practical) venue- Biochemistry Laboratory</li> <li>• Cardiopulmonary resuscitation (CPR) (Physiology –practical) Physiology Laboratory</li> <li>• Demonstration of Triple Response (Physiology –practical) (Physiology Physiology Laboratory</li> </ul>						<ul style="list-style-type: none"> <li>• Biochemistry Heteropolysaccharides CBL (Biochemistry Basement demo room)</li> <li>• Physiology tutorial- Regulation of blood pressure (Physiology Lecture Hall No.05)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches for Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	1-90	Dr Ali Raza	Lecture Hall No.04 (Anatomy)	
Tuesday	D	C	A	B	E	B	91-180	Dr. Quratulain Shareef	Lecture Theatre Complex No.03	
Wednesday	E	D	B	C	A	C	180-270	Dr. Zaneera Saqib	Lecture Theatre Complex No.02	
Thursday	B	A	D	E	C	D	271 onwards	Dr Urooj Shah	Lecture Hall No. 03 (Anatomy)	
Saturday	A	E	C	D	B					
Venue For First Year Batches For PBL &SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2.	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar		3.	Batch –C	141-210	Dr. Romessa Naeem	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room (Basement)		Dr. Fareedullah		4.	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch -E	281-onwards	Dr. Nayab	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)		Venues for Large Group Interactive Session (LGIS) and SDL				
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Romesa (PBL)		Odd Roll Numbers		New Lecture Hall Complex Lecture Theater # 03		
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Afsheen (PGT Physiology)		Even Roll Number		New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						

**Next Week Will Be Assessment Week. The Detail of Assessment Week Will Be Shared Once Finalized.**



**Timetable for CVS Module  
25-09-2023 TO 30-09-2023 (Fifth Week)**

DAY/ TIME	8:00AM-9:0AM	02:00pm – 03:00pm
25-09-2023 MONDAY	ANATOMY /PHYSIOLOGY VIVA VOCE	
26-09-2023 TUESDAY	ANATOMY /PHYSIOLOGY VIVA VOCE	
27-09-2023 WEDNESDAY	ANATOMY THEORY PAPER	
28-09-2023 THURSDAY	SDL	
29-09-2023 FRIDAY	PHYSIOLOGY THEORY PAPER	
30-09-2023 SATURDAY	BIOCHEMISTRY THEORY PAPER & ALLIEDs	

## SECTION VI

**Table of Specification (TOS) For CVS Module Examination**

Sr. #	Discipline	No. of MCQs (%)	No. of MCQs according to cognitive domain			No. of SEQs (%)		No. of SEQs according to cognitive domain			Viva voce	Total Marks
			C1	C2	C3	No. of items	Marks	C1	C2	C3		
1.	Anatomy	25	15	5	5	5	25	1	2	2	60	110
2.	Physiology	40	24	12	4	4	20	1	2	1	25	85
3.	Biochemistry	7	4	3	-	3	15	0.5	1.5	-	-	22
4.	Bioethics / Behavioural Sciences	4	-	3	2	-	-	-	-	-	-	4
5.	Research, Artificial Intelligence & Innovation	5	-	3	2	-	-	-	-	-	-	5
6.	Pathology	3	-	2	1	-	-	-	-	-	-	3
7.	Medicine	5	-	3	2	-	-	-	-	-	-	5
8.	Surgery	3	-	2	1	-	-	-	-	-	-	3
9.	Obs & Gynaecology	5	-	3	2	-	-	-	-	-	-	5
10.	Community Medicine	3	-	2	2	-	-	-	-	-	-	4
11.	Family Medicine	1		0	1							1
<b>\Grand Total</b>											<b>246</b>	

## **Annexure I**

**(Sample MCQ, & SEQ Papers)**

**RAWALPINDI MEDICAL UNIVERSITY, RWP**  
**ANATOMY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQS CVS MODULE EXAM**

1. A medical student while studying a lung specimen noticed number of grooves on the mediastinal surface of left lung, most likely structure producing these grooves is
  - a. Azygous vein
  - b. Inferior vena cava
  - c. Right lymphatic duct
  - d. Ascending aorta
  - e. Esophagus
2. The structure of right ventricle that lodges RBB of conducting system is
  - a. Supraventricular crest
  - b. Septomarginal trabeculae
  - c. Trabeculae carniae
  - d. Septal papillary muscle
  - e. Chordate tendinae
3. The direct branches of descending thoracic aorta are
  - a. Inferior thyroid artery
  - b. left subclavian artery
  - c. Internal thoracic artery
  - d. Right bronchial artery
  - e. Posterior intercostals for 3-11 intercostal spaces
4. In anteroseptal wall MI the posterior 1/3rd of interventricular septum was spared because it receives its blood supply from
  - a. Marginal branch of RCA
  - b. Anterior descending artery
  - c. Posterior descending artery
  - d. Circumflex artery
  - e. Diagonal artery
5. In anteroseptal wall MI the posterior 1/3rd of interventricular septum was spared because it receives its blood supply from
  - a. Marginal branch of RCA
  - b. Anterior descending artery
  - c. Posterior descending artery
  - d. Circumflex artery
  - e. Diagonal artery

**RAWALPINDI MEDICAL UNIVERSITY**  
**CVS MODULE EXAMINATION**  
**1<sup>ST</sup> YEAR MBBS**  
**ANATOMY, SEQ'S PAPER**

1. a. Give characteristic features of interior of right ventricle. (3)
- b. What is a moderator band? (1)
- c. Define sudden death syndrome. (1)
2. a. Discuss formation and partitioning of heart tube. (3)
- b. Enlist different types of interatrial septal defects. (2)

**RAWALPINDI MEDICAL UNIVERSITY**  
**CVS MODULE EXAMINATION**  
**1<sup>ST</sup> YEAR MBBS**  
**PHYSIOLOGY, MCQ PAPER**

1. When the radius of resistance vessels is increased there will be increase in:
  - a. Capillary blood flow
  - b. Diastolic blood pressure
  - c. Hematocrit
  - d. Systolic blood pressure
  - e. Viscosity of blood
2. Turbulence in a blood vessel is inversely proportional to the:
  - a. Viscosity of blood
  - b. Velocity of blood flow
  - c. Diameter of the vessel
  - d. Density of fluid inside the vessel
  - e. Reynolds' number
3. A physiologist while teaching the concept of Starling forces directs his students with the subsequent data to calculate the net force. Pressure in the capillary in muscle= 35 mm Hg at the arteriolar end, 14 mm Hg at the venular end. The interstitial pressure= 0 mm Hg. The colloid osmotic pressure is 25 mm Hg in capillary and 1 mm Hg in interstitium. The net force producing fluid movement across the capillary wall at its arteriolar end is:
  - a. 10mmHg filtration
  - b. 11mmHg filtration
  - c. 11mmHg reabsorption
  - d. 3mmHg filtration
  - e. 3mmHg reabsorption
4. In local control of blood flow the most significant regulatory mechanism is the:
  - a. Release of adrenal medullary catecholamines
  - b. Local concentration of metabolites
  - c. Local concentration of cellular nutrients
  - d. Sympathetic activation of blood vessels
  - e. Sympathetic inhibition of blood vessels
5. Neural control of circulation predominates over local control in the:
  - a. Brain
  - b. Heart
  - c. Kidney
  - d. Skeletal muscle
  - e. Skin

**RAWALPINDI MEDICAL UNIVERSITY**  
**CVS MODULE EXAMINATION**  
**1<sup>ST</sup> YEAR MBBS**  
**PHYSIOLOGY, SEQ'S PAPER**

Q.1 Draw and label a normal electrocardiogram. Give the normal duration of PR interval, in which condition it is prolonged. (3,2)

Q.2 Define cardiac output. Give its normal values in males and females. Enlist factors causing hypoeffective heart. (2, 3)

**RAWALPINDI MEDICAL UNIVERSITY DEPARTMENT OF BIOCHEMISTRY**  
**1<sup>ST</sup> YEAR MBBS**  
**CVS MODULE**

1. The process of interconversion of anomeric forms of sugars is called as
  - a. Fermentation
  - b. Epimerism
  - a. Mutarotation
  - c. Ester formation
  - d. Autorotation
2. The following is the dimer of glucose only
  - a. Sucrose
  - b. Lactose
  - b. Maltose
  - c. Mannose
  - d. Ribose
3. The following sugar does not form the osazone crystals
  - a. Lactose
  - b. Maltose
  - c. Glucose
  - d. Fructose
  - c. Sucrose
4. Cholesterol is involved in the synthesis of the following type of hormones
  - a. Peptide
  - d. Steroid
  - b. Amine derivative
  - c. Protein
  - d. Glycoprotein

**SEQ**

- Q. a. Define with examples: anomers and epimers. 02
- b. Describe structure and functions of glycolipids. 03



**RAWALPINDI MEDICAL UNIVERSITY DEPARTMENT OF BIOEHTICS**  
**1<sup>ST</sup> YEAR MBBS**  
**CVS MODULE**


1. ----Includes rules of conduct that may be used to regulate our activities concerning the biological world.
  - a. Bio-piracy
  - b. Biosafety
  - c. Bioethics
  - d. Bio-patents
  - e. Bio-logistic
2. The right of patients having self-decision is called.
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
3. Following is not code of ethics.
  - a. Integrity
  - b. Objectivity
  - c. Confidentiality
  - d. Behaviour
  - e. Autonomy
4. -----in the context of medical ethics, if it's fair and balanced
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
5. -----Principle requiring that physicians provide, positive benefits
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity



## Respiration Module

### Study Guide First Year MBBS 2022 - 2023



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**Document Approval**

<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>
Additional Director Medical Education, Asst. Director Medical Education,	Curriculum Committee	Vice Chancellor



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## University Moto, Vision, Values & Goals

### RMU Motto



### Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

### Vision and Values

Highly recognized and accredited centre of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

### Goals of the Undergraduate Integrated Modular Curriculum

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the Health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of knowledge to help you attain personal and professional growth & excellence.



**Second Year MBBS 2023**

**Study Guide**

**Respiratory Module**

## Discipline Wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
III	<ul style="list-style-type: none"> <li>Anatomy</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Embryology of Respiratory System</li> </ul>	Histology of Upper & Lower <ul style="list-style-type: none"> <li>Respiratory System</li> </ul>	<ul style="list-style-type: none"> <li>Gross Anatomy of Upper &amp; Lower Respiratory System</li> </ul>
	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>pH, Electron transport chain, Oxidative phosphorylation, Water soluble vitamins riboflavin, biotin, pyridoxine, pantothenic acid, Normal acid base regulation</li> </ul>			
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>Pulmonary Ventilation, Pulmonary Volumes and Capacities, Alveolar Ventilation, Functions of the Respiratory Passageways</li> <li>Pulmonary Circulation, Pulmonary Edema, Physical Principles of Gas Exchange; Diffusion of Oxygen and Carbon Dioxide Through the Respiratory Membrane Transport of Oxygen and Carbon Dioxide in Blood and Tissue Fluids</li> <li>Regulation of Respiration</li> <li>Useful Methods for Studying Respiratory Abnormalities, Respiratory Insufficiency, Hypoxia &amp; Oxygen Therapy, Hypercapnia &amp; Artificial Respiration Respiratory changes during Exercise, Aviation, Space &amp; Deep-Sea Diving Physiology</li> </ul>			
	<ul style="list-style-type: none"> <li>Research Club Activity (IUGRC)</li> </ul>	<ul style="list-style-type: none"> <li>Poster Presentation</li> </ul>			
	<ul style="list-style-type: none"> <li>Artificial Intelligence</li> </ul>	<ul style="list-style-type: none"> <li>Artificial Intelligence basic concepts</li> </ul>			
	<ul style="list-style-type: none"> <li>Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>Approach to a patient with cough hemoptysis &amp; shortness of breath</li> </ul>			
	<ul style="list-style-type: none"> <li>Climate Change &amp; Health</li> </ul>	<ul style="list-style-type: none"> <li>Effects of Climate Changes on Body Systems (IHD, Skin Diseases &amp; Heat Stroke)</li> <li>Effects of Climate Changes on Respiratory System (Asthma, COPD, Allergies &amp; Cancers)</li> <li>Greenhouse effect</li> <li>Global warming and climate change</li> </ul>			
	<ul style="list-style-type: none"> <li>Bioethics Professionalism &amp; Behavioral Sciences</li> </ul>	<ul style="list-style-type: none"> <li>Crises intervention and disaster Conflict resolution and empathy</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical components</li> <li>Vertical Integration</li> </ul>	<ul style="list-style-type: none"> <li>The Holy Quran Translation Component</li> <li>Clinically Content Relevant to Respiratory Module</li> <li>Tuberculosis (Medicine)</li> <li>Clinical disorders of Respiration (Pathology)</li> <li>Foreign body nose &amp; ear &amp; Tonsillitis (ENT)</li> </ul>			

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## Respiration Module Team

Module Name : Respiration Module  
 Duration of module : 04 Weeks  
 Coordinator : Dr. Kamil  
 Co- Coordinator : Dr. Fareed Ullah  
 Review by : Module Committee

Module Committee		Module Task Force	
Vice Chancellor RMU	Prof. Dr. Muhammad Umar	Coordinator	Dr. Kamil
Director DME	Prof. Dr. Rai Muhammad Asghar	DME Focal Person	Dr. Sidra Hamid
Convener Curriculum	Prof. Dr. Naeem Akhter	Co-coordinator	Dr. Quratulain Sharif (Senior Demonstrator of Anatomy)
Chairperson Anatomy & Dean Basic Sciences	Prof Dr. Ayesha Yousaf	Co-Coordinator	Dr. Uzma Zafar (Senior Demonstrator Biochemistry)
Additional Director DME	Prof. Dr. Ifra Saeed	Co-coordinator	Dr. Fareed Ullah (Senior Demonstrator Physiology) & Clinical Co- Coordinator
Chairperson Physiology	Prof. Dr. Samia Sarwar		
Chairperson Biochemistry	Dr. Aneela Jamil	<b>DME Implementation Team</b>	
Focal Person Anatomy First Year MBBS	Prof Dr. Ayesha Yousaf	Director DME	Prof. Dr. Rai Muhammad Asghar
Focal Person Physiology	Dr. Sidra Hamid	Implementation In charge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
Focal Person Biochemistry	Dr. Aneela Jamil	Deputy Director DME	Dr. Shazia Zeb
Focal Person Pharmacology	Dr. Zunera Hakim	Module planner & Implementation coordinator	Dr. Sidra Hamid
Focal Person Pathology	Dr. Asiya Niazi	Editor	Muhammad Arslan Aslam
Focal Person Behavioral Sciences	Dr. Saadia Yasir		
Focal Person Community Medicine	Dr. Afifa Kulsoom		
Focal Person Quran Translation Lectures	Dr. Fahd Anwar		

## Module IV – Respiratory Module

**Rationale:** A respiratory system's function is to allow gas exchange. The space between the alveoli and the capillaries, the anatomy or structure of the exchange system, and the precise physiological uses of the exchanged gases vary depending on the organism. In humans respiratory system include airways, lungs, and the respiratory muscles. Molecules of oxygen and carbon dioxide that are passively exchanged, by diffusion, between the gaseous external environment and the blood. This exchange process occurs in the alveolar region of the lungs.

In this present module has been designed to unfold structural organization function congenital anomalies and diseases of respiration. It explains the anatomy, control, gases exchange, reflexes of respiratory system. It also helps to include the radiological examination of the respiratory system.

### Module Outcomes

At the end of this module the student should be able to:

#### Knowledge:

1. Integrate the basic science knowledge with clinical sciences in order to describe the pathogenesis, clinical presentations of common respiratory disorders, e.g. COPD
2. Use technology based medical education including **Artificial Intelligence.**
3. Appreciate concepts & importance of **Family Medicine**  
**Biomedical Ethics**  
**Research.**

#### Skill:

1. Describe the gross anatomy of mediastinum along with clear understanding of structures present in it.
2. Correlate between histological structure of respiratory membrane and its role in diffusion of gases.

#### Attitude:

1. Demonstrate a professional attitude, team building spirit and good communication skills.

## SECTION - I

### Terms & Abbreviations

#### Contents

- Domains of Learning
- Teaching and Learning

#### Methodologies/Strategies

- Large Group Interactive Session (LGIS)
- Small Group Discussion (SGD)
- Self-Directed Learning (SDL)
- Case Based Learning (CBL)
- Problem- Based Learning (PBL)
- Skill Labs/Practicals (SKL)

#### Tables & Figures

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**Table1. Domains of Learning According to Blooms Taxonomy**

Sr. #	Abbreviation	Domains of learning
1.	C	<b>Cognitive Domain:</b> knowledge and mental skills.
	• C1	Remembering
	• C2	Understanding
	• C3	Applying
	• C4	Analyzing
	• C5	Evaluating
	• C6	Creating
2.	P	<b>Psychomotor Domain:</b> motor skills.
	• P1	Imitation
	• P2	Manipulation
	• P3	Precision
	• P4	Articulation
	• P5	Naturalization
3.	A	<b>Affective Domain:</b> feelings, values, dispositions, attitudes, etc
	• A1	Receive
	• A2	Respond
	• A3	Value
	• A4	Organize
	• A5	Internalize

## Teaching and Learning Methodologies / Strategies

### Large Group Interactive Session (LGIS)

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will be followed for delivery of all LGIS. The lecturer will introduce a topic or common clinical condition and explain the underlying phenomena through questions, pictures, videos of patients, interviews and exercises, etc. Students are actively involved in the learning process.

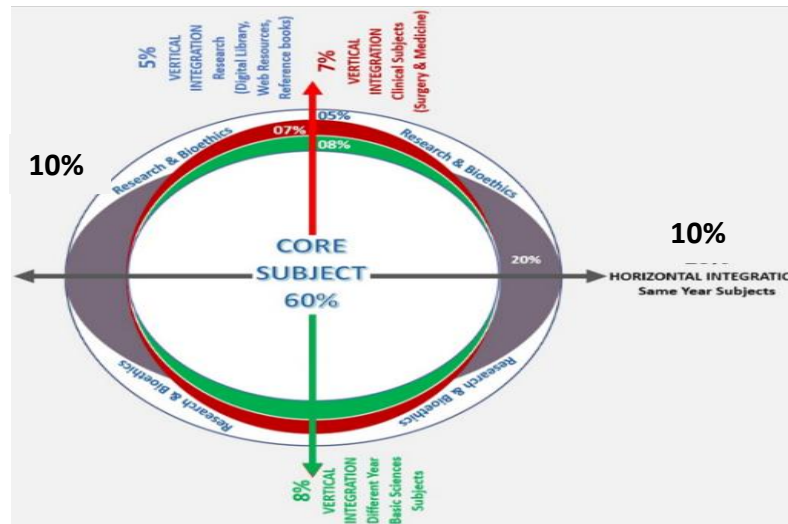


Figure 1. Prof Umar's Model of Integrated Lecture

## Small Group Discussion (SGD)

This format helps students to clarify concepts acquire skills and attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics or power point presentations. Students exchange opinions and apply knowledge gained from lectures, SGDs and self-study. The facilitator role is to ask probing questions, summarize and help to clarify the concepts.

**Table 2. Standardization of teaching content in Small Group Discussions**

S. No	Topics	Approximate %
1	Title Of SGD	
2	Learning Objectives from Study Guides	
3	Horizontal Integration	5%+5%=10%
4	Core Concepts of the topic	60%
5	Vertical Integration	20%
6	Related Advance Research points	3%
7	Related Ethical points	2%

**Table 3. Steps of Implementation of Small Group Discussions**

Step 1	Sharing of Learning objectives by using students Study guides	First 5 minutes
Step 2	Asking students pre-planned questions from previous teaching session to develop co-relation (these questions will be standardized)	5minutes
Step 3	Students divided into groups of three and allocation of learning objectives	5minutes
Step 4	ACTIVITY: Students will discuss the learning objectives among themselves	15 minutes
Step 5	Each group of students will present its learning objectives	20 min
Step 6	Discussion of learning content in the main group	30min
Step 7	Clarification of concept by the facilitator by asking structured questions from learning content	15 min
Step 8	Questions on core concepts	
Step 9	Questions on horizontal integration	
Step 10	Questions on vertical integration	
Step 11	Questions on related research article	
Step 12	Questions on related ethics content	
Step 13	Students Assessment on online MS teams (5 MCQs)	5 min
Step 14	Summarization of main points by the facilitator	5 min
Step 15	Students feedback on the SGD and entry into log book	5 min
Step 16	Ending remarks	

### Self-Directed Learning (SDL)

- Self- directed learning is a process where students take primary charge of planning, continuing, and evaluating their learning experiences.
- Time Home assignment
- Learning objectives will be defined
- Learning resources will be given to students = Textbook (page no), web site
- Assessment:
  - i Will be online on LMS (Mid module/ end of Module)
  - ii.OSPE station

### Case Based Learning (CBL)

- It's a learner centered model which engages students in discussion of specific scenarios that typically resemble real world examples.
- Case scenario will be given to the students
- Will engage students in discussion of specific scenarios that resemble or typically are real-world examples.
- Learning objectives will be given to the students and will be based on
  - i. To provide students with a relevant opportunity to see theory in practice
  - ii. Require students to analyze data in order to reach a conclusion.
  - iii. Develop analytic, communicative, and collaborative skills along with content knowledge.

### Problem Based Learning (PBL)

- Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.
- This problem is what drives the motivation and the learning.

The 7- Jump-Format of PBL (Masstricht Medical School)	
Step 7	Synthesize & Report
Step 6	Collect Information from outside
Step 5	Generate learning Issues
Step 4	Discuss and Organize Ideas
Step 3	Brainstorming to Identify Explanations
Step 2	Define the Problem
Step 1	Clarify the Terms and Concepts of the Problem Scenario
	Problem- Scenario

**Figure 2. PBL 7 Jumps Model**

## Practical Sessions/Skill Lab (SKL)

Practical Session/ Skill Lab (SKL)	
Demonstration/ power point presentation 4-5 slide	10-15 minutes
Practical work	25-30 minutes
Write/ draw and get it checked by teacher	20-25 minutes
05 mcqs at the end of the practical	10 minutes
At the end of module practical copy will be signed by head of department	
At the end of block the practical copy will be signed by	
Head of Department	
Dean	
Medical education department	
QEC	

## SECTION – II

### Learning Objectives, Teaching Strategies & Assessments

#### Contents

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self-Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry

## Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

### Anatomy Large Group Interactive Session (LGIS)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Respiratory system I (Histology)	• Explain division of the respiratory system	C2	LGIS	MCQ SAQ VIVA
	• Describe different functions of respiratory system.	C2		
	• Describe details of respiratory epithelium	C2		
	• Discuss microscopic structure of vestibule	C2		
	• Describe structural specialization in mucosa of nasal cavity proper	C2		
	• Appreciate differences between respiratory mucosa and olfactory mucosa	C1		
	• Describe the features of olfactory mucosa	C2		
	• Describe related Clinical	C3		
	• Read relevant research articles	C3		
• Use HEC digital library	C3			
Respiratory system II (Histology)	• Describe microscopic structure of paranasal sinuses	C2	LGIS	MCQ SAQ VIVA
	• Describe general histological organization of respiratory system	C2		
	• Appreciate different histological layers of nasopharynx	C1		
	• Describe histological structure of laryngeal cartilages	C2		
	• Discuss components of tracheal wall	C2		
	• Read relevant research articles	C3		
• Use HEC digital library	C3			
Histology of Respiratory System III	• Describe division of bronchial tree	C2	LGIS	MCQ SAQ VIVA
	• Discuss microscopic structure of extra and intra pulmonary bronchi	C2		
	• Describe histological structure of bronchioles	C2		
	• Appreciate differences between bronchi and bronchioles Discuss microscopic structure of terminal bronchioles	C1		
	• Appreciate the significance of Clara cells with their functions	C2		
	• Discuss other cells present in terminal bronchioles	C2		
	• Describe the microscopic structure of respiratory bronchioles	C2		
	• Describe differences between respiratory and terminal bronchioles Describe characteristics of alveolar ducts	C2		



	• Read relevant research articles	C3		
	• Use HEC digital library	C3		
Histology of Respiratory System IV	• Describe histological structure of alveolar ducts and their functions	C2	LGIS	MCQ SAQ VIVA
	• Identify type 1 and type II alveolar cells	C1		
	• Describe histological structure of interalveolar septum	C2		
	• Discuss role of alveolar macrophages	C2		
	• Describe Blood – Air barrier in detail	C2		
	• Discuss histology of pleura in detail	C2		
	• Read relevant research articles	C3		
	• Use HEC digital library	C3		
Development of Respiratory System (Nose and Paranasal sinuses)	• Describe role of pharyngeal arches in development of nose	C2	LGIS	MCQ SAQ VIVA
	• Describe development of nose and paranasal sinuses	C2		
	Describe the Congenital anomalies of nose and paranasal sinuses	C2		
	• Read relevant research articles	C3		
	• Use HEC digital library	C3		
Development of Respiratory System (Larynx & Trachea)	• Describe formation of respiratory primordium	C2	LGIS	MCQ SAQ VIVA
	• Describe the role of pharyngeal arches in development of larynx	C2		
	• Discuss formation of laryngotracheal diverticulum	C2		
	• Describe formation of trachea esophageal septum and its importance	C2		
	• Describe Congenital defects associated with development of Trachea	C3		
	• Describe formation and division of respiratory buds	C2		
	• Read relevant research articles	C3		
	• Use HEC digital library	C3		
Development of Respiratory System (Lungs)	• Discuss development of bronchi and bronchopulmonary segments	C2	LGIS	MCQ SAQ VIVA
	• Describe development of pleural cavities	C2		
	• Discuss process of maturation of lungs	C2		
	• Enlist different stages of lung maturation	C1		
	• Explain the production and significance of Surfactant	C2		
	• Describe role of fetal breathing movements in maturation of lungs	C2		
	• Discuss postnatal development of lungs	C2		
	• Describe congenital anomalies associated with lungs	C3		
	• Read relevant research articles	C3		

	• Use HEC digital library	C3		
Development of Respiratory System (Diaphragm)	• Describe the development of diaphragm	C2	LGIS	MCQ SAQ VIVA
	• Elaborate formation of septum transversum and its role in development of diaphragm	C2		
	• Discuss congenital defects associated with diaphragm	C3		
	• Read relevant research articles	C3		
	• Use HEC digital library	C3		

## Physiology Large Group Interactive Session (LGIS)

Topics	Learning Objectives	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Mechanics of pulmonary ventilation, Lung compliance	<ul style="list-style-type: none"> <li>Enumerate muscles of inspiration and expiration and</li> <li>Describe mechanics of pulmonary ventilation</li> <li>Describe surfactant, surface tension and collapse of alveoli</li> <li>Define compliance.</li> <li>Draw compliance diagram of lungs.</li> <li>Explain relationship of surface tension, radius of alveoli, elastic forces of lungs with compliance</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 621,629)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 569)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 189,197)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 36,Page 581) ,(Chapter 40,Page 629)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 38, Page 491,493)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://www.ncbi.nlm.nih.gov/books/NBK538324/">https://www.ncbi.nlm.nih.gov/books/NBK538324/</a></li> <li><a href="https://youtu.be/TwgmMfqOW4">https://youtu.be/TwgmMfqOW4</a></li> </ol>	C1 C1 C1 C1 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Pulmonary circulation & Pulmonary capillary dynamics. Physical principles of gas exchange & diffusion through respiratory membrane	<ul style="list-style-type: none"> <li>Discuss the role of alveoli and pleural space in respiration and pressure changes during respiration</li> <li>Enlist non-respiratory and respiratory functions of respiration</li> <li>Define and explain the concept of respiratory membrane.</li> <li>Define and draw respiratory unit</li> <li>Draw a diagram showing the exchange of gases through the</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 626,633,635)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 574)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 209)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/aJPwUnZtycQ">https://youtu.be/aJPwUnZtycQ</a></li> <li><a href="https://youtu.be/zv1fDFn8BaM">https://youtu.be/zv1fDFn8BaM</a></li> <li><a href="https://pressbooks-dev.oer.hawaii.edu/biology/chapter/gas-exchange-">https://pressbooks-dev.oer.hawaii.edu/biology/chapter/gas-exchange-</a></li> </ol>	C2 C1 C1 C1 C1 C1 C1 C1 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

	<p>respiratory membrane</p> <ul style="list-style-type: none"> <li>• Enlist four factors affecting the rate of gas diffusion through the respiratory membrane</li> <li>• Define diffusing capacity of respiratory membrane.</li> <li>• Describe the diffusing capacity for oxygen.</li> <li>• Describe the diffusing capacity for carbon dioxide.</li> <li>• Describe the changes in diffusing capacity of oxygen and carbon dioxide during exercise</li> <li>• Compare the diffusing capacities of oxygen and carbon dioxide</li> </ul>	<ul style="list-style-type: none"> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 37,Page 592)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 39, Page 503) (Chapter 40, Page 511,515)</li> </ul>	<p><a href="#">across-respiratory-surfaces/</a> 4. <a href="https://www.sciencedirect.com/science/article/pii/S2666496822000194">https://www.sciencedirect.com/science/article/pii/S2666496822000194</a>.</p>			
Pulmonary volumes, capacities & functions of respiratory tract	<ul style="list-style-type: none"> <li>• Define lung volumes and capacities.</li> <li>• Define the four pulmonary volumes and capacities.</li> <li>• Enlist normal values of all the lung volumes and capacities</li> <li>• Draw a graph representing all the lung volumes and capacities.</li> <li>• Describe how lung volumes and capacities can be measured with spirometer.</li> <li>• Enlist the lung volumes and capacities which can't be measured by spirometer</li> </ul>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 628)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 578)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 191)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 38, Page 495)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/9VdHhD1vcDU">https://youtu.be/9VdHhD1vcDU</a></li> <li>2. <a href="https://teachmephysiology.com/respiratory-system/ventilation/lung-volumes/">https://teachmephysiology.com/respiratory-system/ventilation/lung-volumes/</a></li> </ol>	C1 C1 C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Transport of oxygen	Describe in detail the transport of oxygen from lungs to tissues	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 35, Page 639)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://teachmephysiology.com/respiratory-system/gas-exchange/oxygen-transport/">https://teachmephysiology.com/respiratory-system/gas-exchange/oxygen-transport/</a></li> <li>2. <a href="https://youtu.be/HU6">https://youtu.be/HU6</a></li> </ol>	C1	LGIS	MCQ SEQ VIVA VOCE

		<ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Gas Exchange and Transport (Chapter 18, Page 599)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5, Page 210, 213, 216)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. Section 05, (Chapter 38, Page 603)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. (Chapter 41, Page 521)</li> </ul>	<a href="#">LQldvog</a>			MCQ (LMS based Assessment, MST based Assessment) OSPE
Ventilation perfusion ratio	<ul style="list-style-type: none"> <li>• Define And Explain importance.</li> <li>• Draw ventilation perfusion diagram Explain the concept of physiologic shunt and dead space</li> </ul>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 06, Respiratory Physiology (Chapter 34, Page 636)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Mechanics of Breathing (Chapter 17, Page 587)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5, Page 194, 225, 229)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. Section 05, (Chapter 39, Page 612)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. (Chapter 38, Page 497)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/UKsOLb5XWa0">https://youtu.be/UKsOLb5XWa0</a></li> <li>2. <a href="https://teachmephysiology.com/respiratory-system/gas-exchange/ventilation-perfusion/">https://teachmephysiology.com/respiratory-system/gas-exchange/ventilation-perfusion/</a></li> </ol>	C1/C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Oxygen hemoglobin dissociation curve	Describe the role of hemoglobin in oxygen transport. Draw oxy-hemoglobin dissociation curve.	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 06,</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://www.science-direct.com/topics/nursing-and-health-">https://www.science-direct.com/topics/nursing-and-health-</a></li> </ol>	C1 C1 C1	LGIS	MCQ SEQ

	<p>Enlist and explain factors which shift the curve towards right and left. Briefly explain the transport of oxygen in plasma</p>	<p>Respiratory Physiology (Chapter 35, Page 639-641)</p> <ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Gas Exchange and Transport (Chapter 18, Page 608)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5, Page 218)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. (Chapter 41, Page 524)</li> </ul>	<p><a href="#">professions/oxygen-dissociation-curve</a></p> <p>2. <a href="https://youtu.be/MUKkv1rbOIM">https://youtu.be/MUKkv1rbOIM</a></p>	C2		VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Lung function test	<ul style="list-style-type: none"> <li>• Describe all the non-invasive &amp; invasive tests to assess the pulmonary functions</li> </ul>	<ul style="list-style-type: none"> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Mechanics of Breathing (Chapter 17, Page 592)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. (Chapter 44, Page 553)</li> </ul>	<p>1. <a href="https://www.webmd.com/lung/types-of-lung-function-tests">https://www.webmd.com/lung/types-of-lung-function-tests</a></p> <p>2. <a href="https://youtu.be/6dHVhEjzj64">https://youtu.be/6dHVhEjzj64</a></p>	C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Transport of CO <sub>2</sub>	<p>Enumerate and explain the various transport forms of carbondioxide in blood. Also state percentages of all these forms Explain the carbondioxide dissociation curve Define respiratory exchange ratio. Describe haldanes effect ,bohr effect and chloride shift</p>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 06, Respiratory Physiology (Chapter 35, Page 641)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5, Page 223)</li> </ul>	<p>1. <a href="https://courses.lumenlearning.com/wm-biology2/chapter/transport-of-carbon-dioxide-in-the-blood/">https://courses.lumenlearning.com/wm-biology2/chapter/transport-of-carbon-dioxide-in-the-blood/</a></p> <p>2. <a href="https://youtu.be/VgpNSdWvrno">https://youtu.be/VgpNSdWvrno</a></p>	C1 C2 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment)

		<ul style="list-style-type: none"> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 05,(Chapter 38,Page 606)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 41, Page 528)</li> </ul>				OSPE
Respiratory abnormalities (COPD, Tuberculosis, Pneumonia, Atelectasis)	<ul style="list-style-type: none"> <li>Explain the physiologic peculiarities of chronic pulmonary emphysema, pneumonia, atelectasis, asthma and tuberculosis</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 36, Page 664)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 43, Page 541)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://www.physio-pedia.com/Respiratory_Disorders">https://www.physio-pedia.com/Respiratory_Disorders</a></li> <li><a href="https://youtu.be/SrKfsCdeqWc">https://youtu.be/SrKfsCdeqWc</a></li> <li><a href="https://youtu.be/h0p7bs5xdgQ">https://youtu.be/h0p7bs5xdgQ</a></li> </ol>	4. C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Nervous regulation of respiration	<ul style="list-style-type: none"> <li>Describe term respiratory center.</li> <li>Enumerate the various respiratory centers.</li> <li>Give the anatomical location of respiratory centers</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 36, Page 655)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Gas Exchange and Transport (Chapter 18, Page 614)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 231)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05(Chapter 41,Page 646)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 42, Page 531)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/KNAKKNbq20">https://youtu.be/KNAKKNbq20</a></li> <li><a href="https://teachmephysiology.com/respiratory-system/regulation/neural-control-ventilation/">https://teachmephysiology.com/respiratory-system/regulation/neural-control-ventilation/</a></li> </ol>	3. C1 4. C1 5. C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

<p>Hypoxia, hypercapnia, cyanosis</p>	<ul style="list-style-type: none"> <li>Define hypoxia and hypercapnia. Enumerate and explain its various types.</li> <li>Enumerate the roles of oxygen therapy in different types of hypoxia</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 06, Respiratory Physiology (Chapter 35, Page 646,650)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5, Page 239)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. Section 05,, (Chapter 41, Page 653) (Chapter 42, Page 662)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. (Chapter 43, Page 546)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/wtn--qgs3Fg">https://youtu.be/wtn--qgs3Fg</a></li> <li><a href="https://www.verywellhealth.com/hypoxia-types-symptoms-and-causes-2248929">https://www.verywellhealth.com/hypoxia-types-symptoms-and-causes-2248929</a></li> </ol>	<ol style="list-style-type: none"> <li>C1</li> <li>C1</li> </ol>	<p>LGIS</p>	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE</p>
<p>Chemical regulation of respiration &amp; exercise changes</p>	<ul style="list-style-type: none"> <li>Describe in detail the role of respiratory centers in the regulation of respiration.</li> <li>Explain chemical control of respiration in detail</li> <li>Describe changes in respiration during exercise. Enumerate and briefly explain factors which affect respiration.</li> <li>Describe briefly the mechanism of periodic breathing and sleep apnea</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 06, Respiratory Physiology (Chapter 36, Page 657,664)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5, Page 233,235)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. Section 05, (Chapter 41, Page 649)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. (Chapter 42, Page 533,536)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/gR_RLgo9Vn0">https://youtu.be/gR_RLgo9Vn0</a></li> <li><a href="https://journals.physiology.org/doi/abs/10.1152/physrev.1925.5.4.551?journalCode=physrev">https://journals.physiology.org/doi/abs/10.1152/physrev.1925.5.4.551?journalCode=physrev</a></li> </ol>	<ol style="list-style-type: none"> <li>C1</li> <li>C2</li> <li>C1</li> <li>C1</li> </ol>	<p>LGIS</p>	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE</p>
<p>Space physiology</p>	<ul style="list-style-type: none"> <li>Define and explain the process of acclimatization to low oxygen tension</li> <li>Describe acute and chronic mountain sickness</li> </ul>	<ul style="list-style-type: none"> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition. (Chapter 42, Page 659,663)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/NFfHh_rQZJE">https://youtu.be/NFfHh_rQZJE</a></li> <li><a href="https://www.physoc.org/careers/res">https://www.physoc.org/careers/res</a></li> </ol>	<ol style="list-style-type: none"> <li>C1</li> <li>C1</li> <li>C1</li> </ol>	<p>LGIS</p>	<p>MCQ SEQ VIVA VOCE</p>



	<ul style="list-style-type: none"> <li>Describe the effects of acceleratory forces on body in aviation and space physiology</li> </ul>	<ul style="list-style-type: none"> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 44, Page 553)</li> </ul>	<a href="#">earch/space-physiology/</a>			MCQ (LMS based Assessment, MST based Assessment) OSPE
Miscellaneous factors affecting respiration (concept of voluntary control of respiration, lung J receptor, brain edema, anesthesia, chyne stokes breathing, sleep apnea)	<ul style="list-style-type: none"> <li>Describe in detail the role of respiratory centers in the regulation of respiration.</li> <li>Explain chemical control of respiration in detail</li> <li>Describe changes in respiration during exercise. Enumerate and briefly explain factors which affect respiration.</li> <li>Describe briefly the mechanism of periodic breathing and sleep apnea</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 36, Page 662)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 41,Page 656)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 42, Page 538)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://www.physoc.org/careers/research/space-physiology/">https://www.physoc.org/careers/research/space-physiology/</a></li> <li><a href="https://www.brainkart.com/article/Factors-Affecting-Respiration_16533/">https://www.brainkart.com/article/Factors-Affecting-Respiration_16533/</a></li> </ol>		LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
High altitude physiology	<ul style="list-style-type: none"> <li>Describe the effects of low oxygen pressure on body</li> <li>Enumerate the acute effects of hypoxia on body</li> <li>Define and explain the process of acclimatization to low oxygen tension</li> <li>Describe acute and chronic mountain sickness Describe the effects of acceleratory forces on body in aviation and space physiology</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 35, Page 648)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Respiratory Physiology (Chapter 5,Page 237)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 42,Page 659)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 44, Page 553,556,559)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/6KHQGS4jJyI">https://youtu.be/6KHQGS4jJyI</a></li> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2151873/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2151873/</a></li> </ol>	<ol style="list-style-type: none"> <li>C1</li> <li>C1</li> <li>C1</li> <li>C1</li> </ol>	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Deep sea physiology	<ul style="list-style-type: none"> <li>• Discuss Effect of high partial pressure of individual gasses on the body</li> <li>• Discuss Oxygen toxicity at high pressure Carbon dioxide toxicity at high pressure Explain in detail the process of decompression in deep sea divers</li> </ul>	<ul style="list-style-type: none"> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 42, page 665)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 44, Page 553)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://medicoapps.org/m-physiology-of-deep-sea-diving/">https://medicoapps.org/m-physiology-of-deep-sea-diving/</a></li> <li>2. <a href="https://youtu.be/eNMkPam9aU">https://youtu.be/eNMkPam9aU</a></li> </ol>	<ol style="list-style-type: none"> <li>3. C2</li> <li>4. C2</li> </ol>	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
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### Biochemistry Large Group Interactive Session (LGIS)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
PH And PKA	• Define of pH and pKa	C1	LGIS	MCQs SAQs Viva
	• Elaborate Henderson Hasselbalch equation.	C2		
	• Describe Measurement of pH by equation.	C2		
Body buffers	• Define buffers.	C1	LGIS	MCQs SAQs Viva
	• Discuss Mechanism of various buffers in maintenance of blood pH.	C2		
Electron transport chain	• Describe Components/ complexes of electron transport chain.	C2	LGIS	MCQs SAQs Viva
	• Enlist Enzymes and Co-enzymes of each component.	C1		
	• Enlist Inhibitors of these complexes.	C1		
Mechanisms of energy generation in the body.	• Discuss various mechanisms of energy generation in the body.	C2	LGIS	MCQs SAQs Viva
	• Discuss Oxidative phosphorylation.	C2		
	• Describe uncouplers.	C2		
Energy change.	• Define the terms: <ul style="list-style-type: none"> <li>○ Free energy change.</li> <li>○ Standard free energy.</li> </ul>	C1	LGIS	MCQs SAQs Viva
	• Describe various sources of electrons.	C2		
	• Define Vitamins	C1		MCQs

Vitamins	<ul style="list-style-type: none"> <li>• Discuss the distribution, daily requirement and deficiency of vitamins</li> <li>• Clinical indication of vitamins</li> </ul>	C2 C2	LGIS	SAQs Viva
Xenobiotics	<ul style="list-style-type: none"> <li>• Define xenobiotics</li> <li>• Discuss its metabolism and its role in environment</li> </ul>	C1 C2	LGIS	MCQs SAQs Viva

### Anatomy Small Group Discussion (SGDs)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Nose & Paranasal Sinuses	• Describe anatomy of nasal cavity	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Describe the blood supply and the site of anastomosis in the nose.	C2		
	• Discuss the nerve supply of nose	C2		
	• Discuss the applied and the related clinical.	C3		
	• Define and enumerate para nasal sinuses.	C1		
	• Discuss the shape, location and their point of openings.	C2		
	• Clinical significance with surgical interventions.	C3		
	• Read relevant research articles	C3		
	• Use HEC digital library	C3		
Larynx & Trachea	• Enumerate the components of larynx	C1	Skill Lab	MCQ SAQ Viva OSPE
	• Describe paired and unpaired cartilages of larynx Describe Intrinsic and extrinsic muscles of larynx (origin, insertion nerve supply and action).	C2		
	• Describe Intrinsic and extrinsic membrane (attachments and structure piercing the membranes).	C2		
	• Discuss the movements of vocal cords and their effects on the voice and respiration.	C2		
	• Discuss the blood supply and nerve supply of larynx.	C2		
	• Discuss the applied and the related clinical.	C3		
	• Describe the level of commencement of trachea, its termination and the tracheal cartilages.	C2		
	• State the level of division of trachea	C1		
	• Describe in detail the nerve supply and blood supply of trachea.	C2		
	• Discuss the applied and the related clinicals.	C3		

	<ul style="list-style-type: none"> <li>• Read relevant research articles</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Use HEC digital library</li> </ul>	C3		
Overview of Thoracic wall	<ul style="list-style-type: none"> <li>• Enumerate the bones of the thorax.</li> </ul>	C1	Skill Lab	MCQ SAQ Viva OSPE
	<ul style="list-style-type: none"> <li>• Describe and classify the typical ribs (side determination, features, attachments, relations, types and ossification).</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss the applied and the related clinical.</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Read relevant research articles</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Use HEC digital library</li> </ul>	C3		
Skeleton of thoracic wall (Ribs)	<ul style="list-style-type: none"> <li>• Describe and classify the atypical ribs (side determination, features, attachments, relations, types and ossification).</li> </ul>	C2	Skill Lab	MCQ SAQ Viva OSPE
	<ul style="list-style-type: none"> <li>• Differentiate between typical and atypical ribs.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss costal cartilages and their attachments.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss the applied and the related clinicals.</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Read relevant research articles</li> </ul>	C3		
Skeleton of thoracic wall (Sternum)	<ul style="list-style-type: none"> <li>• Identify different parts of sternum.</li> </ul>	C1	Skill Lab	MCQ SAQ Viva OSPE
	<ul style="list-style-type: none"> <li>• Describe the bony features, attachments ossification of sternum</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss the related applied and clinicals.</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Read relevant research articles</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Use HEC digital library</li> </ul>	C3		
Joints of thoracic wall	<ul style="list-style-type: none"> <li>• Classify the joints of the thorax.</li> </ul>	C2	Skill Lab	MCQ SAQ Viva OSPE
	<ul style="list-style-type: none"> <li>• Discuss the type, ligaments and relations of the joints of the thorax (Manubriosternal, xiphisternal, costovertebral, costotransverse, costochondral, chondrosternal, interchondral and intervertebral joints).</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss the components functions of the intervertebral disc.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Discuss the related applied and clinicals.</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Read relevant research articles</li> </ul>	C3		
Thoracic apertures	<ul style="list-style-type: none"> <li>• Discuss the boundaries, shape and structure passing through superior thoracic aperture (viscera, blood vessels, nerve and muscles)</li> </ul>	C2	Skill Lab	MCQ SAQ Viva OSPE
	<ul style="list-style-type: none"> <li>• Describe the thoracic inlet syndrome.</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Discuss the boundaries, shape and structures passing through the inferior thoracic aperture.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Read relevant research articles</li> </ul>	C3		

	<ul style="list-style-type: none"> <li>• Use HEC digital library</li> </ul>	C3		
Intercostal spaces /	<ul style="list-style-type: none"> <li>• Discuss the thoracic wall.</li> </ul>	C2	Skill Lab	MCQ SAQ Viva OSPE
	<ul style="list-style-type: none"> <li>• Describe the intercostals muscles (origin, insertion, direction of fibers, nerve supply and actions).</li> </ul>	C2		
Movements of thoracic wall	<ul style="list-style-type: none"> <li>• Discuss in detail the formation, branches, distribution and the related clinical of the intercostals nerves.</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Explain the formation, course, relations, distribution and branches of the thoracic sympathetic trunk.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Differentiate between the typical and atypical intercostals space.</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>• Compare the typical and atypical intercostals space.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Describe the types and axis of movements of vertebral column (flexion, extension, lateral flexion and rotation).</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Define the respiratory movements on the basis of principles, factors and the different types (pump handle, bucket handle and piston).</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>• Discuss the related physiological and pathological changes occurring (related to age movement etc).</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Read relevant research articles</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Use HEC digital library</li> </ul>	C3		
	Diaphragm	<ul style="list-style-type: none"> <li>• Describe the small and large openings in the diaphragm (vertebral level, location, formation, structures passing through and effects on the openings and structures by the diaphragmatic contraction).</li> </ul>	C2	Skill Lab
<ul style="list-style-type: none"> <li>• Discuss related clinical aspects</li> </ul>		C3		
<ul style="list-style-type: none"> <li>• Read relevant research articles</li> </ul>		C3		
<ul style="list-style-type: none"> <li>• Use HEC digital library</li> </ul>		C3		
Vessels and lymphatics of thoracic wall	<ul style="list-style-type: none"> <li>• Explain the arterial supply of intercostals space (anterior / posterior, parent vessels, branches, course, relations and termination).</li> </ul>	C2	Skill Lab	MCQ SAQ Viva OSPE
	<ul style="list-style-type: none"> <li>• Differentiate between the arterial supply of typical and atypical intercostal space with the related clinicals.</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Explain the venous drainage of the inercostal spaces (anterior / posterior, parent vessels, tributaries, course, relations and termination).</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Differentiate between the venous drainage of typical and atypical intercostal space with the related clinicals</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Read relevant research articles</li> </ul>	C3		
	<ul style="list-style-type: none"> <li>• Use HEC digital library</li> </ul>	C3		

Innervation of Thoracic Wall	• Discuss the origin of intercostal nerves.	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Discuss course of nerves.	C2		
	• Discuss branches and related area supplied by these	C2		
	• Discuss related clinical	C3		
	• Read relevant research articles	C3		
	• Use HEC digital library	C3		
Pleura	• Discuss visceral and parietal pleura	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Discuss the pleural recesses and pleural cavity.	C2		
	• Describe the nerve and blood supply of pleura.	C2		
	• Discuss the applied and the related clinicals.	C3		
	• Read relevant research articles	C3		
	• Use HEC digital library	C3		
Lungs	• Identify the features of right and left lung.	C1	Skill Lab	MCQ SAQ Viva OSPE
	• Discuss the bronchopulmonary segments and their clinical significance	C3		
	• Discuss and differentiate between the root of lung and the hilum of lung.	C2		
	• Describe the nerve plexuses related to the lungs.	C2		
	• Explain the blood supply of lungs	C2		
	• Discuss the applied and the related clinicals.	C3		
	• Read relevant research articles	C3		
	• Use HEC digital library	C3		
Surface Marking	• Identify heart borders	P1	Skill Lab	MCQ SAQ Viva OSPE
	• aortic knuckle,	P1		
	• costophrenic angles,	P1		
	• cardio phrenic angles,	P1		
	• domes of diaphragm,	P1		
	• counting of ribs	P1		
	• Read relevant research articles	C3		
	• Use HEC digital library	C3		

### Physiology Small Group Discussion (SGDs)

Topics	Learning Objectives	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Physiology of unusual environment	<ul style="list-style-type: none"> <li>Define and explain the process of acclimatization to low oxygen tension</li> <li>Describe acute and chronic mountain sickness</li> <li>Describe the effects of acceleratory forces on body in aviation and space physiology</li> </ul>	<ul style="list-style-type: none"> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 42,Page 659,663)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 44, Page 553)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/NFfHh_rQZJE">https://youtu.be/NFfHh_rQZJE</a></li> <li><a href="https://www.physoc.org/careers/research/space-physiology/">https://www.physoc.org/careers/research/space-physiology/</a></li> </ol>	C1 C1 C1	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Mechanics of pulmonary ventilation & compliance (Second week)	<ul style="list-style-type: none"> <li>Enumerate muscles of inspiration and expiration and</li> <li>Describe mechanics of pulmonary ventilation</li> <li>Describe surfactant, surface tension and collapse of alveoli</li> <li>Define compliance.</li> <li>Draw compliance diagram of lungs. Explain relationship of surface tension, radius of alveoli, elastic forces of lungs with compliance</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 621,629)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 569)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 189,197)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 36,Page 581) ,(Chapter 40,Page 629)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 38, Page 491,493)</li> </ul>	<ul style="list-style-type: none"> <li><a href="https://www.ncbi.nlm.nih.gov/books/NBK538324/">https://www.ncbi.nlm.nih.gov/books/NBK538324/</a></li> <li><a href="https://youtu.be/BTWgmMfqOW4">https://youtu.be/BTWgmMfqOW4</a></li> </ul>	C1 C1 C1 C1 C1 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

<p>Ventilation perfusion ratio &amp; regulation of respiration (Second week)</p>	<ul style="list-style-type: none"> <li>• Define And Explain importance.</li> <li>• Draw ventilation perfusion diagram Explain the concept of physiologic shunt and dead space</li> </ul>	<ul style="list-style-type: none"> <li>• Ganong’s Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 34, Page 636)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Mechanics of Breathing (Chapter 17, Page 587)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 194,225,229)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor’s.13<sup>th</sup> Edition.Section 05,(Chapter 39,Page 612)</li> <li>• Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 38, Page 497)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="https://youtu.be/UKsOLb5XWa0">https://youtu.be/UKsOLb5XWa0</a></li> <li>• <a href="https://teachmephysiology.com/respiratory-system/gas-exchange/ventilation-perfusion/">https://teachmephysiology.com/respiratory-system/gas-exchange/ventilation-perfusion/</a></li> </ul>	<p>1. C1/C2 2. C1</p>	<p>SGD</p>	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE</p>
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### Biochemistry Small Group Discussion (SGDs)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Body buffers	• Define buffers.	C1	SGD	MCQs SAQs Viva
	• Discuss Mechanism of various buffers in maintenance of blood PH.	C2		
Electron transport chain	• Enlist Components/ complexes of electron transport chain.	C1	SGD	MCQs SAQs Viva
	• Describe Enzymes and Co-enzymes of each component.	C2		
	• Discuss Inhibitors of these complexes.	C2		
Mechanisms of energy generation in the body.	• Describe various mechanisms of energy generation in the body.	C2	SGD	MCQs SAQs Viva
	• Discuss Oxidative Phosphorylation.	C2		
	• Describe uncouplers of ETC.	C2		
Vitamin	<ul style="list-style-type: none"> <li>• Define Vitamins</li> <li>• Discuss the distribution, daily requirement and deficiency of vitamins</li> <li>• Clinical indication of vitamins</li> </ul>	C1 C2 C2	SGD	MCQs SAQs Viva

## Anatomy Self-Directed Learning (SDL)

Topics Of SDL	Learning Objective	References
Nose, paranasal sinuses, larynx, and trachea	<ul style="list-style-type: none"> <li>• Describe anatomy of nasal cavity</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 395, 396, 973, 974, 978, 979) <a href="https://youtu.be/UPrY8JqXYCc">https://youtu.be/UPrY8JqXYCc</a> <a href="https://youtu.be/IDBYF2i9vqU">https://youtu.be/IDBYF2i9vqU</a>  <a href="https://www.ncbi.nlm.nih.gov/books/NBK513272/">https://www.ncbi.nlm.nih.gov/books/NBK513272/</a>
	<ul style="list-style-type: none"> <li>• Describe the blood supply and the site of anastomosis in the nose.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss the nerve supply of nose</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss the applied and the related clinical.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Define and enumerate para nasal sinuses.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss the shape, location and their point of openings.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Clinical significance with surgical interventions.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Enumerate the components of larynx</li> </ul>	
	<ul style="list-style-type: none"> <li>• Describe paired and unpaired cartilages of larynx Describe Intrinsic and extrinsic muscles of larynx (origin, insertion nerve supply and action).</li> </ul>	
	<ul style="list-style-type: none"> <li>• Describe Intrinsic and extrinsic membrane (attachments and structure piercing the membranes).</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss the movements of vocal cords and their effects on the voice and respiration.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss the blood supply and nerve supply of larynx.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss the applied and the related clinical.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Describe the level of commencement of trachea, its termination and the tracheal cartilages.</li> </ul>	
<ul style="list-style-type: none"> <li>• State the level of division of trachea</li> </ul>		
<ul style="list-style-type: none"> <li>• Describe in detail the nerve supply and blood supply of trachea.</li> </ul>		
<ul style="list-style-type: none"> <li>• Discuss the applied and the related clinicals.</li> </ul>		
Skeleton of thoracic wall	<ul style="list-style-type: none"> <li>• Describe and classify the atypical ribs (side determination, features, attachments, relations, types and ossification.</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 299). <a href="https://youtu.be/PoA-Uq9w-7s">https://youtu.be/PoA-Uq9w-7s</a> <a href="https://www.ncbi.nlm.nih.gov/books/NBK557710/">https://www.ncbi.nlm.nih.gov/books/NBK557710/</a>
	<ul style="list-style-type: none"> <li>• Differentiate between typical and atypical ribs.</li> </ul>	

	<ul style="list-style-type: none"> <li>• Discuss costal cartilages and their attachments.</li> <li>• Discuss the applied and the related clinicals.</li> <li>• Identify different parts of sternum.</li> <li>• Describe the bony features, attachments ossification of sternum</li> <li>• Discuss the related applied and clinicals.</li> </ul>	
Movements of thoracic wall and Intercostal spaces	<ul style="list-style-type: none"> <li>• Discuss the thoracic wall.</li> <li>• Describe the intercostals muscles (origin, insertion, direction of fibers, nerve supply and actions.</li> <li>• Discuss in detail the formation, branches, distribution and the related clinical of the intercostals nerves.</li> <li>• Explain the formation, course, relations, distribution and branches of the thoracic sympathetic trunk.</li> <li>• Differentiate between the typical and atypical intercostals space.</li> <li>• Compare the typical and atypical intercostals space.</li> <li>• Describe the types and axis of movements of vertebral column (flexion, extension, lateral flexion and rotation).</li> <li>• Define the respiratory movements on the basis of principles, factors and the different types (pump handle, bucket handle and piston).</li> <li>• Discuss the related physiological and pathological changes occurring (related to age movement etc).</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 306, 307, 308).  <a href="https://youtu.be/NwDxbNqEVaA">https://youtu.be/NwDxbNqEVaA</a>  <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4534848/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4534848/</a></p>
Anatomy of diaphragm	<ul style="list-style-type: none"> <li>• Describe the small and large openings in the diaphragm (vertebral level, location, formation, structures passing through and effects on the openings and structures by the diaphragmatic contraction).</li> <li>• Discuss related clinical aspects</li> </ul>	<p>Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 297, 313, 314, 391, 396, 397, 412, 455, 457, 521, 523).  <a href="https://youtu.be/6IK-YHK1ToM">https://youtu.be/6IK-YHK1ToM</a>  <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5184786/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5184786/</a></p>

Pleura	<ul style="list-style-type: none"> <li>• Discuss visceral and parietal pleura</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 333, 334, 335, 336). <a href="https://youtu.be/66PR3IYWb0A">https://youtu.be/66PR3IYWb0A</a> <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332049/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332049/</a>
	<ul style="list-style-type: none"> <li>• Discuss the pleural recesses and pleural cavity.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Describe the nerve and blood supply of pleura.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss the applied and the related clinicals.</li> </ul>	
Lungs	<ul style="list-style-type: none"> <li>• Identify the features of right and left lung.</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 337-347). <a href="https://youtu.be/66PR3IYWb0A">https://youtu.be/66PR3IYWb0A</a> <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332049/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332049/</a>
	<ul style="list-style-type: none"> <li>• Discuss the bronchopulmonary segments and their clinical significance</li> </ul>	
	<ul style="list-style-type: none"> <li>• Discuss and differentiate between the root of lung and the hilum of lung.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Describe the nerve plexuses related to the lungs.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Explain the blood supply of lungs</li> </ul>	

### Physiology Self-Directed Learning (SDL)

Topics Of SDL	Learning Objective	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Mechanics of pulmonary ventilation, Lung compliance	<ul style="list-style-type: none"> <li>• Enumerate muscles of inspiration and expiration and</li> <li>• Describe mechanics of pulmonary ventilation</li> <li>• Describe surfactant, surface tension and collapse of alveoli</li> <li>• Define compliance.</li> <li>• Draw compliance diagram of lungs.</li> </ul> <ol style="list-style-type: none"> <li>1. Explain relationship of surface tension, radius of alveoli, elastic forces of lungs with compliance</li> </ol>	<ul style="list-style-type: none"> <li>• Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 621,629)</li> <li>• Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 569)</li> <li>• Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 189,197)</li> <li>• Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 36,Page 581) ,(Chapter 40,Page 629)</li> </ul>	<ol style="list-style-type: none"> <li>1. <a href="https://www.ncbi.nlm.nih.gov/books/NBK538324/">https://www.ncbi.nlm.nih.gov/books/NBK538324/</a></li> <li>2. <a href="https://youtu.be/BTwgmMfqOW4">https://youtu.be/BTwgmMfqOW4</a></li> </ol>	C1 C1 C1 C1 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation

		<ul style="list-style-type: none"> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 38, Page 491,493)</li> </ul>				
	❖					
Pulmonary circulation & Pulmonary capillary dynamics. Physical principles of gas exchange & diffusion through respiratory membrane	<ul style="list-style-type: none"> <li>Discuss the role of alveoli and pleural space in respiration and pressure changes during respiration</li> <li>Enlist non-respiratory and respiratory functions of respiration</li> <li>Define and explain the concept of respiratory membrane.</li> <li>Define and draw respiratory unit</li> <li>Draw a diagram showing the exchange of gases through the respiratory membrane</li> <li>Enlist four factors affecting the rate of gas diffusion through the respiratory membrane</li> <li>Define diffusing capacity of respiratory membrane.</li> <li>Describe the diffusing capacity for oxygen.</li> <li>Describe the diffusing capacity for carbon dioxide.</li> <li>Describe the changes in diffusing capacity of oxygen and carbon dioxide during exercise               <ol style="list-style-type: none"> <li>Compare the diffusing capacities of oxygen and carbon dioxide</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 626,633,635)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 574)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 209)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 37,Page 592)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 39, Page 503) (Chapter 40, Page 511,515)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/aJPwUnZtycQ">https://youtu.be/aJPwUnZtycQ</a></li> <li><a href="https://youtu.be/zv1fDFn8BaM">https://youtu.be/zv1fDFn8BaM</a></li> <li><a href="https://pressbooks-dev.oer.hawaii.edu/biology/chapter/gas-exchange-across-respiratory-surfaces/">https://pressbooks-dev.oer.hawaii.edu/biology/chapter/gas-exchange-across-respiratory-surfaces/</a></li> <li><a href="https://www.sciencedirect.com/science/article/pii/S2666496822000194">https://www.sciencedirect.com/science/article/pii/S2666496822000194</a>.</li> </ol>	C2 C1 C1 C1 C1 C1 C1 C1 C1 C1 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
Pulmonary volumes, capacities &	<ul style="list-style-type: none"> <li>Define lung volumes and capacities.</li> <li>Define the four pulmonary volumes and capacities.</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 628)</li> </ul>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/9VdHhD1vcDU">https://youtu.be/9VdHhD1vcDU</a></li> <li><a href="https://teachmeanatomy.com/physiology">https://teachmeanatomy.com/physiology</a></li> </ol>	C1 C1 C1 C1 C1	SDL	MCQ SEQ VIVA VOCE



	<p>briefly explain factors which affect respiration.</p> <ul style="list-style-type: none"> <li>Describe briefly the mechanism of periodic breathing and sleep apnea</li> </ul>	<ul style="list-style-type: none"> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 41,Page 649)</li> </ul> <p>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 42, Page 533,536)</p>	<a href="#">urnalCode=physre v</a>			<p>MST based Assessment) OSPE SDL Evaluation</p>
<p>Hypoxia, hypercapnia, cyanosis</p>	<ul style="list-style-type: none"> <li>Define hypoxia and hypercapnia. Enumerate and explain its various types.</li> <li>Enumerate the roles of oxygen therapy in different types of hypoxia</li> </ul>	<ul style="list-style-type: none"> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 35, Page 646,650)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Respiratory Physiology (Chapter 5,Page 239)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05.,(Chapter 41,Page 653) (Chapter 42,Page 662)</li> </ul> <p>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 43, Page 546)</p>	<ol style="list-style-type: none"> <li><a href="https://youtu.be/wtn--qgs3Fg">https://youtu.be/wtn--qgs3Fg</a></li> <li><a href="https://www.verywellhealth.com/hypoxia-types-symptoms-and-causes-2248929">https://www.verywellhealth.com/hypoxia-types-symptoms-and-causes-2248929</a></li> </ol>	<p>C1 C1</p>	<p>SDL</p>	<p>MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation</p>

## Biochemistry Self-Directed Learning (SDL)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
HH equation	• Define of pH and pKa	C1	SDL	MCQs SAQs Viva
	• Elaborate Henderson Hasselbalch equation.	C2		
	• Describe Measurement of pH by equation.	C2		
Role of Chemical Buffers in pH regulation	• Define buffers.	C1	SDL	MCQs SAQs Viva
	• Discuss Mechanism of various buffers in maintenance of blood pH.	C2		
	• Elaborate the carbonic acid-bicarbonate buffer system			
pH meter and physiological buffers in pH regulation	• Measure the pH of solution in Pharmaceutical, Chemical, and Biotechnology Industry	C2	SDL	MCQs SAQs Viva
	• Elaborate the Bicarbonate and Phosphate system of Buffers and intracellular and extracellular proteins	C1		
		C1		
Vitamin Pyridoxine	• Discuss Vitamin B <sub>6</sub> , used as a dietary supplement	C2	SDL	MCQs SAQs Viva
	• Describe its deficiency and related clinical disorders	C2		
		C2		
Xenobiotics	• Define xenobiotics	C1	SDL	MCQs SAQs Viva
	• Discuss its metabolism and its role in environment	C2		



### Histology Practicals Skill Laboratory (SKL)

Topic	Learning Objectives At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Olfactory /Nasal mucosa	• Identify microscopic structure of respiratory and nasal mucosa under microscope.	P1	Skills Lab	OSPE
	• Illustrate histological structures of olfactory / nasal mucosa	C1		
	• Write two points of identification	C1		
	• Relevant research articles	C3		
	• Use HEC digital library	C3		
Epiglottis	• Identify types of cells and epithelium of epiglottis under microscope	P1	Skills Lab	OSPE
	• Illustrate histological structures of epiglottis.	C1		
	• Write two points of identification	C1		
	• Relevant research articles	C3		
	• Use HEC digital library	C3		
Trachea	• Identify microscopic structures of trachea.	P1	Skills Lab	OSPE
	• Illustrate microscopic structure of trachea.	C1		
	• Write two points of identification	C1		
	• Relevant research articles	C3		
	• Use HEC digital library	C3		
Lungs	• Identify microscopic structure of, bronchi, terminal bronchiole, respiratory bronchiole, alveoli, alveolar duct of the respiratory tract on the basis of <ul style="list-style-type: none"> <li>○ Types of epithelial cells present</li> <li>○ Relative amount of gland, cartilage, smooth muscles and connective tissue fibers present in wall of the tubes.</li> </ul>	P1	Skill Lab	OSPE
	• Illustrate microscopic structure of different layers of respiratory passages.	C1		
	• Write points of identification of each part	C1		
	• Relevant research articles	C3		
	• Use HEC digital library	C3		

### Physiology Practicals Skill Laboratory (SKL)

Topic	Learning Objectives	Reference	Learning Domains	Learning Strategy	Assessment Tools
Measurement of different lung volume & capacities with the help of spirometer	<ul style="list-style-type: none"> <li>• Description of its various parts</li> <li>• Importance of spirometer for measurements of various volumes</li> <li>• Define various lung volumes &amp; capacity</li> <li>• How to measure them</li> </ul>	Practical Notebook of Physiology First year MBBS by Dr Saqib Sohail	C1/C3 A3 P3	Practicals /skill lab	Viva Voce Ospe Video Assisted Assessment
Recording of normal and modified movement of respiration (Stethography)	<ul style="list-style-type: none"> <li>• Introduction to stethography</li> <li>• How to use it and its clinical importance</li> </ul>	Practical Notebook of Physiology First year MBBS by Dr Saqib Sohail	C1/C3 A3 P3	Practicals /skill lab	Viva Voce Ospe Video Assisted Assessment
Clinical examination of chest for respiration	<ul style="list-style-type: none"> <li>• Detail introduction and explanation about inspection</li> <li>• Palpation</li> <li>• Percussion</li> <li>• Auscultation</li> </ul>	Practical Notebook of Physiology First year MBBS by Dr Saqib Sohail	C1/C3 A3 P3	Practicals /skill lab	Viva Voce Ospe Video Assisted Assessment

### Biochemistry Practicals Skill Laboratory (SKL)

Topic	Learning Objectives At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Henderson Hassel batch equation	Illustrate Henderson Hassel batch equation. Measure pH by equation.	P	Skill lab	OSPE
Buffers	Illustrate buffer actions and buffer zone.	P	Skill lab	OSPE
pH meter	Measure the acidity or basicity of water-based solutions	P	Skill lab	OSPE

## **SECTION - III**

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- **CBLs**
- **Vertical Integration LGIS**
- **Longitudinal Themes**
  - **Biomedical Ethics & Professionalism**
  - **Family Medicine**
  - **Artificial Intelligence (Innovation)**
  - **Integrated Undergraduate Research Curriculum (IUGRC)**

## Basic and Clinical Sciences (Vertical Integration)

### Case Based Learning (CBL)

Subject	Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain
Anatomy	• Lung's cancer	Apply basic knowledge of subject to study clinical case.	C3
	• Chest trauma	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• Wheeze/Stridor	Apply basic knowledge of subject to study clinical case.	C3
	• Crib Death	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• CBL-ABGs	Apply basic knowledge of subject to study clinical case.	C3
	• CBL – uncouplers	Apply basic knowledge of subject to study clinical case.	C3

## Large Group Interactive Sessions (LGIS)

### Pathology

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Clinical disorders of Respiration:	• Discuss Pneumonia in detail.	C1	LGIS	MCQs
	• Discuss Tuberculosis in detail.	C1		
	• Discuss Cystic fibrosis in detail.	C1		
	• Discuss Respiratory Failure Incidence in detail.	C1		
	• Discuss Sign and symptoms in detail.	C1		
	• Discuss Pathophysiology in detail.	C1		

## Surgery

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Chest Deformities (Congenital)	<ul style="list-style-type: none"> <li>• <b>Describe:</b></li> <li>• Various chest deformities &amp; congenital malformations</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>• Significance of deformities</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• General and operative management outline</li> </ul>	C2		
Pneumothorax	<ul style="list-style-type: none"> <li>• <b>Describe:</b></li> <li>• Various types of Pnuemothorax</li> </ul>	C2	LGIS	MCQs
	<ul style="list-style-type: none"> <li>• Causes</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Signs and symptoms Significance of tension pneumothorax</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Emergency and definitive management</li> </ul>	C2		
Hemothorax	<ul style="list-style-type: none"> <li>• Describe:</li> <li>• Various types of Hemothorax</li> </ul>	C2	LGIS	MCQ
	<ul style="list-style-type: none"> <li>• Causes of Hemothorax</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Signs and symptoms of Hemothorax</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Emergency and definitive management</li> </ul>			
Pleural effusion	<ul style="list-style-type: none"> <li>• Describe:</li> <li>• Definition</li> </ul>	C1	LGIS	MCQ
	<ul style="list-style-type: none"> <li>• Causes</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• Signs &amp; symptoms</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>• General and operative management outlines</li> </ul>			

## ENT

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Tonsillitis	• Define tonsillitis	C1	LGIS CBL	MCQs
	• Enlist the causes of tonsillitis	C1		
	• List the clinical features of tonsillitis	C2		
	• Enumerate the management of tonsillitis	C1		
Foreign body nose & ear	• Classify foreign bodies	C1	LGIS	MCQs
	• Enumerate emergency situations for removal.	C2	CBL	

## Bioethics Professionalism & Behavioral Sciences

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Crises intervention and disaster	• To be able identify crises situations and learn the means to cope with them during disasters either natural or man made	C1 C2	LGIS CBL	MCQS
Conflict resolution and empathy	• To be able to identify crises situations and using empathy how to deal with these situations arising in clinical practice	C2	LGIS CBL	MCQS

## Medicine

Topic	At the End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Tuberculosis	• Discuss TB.	C2	LGIS	MCQs
	• Discuss its diagnostic Criteria.	C2		
	• Describe How to treat a patient with TB.	C2		
Drowning & Strangulation	• Discuss How to manage a patient with drowning and strangulation.	C2	LGIS	MCQs

## Climate Change & Health & Community Medicine

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Air and Ventilation Air composition & indices of thermal comfort	<ul style="list-style-type: none"> <li>At the end of the session the students will be able to:</li> <li>Enlist indices of thermal comfort</li> </ul>	C1	LGIS	MCQ
	<ul style="list-style-type: none"> <li>Describe the factors responsible for vitiation of air</li> </ul>	C2		
Air pollution and its factors	<ul style="list-style-type: none"> <li>Define air pollution</li> </ul>	C1	LGIS	MCQ
	<ul style="list-style-type: none"> <li>Identify sources of air pollution and air pollutants</li> </ul>	C1		
Preventive measures to control air pollution	<ul style="list-style-type: none"> <li>Demonstrate selection of air sample for analysis</li> </ul>	C2	LGIS	MCQ
	<ul style="list-style-type: none"> <li>Enumerate the methods to prevent &amp; control of air pollution</li> </ul>	C1		
Air purification methods	<ul style="list-style-type: none"> <li>Enlist natural and artificial methods of air purification.</li> </ul>	C1	LGIS	MCQ
Greenhouse effect	<ul style="list-style-type: none"> <li>Describe the greenhouse effect</li> </ul>	C2	LGIS	MCQ
	<ul style="list-style-type: none"> <li>Enlist greenhouse gases.</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Identify sources of greenhouse gases</li> </ul>	C1		
Global warming and climate change	<ul style="list-style-type: none"> <li>Demonstrate global warming.</li> </ul>	C2	LGIS	MCQ
	<ul style="list-style-type: none"> <li>Define ozone hole.</li> </ul>	C1		
	<ul style="list-style-type: none"> <li>Describe link between global warming and climate change</li> </ul>	C2		

### Artificial Intelligence (AI)

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Artificial Intelligence basic concepts	<ul style="list-style-type: none"> <li>To learn the concept of deep and superficial neural networks in AI</li> </ul>	C2	LGIS	MCQs

### Family Medicine

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Approach to a Patient with cough & hemoptysis	<ul style="list-style-type: none"> <li>Define cough &amp; hemoptysis.</li> </ul>	C1	LGIS	MCQs
	<ul style="list-style-type: none"> <li>Discuss differential diagnoses cough &amp; hemoptysis.</li> </ul>	C2		
	<ul style="list-style-type: none"> <li>When to refer a patient of cough &amp; hemoptysis to pulmonologist</li> </ul>	C2		

### Integrated Undergraduate Research Curriculum (IUGRC)

Topics	At the end of the session the student should be able to:	Learning Domains	Teaching Strategy	Assessment Tool
Practice session 6	<ul style="list-style-type: none"> <li>Finalization of poster presentation</li> <li>Submission at SJRMC/any other medical journal</li> </ul>	C3	Activity	MCQs



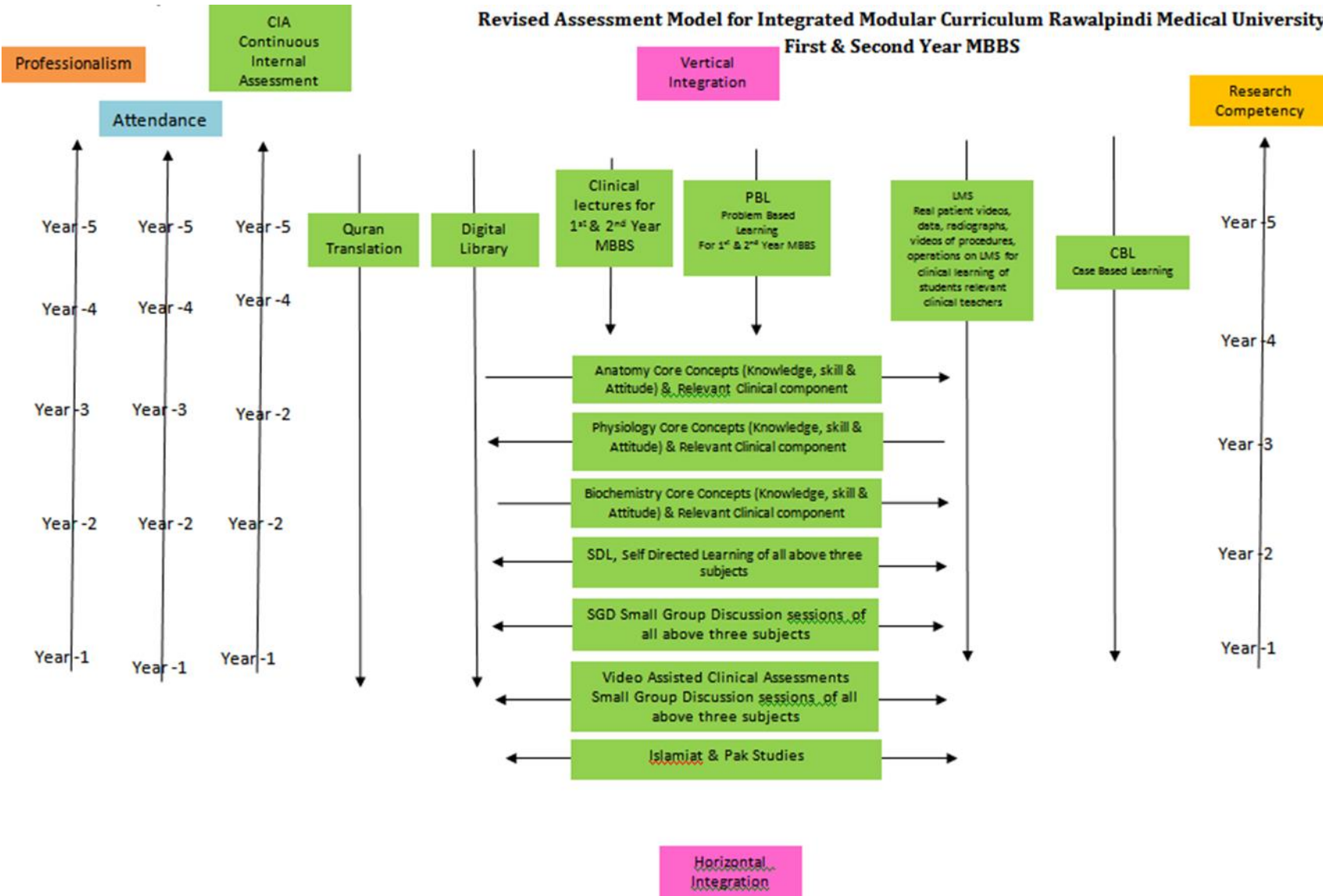
## **SECTION - IV**

### **Assessment Policies**

#### **Contents**

- **Assessment plan**
- **Types of Assessment:**
- **Modular Examinations**
- **Block Examination**
- **Table 4: Assessment Frequency & Time in Respiration**

## Revised Assessment Model for Integrated Modular Curriculum Rawalpindi Medical University First & Second Year MBBS



### Gauge for Continuous Internal Assessment (CIA)

Red Zone	High Alert	Yellow Zone	Green Zone	Excellent	Extra Ordinary
0 - 25%	26 - *50%	51 - 60%	61 - 70%	71 - 80%	81 - 100%

\*50% and above is Passing Marks.

### Gauge for attendance percentage

Red Zone	High Alert	Yellow Zone-1	Yellow Zone-2	Green Zone	Excellent
0 - 25%	26 - 50%	51 - 60%	61 - 74%	*75 - 80%	81 - 100%

90% is eligibility criteria for appearing in professional examination.

## Assessment plan

University has followed the guidelines of Pakistan Medical and Dental Council for assessment. Assessment is conducted at the mid modular, modular and block levels.

### Types of Assessment:

The assessment is formative and summative.

Formative Assessment	Summative Assessment
Formative assessment is taken at modular (2/3 <sup>rd</sup> of the module is complete) level through MS Teams. Tool for this assessment is best choice questions and all subjects are given the share according to their hour percentage.	Summative assessment is taken at the mid modular (LMS Based), modular and block levels.

### Modular Assessment

Theory Paper	Viva Voce
<p>There is a module examination at the end of first module of each block. The content of the whole teaching of the module are tested in this examination.</p> <p>It consists of paper with objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module. (Annexure I attached)</p>	<p>Structured table viva voce is conducted including the practical content of the module.</p>

### Block Assessment

On completion of a block which consists of two modules, there is a block examination which consists of one theory paper and a structured viva with OSPE.

Theory Paper	Block OSPE
<p>There is one written paper for each subject. The paper consists of objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module.</p>	<p>This covers the practical content of the whole block.</p>

**Table 4-Assessment Frequency & Time in Respiratory Module**

Block	Sr #	Module – 1 Respiratory Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block-I	1	Mid Module Examinations LMS based (Anatomy, Physiology & Biochemistry)	Summative	30 Minutes	3 Hour 15 Minutes	45 Minutes	2 Formative	6 Summative
	2	Topics of SDL Examination on MS Team	Formative	30 Minutes				
	3	End Module Examinations (SEQ & MCQs Based)	Summative	2 Hours				
	4	Anatomy Structured and Clinically Oriented Viva	Summative	10 Minutes				
	5	Physiology Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	6	Assessment of Clinical Lectures	Formative	15 Minutes				
	7	Assessment of Bioethics Lectures	Summative	2 Minutes				
	8	Assessment of IUGRC Lectures	Summative	10 Minutes				

## Learning Resources

Subject	Resources
<b>Anatomy</b>	<p><b>A. Gross Anatomy</b></p> <ol style="list-style-type: none"> <li>1. Gray's Anatomy by Prof. Susan Standring 42th edition, Elsevier.</li> <li>2. Clinical Anatomy for Medical Students by Richard S. Snell 10<sup>th</sup> edition.</li> <li>3. Clinically Oriented Anatomy by Keith Moore 9<sup>th</sup> edition.</li> <li>4. Cunningham's Manual of Practical Anatomy by G.J. Romanes, 16th edition, Vol-I, II and III</li> </ol> <p><b>B. Histology</b></p> <ol style="list-style-type: none"> <li>1. B. Young J. W. Health Wheather's Functional Histology 6<sup>th</sup> edition.</li> <li>2. Medical Histology by Prof. Laiq Hussain 7<sup>th</sup> edition.</li> </ol> <p><b>C. Embryology</b></p> <ol style="list-style-type: none"> <li>1. Keith L. Moore. The Developing Human 11<sup>th</sup> edition.</li> <li>2. Langman's Medical Embryology 14<sup>th</sup> edition.</li> </ol>
<b>Physiology</b>	<p><b>A. Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Textbook Of Medical Physiology by Guyton And Hall 14<sup>th</sup> edition.</li> <li>2. Ganong ' S Review of Medical Physiology 26<sup>th</sup> edition.</li> </ol> <p><b>B. Reference Books</b></p> <ol style="list-style-type: none"> <li>1. Human Physiology by Lauralee Sherwood 10<sup>th</sup> edition.</li> <li>2. Berne &amp; Levy Physiology 7<sup>th</sup> edition.</li> <li>3. Best &amp; Taylor Physiological Basis of Medical Practice 13<sup>th</sup> edition.</li> <li>4. Guyton &amp; Hall Physiological Review 3<sup>rd</sup> edition.</li> </ol>
<b>Biochemistry</b>	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Harper's Illustrated Biochemistry 32th edition.</li> <li>2. Lehninger Principle of Biochemistry 8<sup>th</sup> edition.</li> <li>3. Biochemistry by Devlin 7<sup>th</sup> edition.</li> </ol>
<b>Community Medicine</b>	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Community Medicine by Parikh 25<sup>th</sup> edition.</li> <li>2. Community Medicine by M Illyas 8<sup>th</sup> edition.</li> <li>3. Basic Statistics for the Health Sciences by Jan W Kuzma 5<sup>th</sup> edition.</li> </ol>
<b>Pathology/Microbiology</b>	<p><b>Textbooks</b></p> <ol style="list-style-type: none"> <li>1. Robbins &amp; Cotran, Pathologic Basis of Disease, 10<sup>th</sup> edition.</li> <li>2. Rapid Review Pathology, 5<sup>th</sup> edition by Edward F. Goljan MD.</li> <li>3. <a href="http://library.med.utah.edu/WebPath/webpath.html">http://library.med.utah.edu/WebPath/webpath.html</a></li> </ol>
	<b>Textbooks</b>

<b>Pharmacology</b>	<ol style="list-style-type: none"><li>1. Lippincot Illustrated Pharmacology 9<sup>th</sup> edition.</li><li>2. Basic and Clinical Pharmacology by Katzung 5<sup>th</sup> edition.</li></ol>
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## **SECTION - V**

### **Time Table**

**Integrated Clinically Oriented Modular Curriculum for first Year MBBS**

**Respiration Module Time Table**

**First Year MBBS**

**Session 2023-2024**

**Batch- 50**



## Respiration Module Team

Module Name : Respiration Module  
 Duration of module : 04 Weeks  
 Coordinator : Dr. Kamil  
 Co- Coordinator : Dr. Fareed Ullah  
 Review by : Module Committee

Module Committee		Module Task Force	
Vice Chancellor RMU	Prof. Dr. Muhammad Umar	Coordinator	Dr. Kamil
Director DME	Prof. Dr. Rai Muhammad Asghar	DME Focal Person	Dr. Sidra Hamid
Convener Curriculum	Prof. Dr. Naeem Akhter	Co-coordinator	Dr. Quratulain Sharif (Senior Demonstrator of Anatomy)
Chairperson Anatomy & Dean Basic Sciences	Prof Dr. Ayesha Yousaf	Co-Coordinator	Dr. Uzma Zafar (Senior Demonstrator Biochemistry)
Additional Director DME	Prof. Dr. Ifra Saeed	Co-coordinator	Dr. Fareed Ullah (Senior Demonstrator Physiology) & Clinical Co- Coordinator
Chairperson Physiology	Prof. Dr. Samia Sarwar		
Chairperson Biochemistry	Dr. Aneela Jamil	<b>DME Implementation Team</b>	
Focal Person Anatomy First Year MBBS	Prof Dr. Ayesha Yousaf	Director DME	Prof. Dr. Rai Muhammad Asghar
Focal Person Physiology	Dr. Sidra Hamid	Implementation In charge 1st & 2 <sup>nd</sup> Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
Focal Person Biochemistry	Dr. Aneela Jamil	Deputy Director DME	Dr. Shazia Zeb
Focal Person Pharmacology	Dr. Zunera Hakim	Module planner & Implementation coordinator	Dr. Sidra Hamid
Focal Person Pathology	Dr. Asiya Niazi	Editor	Muhammad Arslan Aslam
Focal Person Behavioral Sciences	Dr. Saadia Yasir		
Focal Person Community Medicine	Dr. Afifa Kulsoom		
Focal Person Quran Translation Lectures	Dr. Fahd Anwar		

## Discipline wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
III	<ul style="list-style-type: none"> <li>Anatomy</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Embryology of Respiratory System</li> </ul>	Histology of Upper & Lower <ul style="list-style-type: none"> <li>Respiratory System</li> </ul>	<ul style="list-style-type: none"> <li>Gross Anatomy of Upper &amp; Lower Respiratory System</li> </ul>
	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>pH, Electron transport chain, Oxidative phosphorylation, Water soluble vitamins riboflavin, biotin, pyridoxine, pantothenic acid, Normal acid base regulation</li> </ul>			
	<ul style="list-style-type: none"> <li>Physiology</li> </ul>	<ul style="list-style-type: none"> <li>Pulmonary Ventilation, Pulmonary Volumes and Capacities, Alveolar Ventilation, Functions of the Respiratory Passageways</li> <li>Pulmonary Circulation, Pulmonary Edema, Physical Principles of Gas Exchange; Diffusion of Oxygen and Carbon Dioxide Through the Respiratory Membrane Transport of Oxygen and Carbon Dioxide in Blood and Tissue Fluids</li> <li>Regulation of Respiration</li> <li>Useful Methods for Studying Respiratory Abnormalities, Respiratory Insufficiency, Hypoxia &amp; Oxygen Therapy, Hypercapnia &amp; Artificial Respiration Respiratory changes during Exercise, Aviation, Space &amp; Deep-Sea Diving Physiology</li> </ul>			
	<ul style="list-style-type: none"> <li>Research Club Activity (IUGRC)</li> </ul>	<ul style="list-style-type: none"> <li>Poster Presentation</li> </ul>			
	<ul style="list-style-type: none"> <li>Artificial Intelligence</li> </ul>	<ul style="list-style-type: none"> <li>Artificial Intelligence basic concepts</li> </ul>			
	<ul style="list-style-type: none"> <li>Family Medicine</li> </ul>	<ul style="list-style-type: none"> <li>Approach to a patient with cough hemoptysis &amp; shortness of breath</li> </ul>			
	<ul style="list-style-type: none"> <li>Climate Change &amp; Health</li> </ul>	<ul style="list-style-type: none"> <li>Effects of Climate Changes on Body Systems (IHD, Skin Diseases &amp; Heat Stroke)</li> <li>Effects of Climate Changes on Respiratory System (Asthma, COPD, Allergies &amp; Cancers)</li> <li>Greenhouse effect</li> <li>Global warming and climate change</li> </ul>			
	<ul style="list-style-type: none"> <li>Bioethics Professionalism &amp; Behavioral Sciences</li> </ul>	<ul style="list-style-type: none"> <li>Crises intervention and disaster Conflict resolution and empathy</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical components</li> </ul>	<ul style="list-style-type: none"> <li>The Holy Quran Translation Component</li> </ul>			
	<ul style="list-style-type: none"> <li>Vertical Integration</li> </ul>	<ul style="list-style-type: none"> <li>Clinically Content Relevant to Respiratory Module</li> <li>Tuberculosis (Medicine)</li> <li>Clinical disorders of Respiration (Pathology)</li> <li>Foreign body nose &amp; ear &amp; Tonsillitis (ENT)</li> </ul>			

## Categorization of Modular Contents

### Anatomy

Category A*	Category B**	Category C***			
Special Embryology	Special Histology	Demonstrations / SGD	CBL	Practical's	Self-Directed Learning (SDL)
		<ul style="list-style-type: none"> <li>• Nose and Paranasal sinuses</li> <li>• Larynx and trachea</li> <li>• Overview of thoracic wall</li> <li>• Skeleton of thoracic wall (Ribs)</li> <li>• Skeleton of thoracic wall (Sternum)</li> <li>• Joints of Thoracic Wall</li> <li>• Thoracic Apertures</li> <li>• Movements Of Thoracic Wall &amp; Intercostal Spaces</li> <li>• Diaphragm</li> <li>• Vasculature of thoracic wall</li> <li>• Innervation of Thoracic Wall</li> <li>• Pleura</li> <li>• Lungs</li> <li>• Radiology &amp; Surface Marking</li> </ul>	<ul style="list-style-type: none"> <li>• Lungs and its lymphatics</li> <li>• Thorax &amp; Pleura</li> </ul>	<ul style="list-style-type: none"> <li>• Nose/paranasal sinuses /epiglottis</li> <li>• Trachea</li> <li>• Lungs</li> </ul>	<ul style="list-style-type: none"> <li>• Nose paranasal sinus larynx and trachea</li> <li>• Skeleton of thoracic wall</li> <li>• Movement of Thoracic Wall &amp; Intercostal Spaces</li> <li>• AnatomyOf diaphragm</li> <li>• Anatomy Pleura</li> <li>• Lungs</li> </ul>

**Category A\*:** By Professor

**Category B\*\*:** By Associate & Assistant Professors

**Category C\*\*\*:** By Senior Demonstrators & Demonstrators

## Teaching Staff / Human Resource of Department of Anatomy

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of Anatomy department	01
2.	Associate Professor of Anatomy department (AP)	01
3.	Demonstrators of Anatomy department	04

### Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$2 * 08 = 16$ hours
2.	Small Group Discussions (SGD)	$1 * 4, 2 * 11 = 26$ hours
3.	Practical / Skill Lab	$7.5 * 3 = 22.5$ hours

### Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	$1 * 8 = 8$ hours
2.	Small Group Discussions (SGD)	$1 * 4, 2 * 11 = 26$ hours
3.	Practical / Skill Lab	$1.5 * 3 = 4.5$ hours
4.	Self-Directed Learning (SDL)	$2 * 6 = 12$ hours

## Physiology

Category A*	Category B**	Category C***					
		Transport of CO <sub>2</sub> (Prof. Dr. Samia Sarwar/Dr Iqra) Deep sea physiology (Prof. Dr. Samia Sarwar/Dr Nayab)	PBL	Demonstrations / SGD	CBL	SKL/Practical's	Self-Directed Learning (SDL)
<ul style="list-style-type: none"> <li>• Transport of oxygen (Prof. Dr. Samia Sarwar/Dr Sheena)</li> <li>• Oxygen hemoglobin dissociation curve (Prof. Dr. Samia Sarwar/Dr Sheena)</li> <li>• Transport of CO<sub>2</sub> (Prof. Dr. Samia Sarwar/Dr Iqra)</li> <li>• Nervous regulation of respiration (Prof. Dr. Samia Sarwar/Dr Kamil)</li> <li>• Chemical regulation of respiration &amp; exercise changes (Prof. Dr. Samia Sarwar/Dr Kamil)</li> <li>• Space physiology (Prof. Dr. Samia Sarwar/Dr Fareed)</li> <li>• High altitude physiology (Prof. Dr. Samia Sarwar/Dr Fareed)</li> <li>• Deep sea physiology (Prof. Dr. Samia Sarwar/Dr Nayab)</li> <li>• Mechanics of pulmonary ventilation, Lung compliance (By Dr. Shmyla)</li> <li>• Pulmonary volumes, capacities &amp; functions of respiratory tract (By Dr. Shmyla)</li> <li>• Ventilation perfusion ratio (By Dr. Shmyla)</li> <li>• Lung function teRespiratory abnormalities (COPD, Tuberculosis, Pneumonia, Atelectasis)</li> <li>• (By Dr. Shmyla)st (By Dr. Shmyla)</li> <li>• Hypoxia, hypercapnia, cyanosis (By Dr. Shmyla)</li> </ul>			One PBL In two sessions	<ul style="list-style-type: none"> <li>• Physiology of unusual environment.</li> <li>• Mechanics of pulmonary ventilation &amp; compliance (Second week)</li> <li>• Ventilation perfusion ratio &amp; regulation of respiration (Second week)</li> </ul>	<ul style="list-style-type: none"> <li>• Wheeze/Strid or</li> <li>• Crib Death</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement of different lung volume &amp; capacities with the help of spirometer</li> <li>• Recording of normal and modified movement of respiration (Stethography)</li> <li>• Clinical examination of chest for respiration.</li> </ul>	<p style="text-align: center;"><b>(OFF CAMPUS)</b></p> <ul style="list-style-type: none"> <li>• Mechanics of pulmonary ventilation, Lung compliance</li> <li>• Pulmonary circulation</li> <li>• Pulmonary volumes, capacities</li> <li>• Transport of oxygen</li> <li>• Chemical regulation of respiration &amp; exercise changes</li> <li>• Hypoxia, hypercapnia, cyanosis</li> </ul>

**Category A\*:** By Professor

**Category B\*\*:** By Associate & Assistant Professors

**Category C\*\*\*:** By Senior Demonstrators & Demonstrators

### Teaching Staff / Human Resource of Department of Physiology

Sr. #	Designation Of Teaching Staff / HumanResource	Total number ofteaching staff
1.	Professor of physiology department	01
2.	Associate professor of physiology department	01
3.	Assistant professor of physiology department (AP)	01
4.	Demonstrators of physiology department	07
5.	Residents of physiology department (PGTs)	06

### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LECTURES)	$16 \times 1 = 16$ Hours
2.	Small Group Discussions (SGD)/CBL	$1.5 \times 3 = 4.5$ Hours + 2 Hours (2nd week) = 6.5 Hours
3.	Problem Based Learning (PBL)	---
4.	Practical / Skill Lab	$1.5 \times 3 = 4.5$ Hours
5.	Self-Directed Learning (SDL)	$6 \times 1 = 6$ Hours (Off Campus)

## Biochemistry

Category A*	Category B**				
LGIS	LGIS	PBL	CBL	Practical's	SGD
<ul style="list-style-type: none"> <li>• Simple Lipids</li> <li>• Compound Lipids (phospholipids, glycolipids, lipoproteins)</li> <li>• Prostaglandins</li> </ul>	<ul style="list-style-type: none"> <li>• Definition and Biological importance of Lipids</li> <li>• Fatty acids</li> <li>• Derived lipids</li> <li>• Cholesterol</li> <li>• Introduction and classification of carbohydrates</li> <li>• Isomerism, optical activity and mutarotation</li> <li>• Monosaccharide</li> <li>• Disaccharides</li> <li>• Homopolysaccharides</li> <li>• Heteropolysaccharides</li> </ul>		<ul style="list-style-type: none"> <li>• Atherosclerosis</li> <li>• Heteropoly saccharides</li> </ul>	<ul style="list-style-type: none"> <li>• Lipid solubility</li> <li>• Benedict's test and Molisch's test</li> <li>• Barfoed's Test and Selivanoff's test</li> <li>• Iodine Test</li> </ul>	<ul style="list-style-type: none"> <li>• Classification of carbohydrates and lipids</li> <li>• Classification and properties of fatty acids</li> </ul>

**Category A\*:** By HOD and Assistant Professor

**Category B\*\*:** By All (HOD, Assistant Professors, Senior Demonstrators)

**Category C\*\*\*:** (By All Demonstrators)

### Teaching Staff / Human Resource of Department of Biochemistry

Sr. #	Designation of Teaching Staff / Human Resource	Total number of teaching staff
1	Assistant professor of biochemistry department (AP)	01
2	Demonstrators of biochemistry department	07

#### Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours (Faculty)	Total Hours (student)
1.	Large Group Interactive Session (LECTURES)	$2 * 8 = 16$ hours	08
2.	Small Group Discussions (SGD)	$1.5 * 5 = 7.5$ hours	06
3.	Problem Based Learning (PBL)	Zero	zero
4.	Practical / Skill Lab	$1.5 * 5 = 7.5$ hours	6
5.	Self-Directed Learning (SDL)	-----	08



## Timetable For Respiratory Module 02-10-2023 TO 07-10-2023 (First Week)

DAY/ TIME	8:00AM-9:00AM	09:00AM-10:00AM	10:00AM-11:00AM	11:00AM-12:00 PM	12:00PM-12:20PM	12:20PM-02:00PM	Home Assignment ( 2 Hours)	
02-10-2023 MONDAY	<b>DISSECTION SGD</b>		<b>ANATOMY (LGIS)</b>		<b>DME SESSION</b>			
	Nose and Paranasal sinuses		Development of Respiratory System (Nose & Paranasal sinuses)	Histology of Respiratory System I	Feedback & Paper Discussion			
Prof. Dr. Ayesha Yousaf (Even)			Assoct. Prof . Dr Mohtasham (Odd)	Dr. Sidra Hamid/ Dr. Saira Aijaz	Dr. Maria, Dr. Aneela & Dr Anila yasmeen			
03-10-2023 TUESDAY	<b>DISSECTION SGD</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>PHYSIOLOGY(LGIS)</b>			
	Larynx and trachea		PH, PKa, Henderson Hasselbalch equation	Electron transportchain	Mechanics of pulmonary ventilation, Lung compliance	Pulmonary circulation & Pulmonary capillary dynamics. Physical principles of gas exchange & diffusion through respiratory membrane		
Dr. Isma (Even)			Dr. Aneela jamil (Odd)	Dr. Faizania (Even)	Dr. Kamil (Odd)			
04-10-2023 WEDNESDAY	<b>DISSECTION SGD</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>			
	Overview of thoracic wall		Histology of Respiratory system I	Development of Respiratory System (Nose & Paranasal sinuses)	Pulmonary circulation & Pulmonary capillary dynamics Physical principles of gas exchange& diffusion through respiratory membrane	Mechanics of pulmonary ventilation Lung compliance		
Assoct. Prof. Dr Mohtasham (Even)			Prof. Dr. Ayesha(Odd)	Dr. Kamil (Even)	Dr. Faizania (Odd)			
05-10-2023 THURSDAY	<b>DISSECTION/SGD</b>	<b>PBL SESSION -I</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		
	Skeleton of thoracic wall (Ribs)	Asbestosis First Year Batch of Physiology Teachers Supervised by Dr. Sidra Hamid		Histology of Respiratory system II	Development of Respiratory system (Trachea and Larynx)	Transport of oxygen	Pulmonary volumes, capacities & functions of respiratory tract	
		Assoct. Prof. Dr. Mohtashim (odd)	Prof. Dr. Ayesha (Even)	Prof. Dr. Samia / Dr. Sheena (Odd)	Dr. Faizania (even)			
06-10-2023 FRIDAY	<b>DISSECTION/SGD</b>	<b>QURAN TRANSLATION – I</b>		<b>PHYSIOLOGY LGIS</b>		<b>BIOCHEMISTRY (LGIS)</b>		
	Skeleton of thoracic wall (Sternum)	Immaniat- V &VI	Ibaadat-V	Pulmonary volumes, capacities & functions of respiratory tract	Transport of oxygen	Electron transport chain	PH, pKa, Henderson Hasselbalch equation	
		Mufti Naeem (Even)	Molana AbdulWahid (Odd)	Dr. Faizania (Odd)	Prof. Dr. Samia / Dr. Sheena (even)	Dr. Aneela Jamil (Even)	Dr. Isma (Odd)	
07-10-2023 SATURDAY	<b>BIOCHEMISTRY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY LGIS</b>	
	Oxidative phosphorylation	Normal pH regulation by buffers	Oxygen hemoglobin dissociation curve	Ventilation perfusionratio	Development of Respiratory system (Trachea and Larynx)	Histology of Respiratory system II	Ventilation perfusionratio	Oxygen hemoglobin dissociation curve
		Dr. Aneela Jamil (even)	Dr. Isma (Odd)	Prof. Dr. Samia / Dr. Sheena (even)	Dr. Nayab (Odd)	Prof. Dr. Ayesha (Even)	Assoct. Prof. Dr. Mohtashim(Odd)	Dr. Nayab (even)
						Dr. Aneela Jamil (Even)	Prof. Dr. Samia / Dr. Sheena (Odd)	

**Break**

**Break**

Topics For Practical with Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>Olfactory nasal mucosa/Epiglottis/ (Anatomy/ Histology-practical) venue Histology Laboratory</li> <li>HH equation (Biochemistry practical) venue- Biochemistry Laboratory</li> <li>Measurement of different lung volume &amp; capacities with the help of spirometer (Physiology – practical) Physiology Laboratory</li> </ul>						<ul style="list-style-type: none"> <li>Biochemistry tutorial- Electron transport chain (Lecture Hall 03)</li> <li>Physiology CBL Wheeze/Stridor. (Lecture Hall 05)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD	Batches	Roll No	Anatomy Teacher	Venue	
Monday	C	B	E	A	D	A	01-90	Dr. Quratulain Sharif	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	91-180	Dr. Ali Raza	New Lecture Hall Complex Lecture Theater # 04	
Wednesday	E	D	B	C	A	C	181- 270	Dr. Urooj	New Lecture Hall Complex Lecture Theater # 02	
Thursday	B	A	D	E	C	D	271 - onwards	Dr. Zanera Saqib	New Lecture Hall Complex Lecture Theater # 01	
Saturday	A	E	C	D	B					
1 <sup>st</sup> week Practical by Dr. Ali Raza										
Venue For First Year Batches For PBL & SGD Team-I						Sr.No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2	Batch –B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar		3	Batch –C	141-210	Dr. Shahrukh Khan	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room(Basement)		Dr. Fareedullah		4	Batch –D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas(PGT Physiology)		5	Batch -E	281-onwards	Dr. Faiza Zafar	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh ( PBL) Dr. Shazia Noreen (SGD)		<b>Odd Roll Numbers</b>			New Lecture Hall Complex Lecture Theater # 03	
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		<b>Even Roll Number</b>			New Lecture Hall Complex Lecture Theater # 02	
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						
						Venues for Large Group Interactive Session (LGIS) and SDL				

**Timetable For Respiratory Module  
09-10-2023 TO 14-10-2023 (Second Week)**

DAY/ TIME	8:00AM-9:00AM	09:00AM-10:00AM	10:00AM-11:00AM	11:00AM-12:00 PM	12:00PM-12:20PM	12:20PM-02:00PM	Home Assignment ( 2 Hours)
09-10-2023 MONDAY	<b>DISSECTION/SGD</b>		<b>MEDICINE (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>Break</b>
	Joints of Thoracic Wall		Tuberculosis		Transport of CO <sub>2</sub>	Lung function test	
10-10-2023 TUESDAY	<b>DISSECTION/SGD</b>	<b>PBL SESSION -II</b>	<b>ANATOMY (LGIS)</b>		<b>CLIMATE CHANGE &amp; HEALTH</b>		
	Thoracic Apertures	Asbestosis First Year Batch Of Physiology Teachers	Histology of Respiratory system III	Development of Respiratory System (Lungs)	Effects of Climate Changes on Body Systems (IHD, Skin Diseases & Heat Stroke)		
		PBL Team – I Supervised by Dr. Sidra Hamid	Assoct. Prof. Dr. Mohtashim (even)	Prof. Dr. Ayesha (Odd)	Dr. Sidra Hamid	Dr. Maria Tasleem	
11-10-2023 WEDNESDAY	<b>DISSECTION/SGD</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		
	Movements of Thoracic Wall & Intercostal Spaces		Development of Respiratory system (Lungs)	Histology of Respiratory system III	Lung function test	Transport of CO <sub>2</sub>	
12-10-2023 THURSDAY	<b>DISSECTION/SGD</b>	<b>PRACTICAL COPIES</b>		<b>ANATOMY (LGIS)</b>		<b>FAMILY MEDICINE (LGIS)</b>	
	Diaphragm	Marking by QEC, Dean & DME		Development of Respiratory system (Diaphragm)	Histology of Respiratory system IV	Approach to a patient with cough hemoptysis & shortness of breath	
		Dr. Fareed (Odd)	Dr. Quratulain (Even)	Prof. Dr. Ayesha (Even)	Assoct. Prof. Dr. Mohtashim(Odd)	Dr. Sidra Hamid (Even)	Dr. Sadia Khan (Odd)
13-10-2023 FRIDAY	<b>DISSECTION/SGD</b>	<b>BIOCHEMISTRY (LGIS)</b>		<b>ANATOMY (LGIS)</b>		<b>BEHAVIOUR SCIENCES &amp; BIOETHICS</b>	
	Diaphragm	NormalpH regulation by buffers	Oxidative phosphorylation	Thoracic Radiology		Crises intervention and disasterConflict resolution and empathy	
14-10-2023 SATURDAY	<b>DISSECTION/SGD</b>	<b>PHYSIOLOGY (LGIS)</b>		<b>RESEARCH CLUB ACTIVITY</b>		<b>PHYSIOLOGY (LGIS)</b>	
	Vasculature of thoracic wall	Respiratory abnormalities	Nervous regulationof respiration	Poster Presentation		Nervous regulation of respiration	Respiratory abnormalities
		Dr. Faizania (Even)	Prof.Dr. Samia / Dr. Kamil (Odd)	Dr. Sidra Hamid (Even)	Dr Khaula (Odd)	Prof.Dr. Samia / Dr. Kamil (Even)	Dr. Faizania (Odd)
							SDL Physiology Lung volumes and capacities
							SDL Physiology Transport of Oxygen
							SDL Biochemistry Role of buffers (chemical and physiological)
							SDL Biochemistry pH meter and body buffers
							SDL Anatomy Movement of Thoracic Wall & Intercostal Spaces
							SDL AnatomyOf diaphragm

Topics For Practical With Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>• Trachea (Anatomy/ Histology-practical) venue Histology Laboratory</li> <li>• Buffers (Biochemistry practical) venue- Biochemistry Laboratory</li> <li>• Recording of normal and modified movement of respiration (Stethography) (Physiology –practical) Physiology Laboratory</li> </ul>						<ul style="list-style-type: none"> <li>• Biochemistry CBL-Acid based (Lecture Hall 03)</li> <li>• Physiology CBL Crib Death. (Lecture Hall 05)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	BiochemistrySGD	Batches	Roll No	AnatomyTeacher	Venue	
Monday	C	B	E	A	D	A	01-90	Dr. Quratulain Sharif	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	91-180	Dr. Ali Raza	New Lecture Hall Complex Lecture Theater # 04	
Wednesday	E	D	B	C	A	C	181- 270	Dr. Urooj	New Lecture Hall Complex Lecture Theater # 02	
Thursday	B	A	D	E	C	D	271 - onwards	Dr. Zanera Saqib	New Lecture Hall Complex Lecture Theater # 01	
Saturday	A	E	C	D	B					
2 <sup>nd</sup> week Practical by Dr. Quratulain Sharif										
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2.	Batch – B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar		3.	Batch – C	141-210	Dr. Shahrukh Khan	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room(Basement)		Dr. Fareedullah		4.	Batch – D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas(PGT Physiology)		5.	Batch - E	281- onwards	Dr. Faiza Zafar	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh ( PBL) Dr. Shazia Noreen (SGD)		Odd Roll Numbers		New Lecture Hall Complex Lecture Theater # 03		
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		Even Roll Number		New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						
Venues for Large Group Interactive Session (LGIS) and SDL										

## Timetable For Respiratory Module 16-10-2023 TO 21-10-2023 (Third Week)

DAY/ TIME	8:00AM-9:00AM	09:00AM-10:00AM	10:00AM-11:00AM	11:00AM-12:00 PM	12:00PM-12:20PM	12:20PM-02:00PM	Home Assignment ( 2 Hours)	
16-10-2023 MONDAY	<b>DISSECTION/SGD</b>	<b>PATHOLOGY</b>		<b>ANATOMY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		
	Innervation of Thoracic Wall	Clinical disorders of Respiration		Histology of Respiratorysystem IV	Development of Respiratorysystem (Diaphragm)	Hypoxia, hypercapnia, cyanosis	Chemical regulation of respiration & exercise changes	
		Dr. Sara(Even)	Dr. Aasia(Odd)	Assoc. Prof. Dr. Mohtashim(Even)	Prof. Dr. Ayesha (Odd)	Dr. Nayab (Even)	Prof.Dr. Samia / Dr. Kamil(Odd)	
17-10-2023 TUESDAY	<b>DISSECTION/CBL</b>		<b>PHYSIOLOGY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		Break	
	Pleura		Hypoxia, hypercapnia,cyanosis	Chemical regulation of respiration & exercise changes	Chemical regulation of respiration & exercise changes	Hypoxia, hypercapnia, cyanosis		Practical & CBLTopics & venue mentioned at theend
		Dr. Shmyla Hamid (Even)	Prof.Dr. Samia /Dr. Kamil(Odd)	Prof.Dr. Samia / Dr. Kamil(Even)	Dr. Nayab (Odd)	SDL Physiology Chemical regulation of respiration & exercise changes <span style="background-color: yellow;">Online SDLEvaluation</span>		
18-10-2023 WEDNESDAY	<b>DISSECTION/CBL</b>		<b>COMMUNITY MEDICINE</b>		<b>PHYSIOLOGY (LGIS)</b>			Practical & CBLTopics & venue mentioned at theend
	Lungs		Greenhouse effect		Miscellaneous factors affecting respiration (concept of voluntary control of respiration, lung J receptor, brain edema, anesthesia, chyne stokes breathing, sleep apnea)	Space physiology		
		Dr. Rizwana (Odd)	Dr. Asif (Even)	Dr. Kamil (Even)	Prof. Dr Samia / Dr. Fareed(Odd)			
19-10-2023 THURSDAY	<b>DISSECTION/SGD</b>	<b>DEEN CLUB ACTIVITY</b>			<b>PHYSIOLOGY (LGIS)</b>		Practical & CBLTopics & venue mentioned at theend	
	Lungs	Lecture on Character Building Activity of Counselling Cell			Space physiology	Miscellaneous factors affecting respiration (concept of voluntary control of respiration, lung J receptor, brain edema, anesthesia, chyne stokes breathing, sleep apnea)		SDL Biochemistry Xenobiotic <span style="background-color: yellow;">Online Clinical Evaluation</span>
				Prof. Dr Samia / Dr. Fareed(Even)	Dr. Kamil(Odd)			
20-10-2023 FRIDAY	<b>BIOCHEMISTRY (LGIS)</b>		<b>ENT (LGIS)</b>		<b>COMMUNITY MEDICINE</b>		<b>PHYSIOLOGY (LGIS)</b>	
	Pyridoxin Pant ethnic acid biotin &Ribo flavin	Xenobiotics	Foreign body nose & ear &Tonsillitis		Global warming and climate change		Deep sea physiology	High Altitude Physiology
	Dr. Almas (Even)	Dr. Uzma Zafar (Odd)	Dr. Sundus (Even)	Dr. Arshad (Odd)	Dr. Rizwana (Odd)	Dr. Asif (Even)	Prof. Dr. Samia /Dr. Nayyab (even)	Prof. Dr. Samia / Dr. Fareed (Odd)
21-10-2023 SATURDAY	<b>DISSECTION/SGD</b>		<b>BIOCHEMISTRY (LGIS)</b>		<b>PHYSIOLOGY (LGIS)</b>		Break	
	Radiology & Surface Marking		Xenobiotics	Pyridoxin&Pantot henic acidbiotin&Ribof lavin	High AltitudePhysiology	Deep sea physiology		Practical & CBLTopics & venue mentioned at theend
			Dr. Uzma Zafar(even)	Dr. Almas (Odd)	Prof. Dr. Samia /Dr. Fareed (even)	Prof. Dr. Samia /Dr. Nayyab (Odd)	SDL Anatomy Lungs	

Topics For Practical With Venue						Topics For Small Group Discussion & CBLs With Venue				
<ul style="list-style-type: none"> <li>Lungs (Anatomy/ Histology-practical) venue Histology Laboratory</li> <li>pH meter (Biochemistry practical) venue- Biochemistry Laboratory</li> <li>Clinical examination of chest for respiration (Physiology –practical) Physiology Laboratory</li> </ul>						<ul style="list-style-type: none"> <li>Biochemistry CBL – Vitamin biotin and pantothenic acid uncouplers (Lecture Hall 03)</li> <li>Physiology tutorial- physiology of unusual environmental (Lecture Hall 05)</li> </ul>				
Schedule For Practical / Small Group Discussion						Venue For First Year Batches For Anatomy Dissection / Small Group Discussion				
Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	BiochemistrySGD	Batches	Roll No	AnatomyTeacher	Venue	
Monday	C	B	E	A	D	A	01-90	Dr. Quratulain Sharif	Lecture Hall No.03 Anatomy Lecture Hall	
Tuesday	D	C	A	B	E	B	91-180	Dr. Ali Raza	New Lecture Hall Complex Lecture Theater # 04	
Wednesday	E	D	B	C	A	C	181- 270	Dr. Urooj	New Lecture Hall Complex Lecture Theater # 02	
Thursday	B	A	D	E	C	D	271 - onwards	Dr. Zanera Saqib	New Lecture Hall Complex Lecture Theater # 01	
Saturday	A	E	C	D	B					
3 <sup>rd</sup> week Practical by Dr. Kashif										
Venue For First Year Batches For PBL & SGD Team-I						Sr. No	Batch	Roll no	Names of Teachers	
Batches	Roll No	Venue							Biochemistry	Physiology
Batch-A1	(01-35)	New Lecture Hall Complex Lecture no.02		Dr. Sheena Tariq		1.	Batch – A	01-70	Dr. Almas Ijaz	Dr. Sheena Tariq
Batch-A2	(36-70)	New Lecture Hall Complex Lecture no.03		Dr. Uzma Kiani		2.	Batch – B	71-140	Dr. Rahat Afzal	Dr. Uzma Kiani
Batch-B1	(71-105)	Lecture Hall no.02(Basement)		Dr. Fahd Anwar		3.	Batch – C	141-210	Dr. Shahrukh Khan	Dr. Fahd Anwar
Batch-B2	(106-140)	Conference room(Basement)		Dr. Fareedullah		4.	Batch – D	211-280	Dr. Uzma Zafar	Dr. Maryam Abbas & Dr. Nayab Zonish
Batch-C1	(141-175)	Lecture Hall no.04(Basement)		Dr. Maryam Abbas (PGT Physiology)		5.	Batch - E	281- onwards	Dr. Faiza Zafar	Dr. Fareed
Batch-C2	(176-210)	Lecture Hall no.05(Basement)		Dr. Nayab (PGT Physiology)						
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)		Dr. Iqra Ayub (PGT Physiology)						
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)		Dr. Shahrukh ( PBL) Dr. Shazia Noreen (SGD)		Odd Roll Numbers		New Lecture Hall Complex Lecture Theater # 03		
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)		Dr. Izzah (PGT Physiology)		Even Roll Number		New Lecture Hall Complex Lecture Theater # 02		
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology		Dr. Uzma Zafar (PBL) Dr. Kamil Tahir (SGD)						
						Venues for Large Group Interactive Session (LGIS) and SDL				

**Timetable For Respiratory Module  
23-10-2023 TO 28-10-2023 (Fourth Week)**

DAY/ TIME	8:00AM-9:00AM
23-10-2023 MONDAY	Assessment Week
24-10-2023 TUESDAY	
25-10-2023 WEDNESDAY	
26-10-2023 THURSDAY	
27-10-2023 FRIDAY	
28-10-2023 SATURDAY	

## SECTION VI

**Table of Specification (TOS) For Respiratory Module Examination for First Year MBBS**

Sr. #	Discipline	No. of MCQs (%)	No. of MCQs according to cognitive domain			No. of SEQs (%)		No. of SEQs according to cognitive domain			Viva voce/OSPE	Total Marks
			C1	C2	C3	No. of items	Marks	C1	C2	C3		
1.	Anatomy	25	15	5	5	5	25	1	2	2	50	100
2.	Physiology	30	18	9	3	4	20	1	2	1	50	100
3.	Biochemistry	5	3	2	-	3	15	-	1	-	20	20
4.	Bioethics Professionalism	5										5
5.	Research, Artificial Intelligence & Innovation	10										6
6.	Behavioral Sciences	2										2
7.	Family Medicine	1										1
<b>Grand Total</b>											<b>234</b>	



## **Annexure-I**

**(Sample MCQ, SEQ & OSPE papers)**

**RAWALPINDI MEDICAL UNIVERSITY**  
**ANATOMY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs RESPIRATORY MODULE EXAM**

1. Radiographic examination of a patient with insufficient breathing movements reveals permanent elevation and paradoxical movement of one half of the diaphragm, most likely reason is
  - a. Irritation of diaphragm bilaterally
  - b. Unilateral damage of phrenic nerve
  - c. Injury to intercostal nerves on one side
  - d. Vagal stimulation
  - e. Damage to respiratory center
2. Lymphatics from the back of thoracic wall drains into
  - a. posterior intercostal nodes
  - b. internal mammary nodes
  - c. anterior intercostal nodes
  - d. pectoral nodes
  - e. subdiaphragmatic node
3. Type I Pneumocytes covering approximately 95% of the alveolar surface are
  - a. Source of surfactant
  - b. Squamous & Thin
  - c. Having microvilli at apical surface
  - d. Joined with neighboring cells by adhering junctions
  - e. Also called dust cells
4. A 60 years old man presented to OPD with edema of lower limbs, on investigations there is obstruction of the inferior vena cava, alternative pathway to return of blood to right atrium is provided by
  - a. Azygos vein
  - b. Inferior hemiazygos vein
  - c. Superior hemiazygos vein
  - d. Right subcostal vein
  - e. Internal thoracic vein
5. Non-ciliated dome shaped cells with apical ends bulging due to secretory granules; also involved in producing protein content of surfactants in the lining of bronchioles are
  - a. Type I pneumocytes
  - b. Type II pneumocytes
  - c. Clara cells
  - d. Brush cells
  - e. Goblet cells

**RAWALPINDI MEDICAL UNIVERSITY**  
**ANATOMY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS SEQs RESPIRATORY MODULE EXAM**

1. A person sustained multiple rib fractures in a road traffic accident. After this he developed flail chest.
  - a. What is the movement of chest wall in this condition? (1)
  - b. Explain pump handle movement of chest wall. (2)
  - c. Give contents of intercostal space. (2)
2. a. Give characteristic features of interior of right ventricle. (3)
  - b. What is a moderator band? (1)
  - c. Define sudden death syndrome. (1)
    - a. Discuss formation and partitioning of heart tube. (3)
    - b. Enlist different types of inter atrial septal defects. (2)
4. a. Discuss characteristic features of sinusoidal capillaries. (1)
  - b. Draw and label elastic artery. (2)
  - c. Give location and function of type II pneumocytes. (2)

**RAWALPINDI MEDICAL UNIVERSITY**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs RESPIRATORY MODULE EXAM**

1. When the radius of resistance vessels is increased there will be increase in:
  - a. Capillary blood flow
  - b. Diastolic blood pressure
  - c. Hematocrit
  - d. Systolic blood pressure
  - e. Viscosity of blood
  
2. Turbulence in a blood vessel is inversely proportional to the :
  - a. Viscosity of blood
  - b. Velocity of blood flow
  - c. Diameter of the vessel
  - d. Density of fluid inside the vessel
  - e. Reynolds' number
  
3. A physiologist while teaching the concept of Starling forces directs his students with the subsequent data to calculate the net force. Pressure in the capillary in muscle= 35 mm Hg at the arteriolar end, 14 mm Hg at the venular end. The interstitial pressure= 0 mm Hg. The colloid osmotic pressure is 25 mm Hg in capillary and 1 mm Hg in interstitium. The net force producing fluid movement across the capillary wall at its arteriolar end is:
  - a. 10mmHg filtration
  - b. 11mmHg filtration
  - c. 11mmHg reabsorption
  - d. 3mmHg filtration
  - e. 3mmHg reabsorption
  
4. In local control of blood flow the most significant regulatory mechanism is the :
  - a. Release of adrenal medullary catecholamines
  - b. Local concentration of metabolites
  - c. Local concentration of cellular nutrients
  - d. Sympathetic activation of blood vessels
  - e. Sympathetic inhibition of blood vessels
  
5. Neural control of circulation predominates over local control in the :
  - a. Brain
  - b. Heart
  - c. Kidney
  - d. Skeletal muscle
  - e. Skin

**RAWALPINDI MEDICAL UNIVERSITY**  
**PHYSIOLOGY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS SEQs RESPIRATORY MODULE EXAM**

- Q.1 Draw and label a normal electrocardiogram. Give the normal duration of PR interval, in which condition it is prolonged. (3,2)
- Q.2 Define cardiac output. Give its normal values in males and females. Enlist factors causing hypoeffective heart (2,3)
- Q3 A 50-year-old smoker progressively developed dyspnea and cough over a few months. After clinical examination and lung function tests he was diagnosed to be suffering from pulmonary emphysema.
- a. How ventilation perfusion ratio will be altered in this patient? (3)
  - b. Enumerate the muscles that elevate the chest cage during inspiration (2)
- Q.4 a. Define and give normal values:
1. Functional residual capacity (1.5)
  2. Vital capacity (1.5)
- b. What is the physiological significance of Functional residual capacity? (2)

**RAWALPINDI MEDICAL UNIVERSITY**  
**BIOCHEMISTRY DEPARTMENT**  
**1<sup>ST</sup> YEAR MBBS MCQs RESPIRATORY MODULE EXAM**

1. Buffer has maximum buffering capacity when
  - a. pH is acidic
  - b.  $\text{pH} < \text{pKa}$
  - a.  $\text{pH} = \text{pKa}$
  - c.  $\text{pH} > \text{pKa}$
  - d. pH is alkaline
2. NAD is the coenzyme in the following type of chemical reactions
  - a. Carboxylation
  - b. Phosphorylation
  - c. Decarboxylation
  - b. Oxidation – reduction
  - d. Transamination
3. The following complex of electron transport chain is inhibited by Antimycin A
  - a. Complex I
  - b. Complex II
  - c. Complex III
  - c. Complex IV
  - d. Complex V
4. Following complex of electron transport chain contains copper:
  - a. Complex I
  - b. Complex II
  - c. Complex III
  - d. Complex IV
  - d. Complex V

**SEQ**

Q. Explain Chemiosmotic hypothesis of ATP synthesis. 05

**RAWALPINDI MEDICAL UNIVERSITY**  
**1<sup>ST</sup> YEAR MBBS BIOETHICS MCQs EXAM**

1. ---Includes rules of conduct that may be used to regulate our activities concerning the biological world.
  - a. Bio-piracy
  - b. Biosafety
  - c. Bioethics
  - d. Bio-patents
  - e. Bio-logistic
2. The right of patients having self-decision is called.
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
3. Following is not code of ethics.
  - a. Integrity
  - b. Objectivity
  - c. Confidentiality
  - d. Behaviour
  - e. Autonomy
4. -----in the context of medical ethics, if it's fair and balanced
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity
5. -----Principle requiring that physicians provide, positive benefits
  - a. Justice
  - b. Autonomy
  - c. Beneficence
  - d. Veracity
  - e. Fidelity

**Rawalpindi Medical University**  
**Department of Anatomy**  
**Block-I OSPE 1<sup>st</sup> Year MBBS**

**For Candidate:**

**Station No. 1**

Time Allowed: 1 Min 30secs

Histology sketch copy will be assessed for

- a. Complete index (1)
- b. Complete and signed diagrams (1)
- c. 2 ID points mentioned with each diagram (1)

**Station No. 2**

For Candidate: Time Allowed: 1 Min 30secs

- a. Identify slide A (1)
- b. Identify slide B (1)
- c. What are common locations of slide A in human body (1)



**Rawalpindi Medical University**  
**Department of Physiology**  
**Block-I OSPE 1<sup>st</sup> Year MBBS**

**For Candidate:**

Time Allowed: 2 Minutes

- 1 A resident of internal medicine was examining a visibly dyspnoeic old man, he noted pulsations in the neck, he was confused about their nature. Enlist some maneuvers which will ascertain the nature of the pulsation. **(2.5)**
  
- 2 Give 03 sites for recording arterial pulse. **(0.5)**

**Rawalpindi Medical University  
Department of Biochemistry  
Block-I OSPE 1<sup>st</sup> Year MBBS**

**For Candidate:**

**Station No. 1**

Time Allowed: 2 Mins

**Observed Station**

Perform Iodine test. 03

**For Organizer:**

**Station No. 2**

**Observed Station**

Observe the slide under the microscope. Give one identifying feature. 03