



Musculoskeletal -II Module



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Document Approval

Prepared By	Reviewed By	Approved By
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 2024

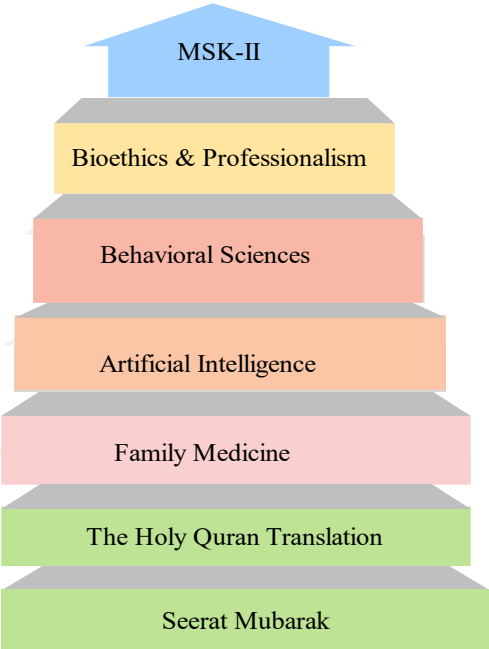
Study Guide

MSK-II Module

Integration of Disciplines in MSK-II Module



Spiral / General Education Cluster Courses



Discipline Wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
II	Anatomy	- Muscles - Skin	- Development of Axial Skeleton - Development of limbs - Development of muscles	General Histology - Muscles - Skin - Skin appendages	Gluteal Region to Lateral compartment of leg
	Biochemistry	Protein chemistry, Protein separation techniques, Collagen and Elastin			
	Physiology	- Sarcotubular system, excitation contraction coupling mechanism inskeletal muscle. - Molecular Mechanism of skeletal muscle contraction, Rigormortis, Muscular dystrophies - Introduction to muscle physiology, Structure of sarcomere - Energetics, efficiency and types of contraction, heat production in muscle - Physiologic anatomy, types and properties of Smooth Muscle - Mechanism of smooth muscle contraction & its control - Introduction to pericardium Properties of myocardium & endocardium,myocardial action potential - Regulation of myocardial activity - Comparison of 3 types of Muscle - Introduction to CVS - Excitatory & Conducting system of heart			
	Spiral Courses				
	Bioethics & Professionalism	- Introduction to Professional Ethics and PM&DC Code of Conduct - History of Medical Ethics			
	Behavioural Sciences	Communication Skills			
		Rights and Responsibilities of patients and doctors			
	Artificial Intelligence	Introduction to Atificial Intelligence			
	Family Medicine	Communication and consultation skills in Family Medicine Practice			
	The Holy Quran Translation	- Imaniat-I - Ibadat-II - Ibadat-III - Immaniat-II - Immaniat-III - Ibadat-IV			

	Seerat Mubarak	Importance of Hadees and Sunnah
	Vertical Integration	
	Fractures of Lower Limb (Orthopedics) x-rays of hipbone lower limb (Radiology)	
	Early Clinical Exposure (ECE)	
	Clinical Rotations	- Cases of myopathies/ muscular dystrophy - Polymyositis/Muscle atrophy - Muscle enzyme interpretation Medicine
		- Burns and Plastic Surgery - Management of superficial and deep burns Surgery
		- X-Ray of Hip Bone and Hip Joint - X ray of pelvis - X ray of long Bones Radiology

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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 Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Fahd Anwar (Demonstrator of Physiology)
2.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	2.	DME Focal Person	Dr. Farzana Fatima
3.	Director DME	Prof. Dr. Ifra Saeed	3.	Co-coordinator	Dr. Sajjad Hussain (Senior Demonstrator of Anatomy)
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Almas (Senior Demonstrator Biochemistry)
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Fareed Ullah Khan (Senior Demonstrator Physiology) & Clinical Co- Coordinator
6.	Focal Person Anatomy First Year MBBS	Asso. Prof. Dr. Mohtashim Hina			
7.	Focal Person Physiology	Dr. Sidra Hamid	DME Implementation Team		
8.	Focal Person Biochemistry	Dr. Aneela Jamil	1.	Director DME	Prof. Dr. Ifra Saeed
9.	Focal Person Pharmacology	Dr. Zunera Hakim	2.	Assistant Director DME	Dr. Farzana Fatima
10.	Focal Person Pathology	Dr. Asiya Niazi	3.	Implementation Incharge 1st & 2 nd Year MBBS	Prof. Dr. Ifra Saeed Dr. Farzana Fatima
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir	4.	Editor	Muhammad Arslan Aslam
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
13.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar			
14.	Focal Person Family Medicine	Dr. Sadia Khan			

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^{++} 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	Cognitive Domain: knowledge and mental skills.
	• C1	Remembering
	• C2	Understanding
	• C3	Applying
	• C4	Analyzing
	• C5	Evaluating
	• C6	Creating
2.	P	Psychomotor Domain: motor skills.
	• P1	Imitation
	• P2	Manipulation
	• P3	Precision
	• P4	Articulation
	• P5	Naturalization
3.	A	Affective Domain: 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.

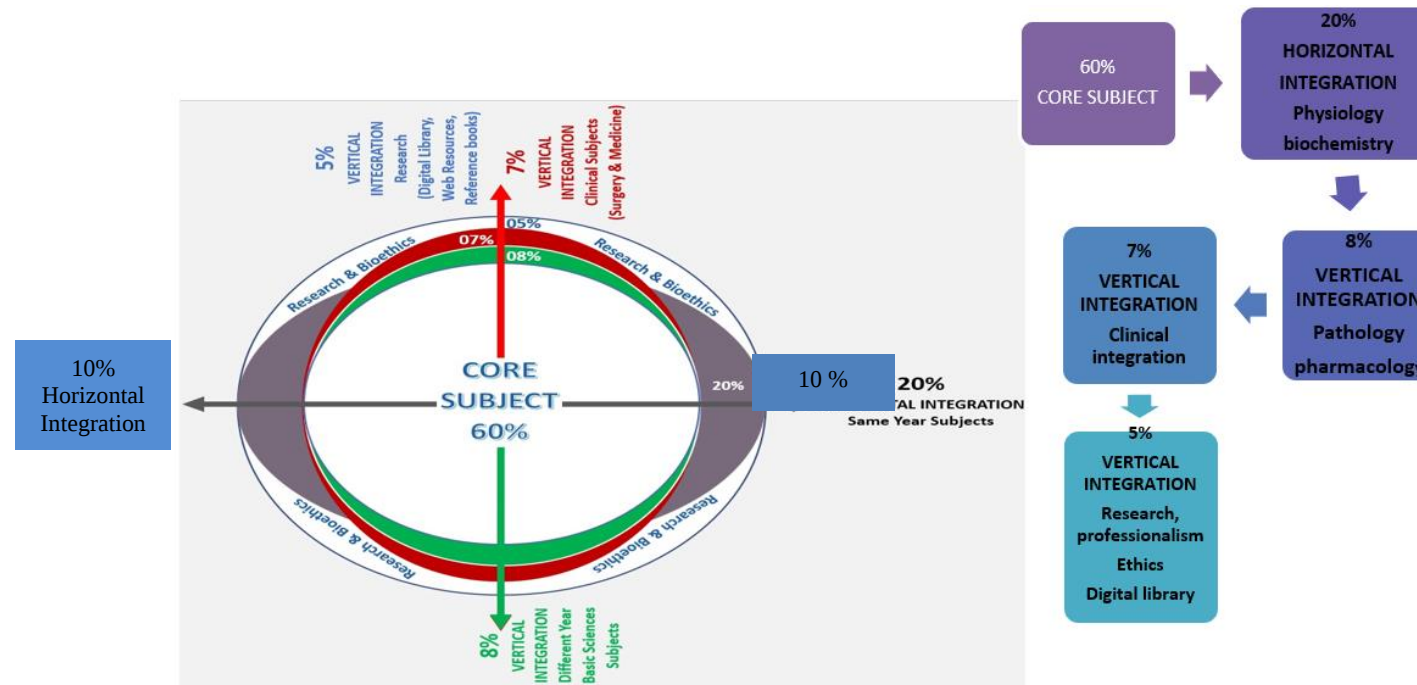


Figure 1. Prof Umar's Model of Integrated Lecture

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 (Masstricht Medical School)		
Step 7	Synthese & Report	Session - II
Step 6	Collect Information from outside	
Step 5	Generate learning Issues	Session - I
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 Mode

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)	- Classify muscles with examples according to i) Shape` ii) Histology iii) Development iv) Contraction - Describe the general features of skeletal muscle. - Differentiate between Red white and intermediate fibers. - Describe blood supply and nerve supply of skeletal muscles. - Correlate the clinical conditions - Understand the preventive and curative health care measures - Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	C1 C3 C3 C3 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA
Histology (Skeletal Muscle)	- Classify muscle on histological basis. - Describe histological structure of skeletal muscles - Discuss ultrastructure of skeletal muscles - Understand the contraction mechanisim - Correlate the clinical conditions - Understand the preventive and curative health care measures - Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	C1 C2 C2 C2 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA
General Anatomy (Muscle II)	- Discuss connective tissue associated with skeletal muscle. - Discuss parts of skeletal muscles. - Give classification of skeletal muscles. - Explain the actions of a prime mover or agonist Fixators - Synergist and antagonist with examples. - Correlate the clinical conditions - Understand the preventive and curative health care measures	C2 C2 C1 C2 C3 C3	LGIS	MCQ SAQ VIVA

	- Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	C3 C3 C3 C3		
Histology (Cardiac & Smooth Muscles)	- Describe histological structure of cardiac and smooth muscles - Describe ultrastructure of smooth and cardiac muscles. - Differentiate between skeletal smooth and cardiac muscles. - Discuss regeneration of muscle fibers - Correlate the clinical conditions - Understand the preventive and curative health care measures - Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	C2 C2 C2 C2 C3 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA
Histology (Skin)	- Enlist components of integumentary system - Describe histological structure of skin with special reference to cells residing in epidermis. - Describe histological features of thick and thin skin - Differentiate between thick and thin skin - Correlate the clinical conditions - Understand the preventive and curative health care measures - Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	C1 C2 C2 C2 C3 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA
Embryology (Development Of Axial Skeleton)	- Discuss the cartilagenous stage of vertebral column - Discuss the bony stage of vertebral column - Describe development of ribs and sternum. - Correlate the clinical conditions - Understand the preventive and curative health care measures - Practice the principles of Bioethics - Apply strategic use of AI in health care	C2 C2 C2 C3 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA

	• Read relevant research article	C3		
Histology (Skin Appendages)	• Describe appendages of skin • Discuss histological structure of hair • Discuss histological structure of nail • Discuss histological structure of glands of skin • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C2 C2 C2 C2 C3 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA
Embryology (Development of limbs)	• Enlist different stages of limb development • Discuss early and late stage of limb development • Correlate congenital anomalies of limb development • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C1 C2 C3 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA
Embryology (Development Of Muscles)	• Discuss development of skeletal muscle with special reference to myotomes, pharyngeal arch muscles and limb muscle along with limb skeleton. • Describe development of smooth and cardiac muscles with anomalies. • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C2 C2 C3 C3 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA

General Anatomy (Skin)	• Enlist functions of skin • Discuss types of skin • Compare between thick and thin skin • Classify skin lines • Describe the significance of skin lines • Discuss burns of skin • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C1 C2 C2 C1 C2 C3 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA
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Physiology Large Group Interactive Session (LGIS)

Topic	Learning Objectives At The End Of Lecture Students Should Be Able To:	Learning Domain	Assessment Tool	References	Learning Resources
Introduction to muscle physiology, Structure of Sarcomere	Explain the physiologic anatomy of skeletal muscle Draw and label the sarcomere	C2	MCQ SAQ VIVA	- Ganong's Review of Medical Physiology. 25TH Edition. Section 01, Excitable tissue: Muscle (Chapter 05, Page 99) - Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 34) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 411) - Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 79)	https://youtu.be/8iklTDlra5Q https://www.sciencedirect.com/science/article/abs/pii/S0197018687901070 https://teachmeanatomy.com/histology/tissue-structure/muscle-histology/skeletal-muscle/
Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle	Discuss the sliding filament model of muscle contraction. Describe the structure sarcotubular system and its importance in muscle contraction	C2 C2	MCQ SAQ VIVA	- Ganong's Review of Medical Physiology. 25TH Edition. Section 01, Excitable tissue: Muscle (Chapter 05, Page 103) - Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 36) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 413, 421) - Physiological Basis of Medical	https://www.sciencedirect.com/science/article/abs/pii/S0197018687901070 https://youtu.be/8iklTDlra5Q https://link.springer.com/article/10.1007/s12551-013-0135-x

				Practice by Best & Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 68) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 81) (Chapter 07, Page 93,97)	
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	C1 C2	MCQ SAQ VIVA	• Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 36) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 413,421) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, , (Chapter 04,page 70) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 82,88)	1. https://youtu.be/RTnKBt2sDf0 2. https://youtu.be/NvV2xTrShvg

Length tension curve, Load and velocity of contraction, diseases of muscle	Draw and describe Length duration curve Load and velocity of contraction	C2	MCQ SAQ VIVA	- Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 39) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 431, 435) - Physiological Basis of Medical Practice by Best & Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, , (Chapter 04, page 74) - Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 91)	https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=85&ContentID=P00792 https://www.sciencedirect.com/topics/engineering/length-tension-curve
Energetics, efficiency and types of contraction, heat production in muscle	Elaborate Energetic and efficiency of contraction. Discuss heat production in nerve and muscle	C3	MCQ SAQ VIVA	- Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 431) - Physiological Basis of Medical Practice by Best & Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, , (Chapter 04, page 77, 84) - Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 85, 87)	https://www.sciencedirect.com/topics/engineering/length-tension-curve https://youtu.be/3ntulKD4kvY

Properties of skeletal muscles, Tetanus & Fatigue	Discuss various properties of skeletal muscle in detail Tetanus and fatigue	C2	MCQ SAQ VIVA	- Ganong's Review of Medical Physiology.25TH Edition.Section 01,Excitable tissue:Muscle (Chapter 05, Page 110) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 422,424,428) - Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 74,86)	https://youtu.be/v5NmLaAQVo https://www.sciencedirect.com/science/article/abs/pii/S2387020622003485
Introduction to CVS	Introduction to Cardiovascular system. Classify blood vessels	C1	MCQ SAQ VIVA	- Ganong's Review of Medical Physiology.25TH Edition.Section 05,Cardioascular physiology (Chapter 29, Page 519) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Cardioascular physiology (Chapter 14,Page 469) - Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 02, Introduction to Cardiovascular system.(Chapter 05,page 101)	https://youtu.be/28CYhgjrBLA https://litfl.com/cardiovascular-physiology-overview/

Physiologic anatomy, types and properties of Smooth Muscle	Enlist type of smooth muscles and explain their characteristics Explain the properties of smooth muscle	C1 C2	MCQ SAQ VIVA	- Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 40) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 436) - Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Excitation and Contraction of Smooth muscle. Section 02. (Chapter 08, Page 101)	https://www.kenhub.com/en/library/anatomy/smooth-musculature https://youtu.be/qEVRoKuoJ4U
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	C1 C2 C1 C2	MCQ SAQ VIVA	- Physiology by Linda S. Costanzo 6th Edition. Cardiovascular Physiology (Chapter 14. Page 131) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 482) - Textbook of Medical Physiology by Guyton & Hall. 14th Edition. (Chapter 09, Page 114)	https://youtu.be/L2Gf9cj7jBw https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential
Mechanism of smooth muscle contraction & its control	Explain the chemical and physical basis of smooth muscle contraction	C2	MCQ SAQ VIVA	- Ganong's Review of Medical Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 42) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 439, 443) - Textbook of Medical Physiology by	https://www.kenhub.com/en/library/anatomy/smooth-musculature https://youtu.be/qEVRoKuoJ4U

				Guyton & Hall.14th Edition. Excitation and Contraction of Smooth muscle.Section 02. (Chapter 08, Page 103,105)	
Regulation of myocardial activity	Describe the regulation of pumping activity of heart	C1	MCQ SAQ VIVA	Textbook of Medical Physiology by Guyton & Hall.14th Edition. Excitation and Contraction of Smooth muscle.Section 02. (Chapter 09, Page 123)	https://pubmed.ncbi.nlm.nih.gov/1661829/ https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential
Comparison of 3 types of muscle	Discuss differences among three types of muscle in detail	C2	MCQ SAQ VIVA	Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 444)	https://training.seer.cancer.gov/anatomy/muscular/types.html https://youtu.be/eShBZ3-RxHA
Excitatory & Conducting system of heart	- Describe the conductive system of heart in detail - Enlist the various components of conductive system of heart - Describe the mechanism of production of action potential in SA node, AV node, ventricles.also describe its propogation	C1 C1 C1	MCQ SAQ VIVA	- Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 488) - Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 08,page 155,162) - Textbook of Medical Physiology by Guyton & Hall.14th Edition.Section 02. (Chapter 10, Page 127,133)	https://youtu.be/TnFoJ7Hhi-M https://teachmeanatomy.info/thorax/organs/heart/conducting-system/

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	- Describe amphoteric properties of amino acids - Discuss Post transitional amino acids and location of amino acids in proteins - Explain Important peptides	C2 C2 C2	LGIS	MCQs, SAQs & Viva
Proteins	- Discuss Importance of proteins - Classify proteins - Describe Functions of proteins	C1 C2 C2	LGIS	MCQs, SAQs & Viva
Primary structure of proteins	- Describe Primary structure of protein - Discuss Peptide bond	C2 C2	LGIS	MCQs, SAQs & Viva
Secondary structure of proteins	- Enlist Types of secondary structure. - Describe Secondary structure of proteins. - Elaborate Significance of secondary structure	C1 C2 C2	LGIS	MCQs, SAQs & Viva
Tertiary and quaternary structure	- Describe Tertiary and quaternary structure of proteins - Understand the forces stabilizing protein structure	C2 C2	LGIS	MCQs, SAQs & Viva
Protein folding And denaturation	- Discuss Folding of proteins - Describe protein misfolding - Interpret the clinical cases related to protein misfolding - Discuss denaturation of proteins	C2 C2 C3 C2	LGIS	MCQs, SAQs & Viva
Collagen and Elastin	- Describe structure of collagen and elastin - Discuss differences between collagen and elastin - Explain Synthesis of collagen	C2 C2 C2	LGIS	MCQs, SAQs &

	• Enlist Factor regulating and helping in strengthening of collagen • Interpret defects of collagen synthesis and elastin	C1 C3		Viva
Techniques for separation of proteins	• Describe Techniques for separation of proteins	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	• Demonstrate the anatomical position • Identify bony features of ilium. • Describe the muscular, ligamentous, and capsular attachments. • Discuss the ventral and dorsal auricular surfaces, ossification. • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	P C1 C2 C2 C3 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Hip Bone-II	• Demonstrate the anatomical position • Identify bony features of pubis and ischium. • Describe the muscular, ligamentous, and capsular attachments. • Discuss the ventral and dorsal auricular surfaces, ossification. • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	P C1 C2 C2 C3 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Femur	• Demonstrate the anatomical position of bone • Demonstrate different parts • Describe proximal and distal articulations • State angle of femoral torsion. • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care	P C1 C2 C1 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE

	Read relevant research article	C3 C3		
Femur and Patella	- Demonstrate the anatomical position of bones - Describe muscle attachment and ossification - Discuss fractures with special reference to the fracture of neck of femur in old age. - Describe anatomy of patella and factors responsible for its stability. - Enumerate different bursae related to patella - Correlate the clinical conditions - Understand the preventive and curative health care measures - Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	P C2 C2 C2 C1 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Anterolateral Compartment of Thigh (Muscles)	- Describe the origin and insertion of muscles in anterior compartment of thigh. - Describe the origin and insertion of muscles in lateral compartment of thigh. - Discuss the femoral triangle and adductor canal with contents - Identify these muscles. - Correlate the clinical conditions - Understand the preventive and curative health care measures - Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	C2 C2 C2 C1 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Anterolateral compartment of thigh (Neurovascular organization)	- Describe the nerves and vessels of anterolateral compartment of thigh - Discuss various relation of vessels and nerves in anterolateral compartment of thigh - Identify these structures - Map the outline of femoral artery in a simulated patient / model	C2 C2 C1 P	Skill Lab	MCQ SEQ VIVA OSPE

	• Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C3 C3 C3 C3 C3		
Medial Compartment of thigh	• Describe the muscles of medial compartment of thigh • Discuss origin, insertion and nerve supply of medial compartment of thigh • Describe the course relations and branches of obturator nerve. • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C2 C2 C2 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Gluteal Region (Muscles)	• Tabulate the he various muscles of gluteal region with origin, insertion, action nerve supply. • Enlist various structures undercover of gluteal maximus i.e. muscles, vessels, nerves, bones and joints, ligaments, bursae. • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C2 C1 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Gluteal Region (Neurovascular organization)	• Describe trochanteric anastomosis and cruciate anastomosis. • Enumerate the structures passing through greater sciatic foraman. • Discuss the formation course relations, branches, distribution of sciatic nerve with applied anatomy.. • Correlate the clinical conditions • Understand the preventive and curative health care measures	C2 C1 C2	Skill Lab	MCQ SEQ VIVA OSPE

	- Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	C3 C3 C3 C3		
Posterior Compartment of Thigh (Muscles)	- Enlist the Hamstring muscles - Discuss origin insertion, nerve supply and actions - Identify the muscles - Correlate the clinical conditions - Understand the preventive and curative health care measures - Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	C1 C2 C1 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Posterior Compartment of thigh (Neurovascular Organization)	- Describe the nerves and vessels of posterior compartment of thigh - Discuss course, relations, distribution and branches of neurovascular structures of posterior compartment - Identify these structures - Correlate the clinical conditions - Understand the preventive and curative health care measures - Practice the principles of Bioethics - Apply strategic use of AI in health care - Read relevant research article	C2 C2 C1 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Hip Joint	- Describe the type of joint - Describe articular surfaces, - Describe capsular attachments. - Discuss synovial membrane and its folding. - Enlist ligaments and their attachments - Discuss movements possible at hip joint and muscles producing them - Describe blood supply and nerve supply.	C2 C2 C2 C2 C1 C2 C2	Skill Lab	MCQ SEQ VIVA OSPE

	• Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C3 C3 C3 C3 C3		
Tibia	• Identify bone • Demonstrate its side. • Demonstrate its normal anatomical position. • Describe bony features. • Discuss attachment of muscle and ligament • Describe articular surfaces • Identify nutrient foramen • Describe its ossification • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C1 P P C2 C2 C2 C1 C2 C3 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Fibula	• Identify bone • Demonstrate its side. • Demonstrate its normal anatomical position. • Describe bony features. • Discuss attachment of muscles and ligaments • Describe articular surfaces • Identify nutrient foramen • Describe its ossification • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C1 P P C2 C2 C2 C1 C2 C3 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Popliteal Fossa	• Identify surface landmarks • Enlist contents	C1 C1		MCQ

	• Discuss boundaries, roof and floor • Map the outline of popliteal artery in a simulated patient / model • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C2 P C3 C3 C3 C3 C3	Skill Lab	SEQ VIVA OSPE
Knee Joint	• State type of joint • Describe its articular surfaces • Demonstrate capsular attachments, • Enlist extra capsular and intracapsular ligaments and their attachments • Demonstrate the movements possible at knee joint and muscles producing them. • Describe the concept of locking and unlocking of knee joint • Describe blood supply and nerve supply of joint • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C1 C2 P C1 P C2 C2 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Anterior Compartment of Leg (Muscles and Neurovascular Organization)	• Demonstrate surface landmarks • Discuss superficial fascia & deep fascia, their contents including retinacula • Describe Origin, insertion, nerve supply and action of all muscles of anterior compartment of leg • Identify different structures in compartment • Correlate the clinical conditions • Understand the preventive and curative health care measures • Practice the principles of Bioethics • Apply strategic use of AI in health care	P C2 C2 C1 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE

	• Read relevant research article	C3 C3		
Radiology / Cross Sectional Anatomy	• Demonstrate major landmarks of thigh and anterior compartment of leg on radiographs • Identify the structures present at different levels of cross sections Upper 3rd of thigh Mid shaft of femur Lower 3rd of thigh Upper part of patella Distal part of patella Through tibial condyles • Correlate the clinical conditions	P C2 C3	Skill Lab	MCQ SEQ VIVA OSPE

Physiology Small Group Discussion (SGDs)

Topic	Learning Objectives Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tools
Sliding filaments of skeletal muscle, sarcotubular system	• Discuss the sliding filament model of muscle contraction.	C2	SGD	MCQ SAQ VIVA
	• Describe the structure sarcotubular system and its importance in muscle contraction	C1		
Physiology of smooth muscle, mechanism of smooth muscle contraction	• Enlist type of smooth muscles and explain their characteristics	C1	SGD	MCQ SAQ VIVA
	• Discuss the properties of smooth muscle	C2		
Properties of myocardium, myocardial action potential, Excitatory and conduction system of heart	• Describe the physiologic anatomy of myocardium Discuss properties of myocardium.	C1	LGIS	MCQ SAQ VIVA
	• Discuss in detail various properties of myocardium Describe the mechanism of production of action potential and its propagation.	C2		
	• Describe excitation contraction coupling in detail	C1		
	• Discuss propagation of electrical activity in cardiac muscle	C2		
Comparison of three types of muscle	• Discuss three types of muscles	C2	LGIS	MCQ SAQ VIVA
	• Discuss differences among three types of muscle in detail	C2		

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	• Explain primary, secondary, tertiary and quaternary structures of proteins	C2	SGD	MCQs & SAQs
Collagen	• Discuss structure of collagen • Describe synthesis of collagen • Interpret related clinical disorders	C2 C2 C3	SGD	MCQs & SAQs

Anatomy Self Directed Learning (SDL)

Topics Of SDL	Learning Objective	References
Hip Bone	• Demonstrate the anatomical position • Identify bony features of ilium. • Describe the muscular, ligamentous, and capsular attachments. • Discuss the ventral and dorsal auricular surfaces, ossification. • Demonstrate the anatomical position • Identify bony features of pubis and ischium. • Describe the muscular, ligamentous, and capsular attachments. • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510-516,526,328,329). https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/referenceworkentry/10.1007/978-3-030-43240-9_2
Femur	• Demonstrate the anatomical position of bone • Demonstrate different parts • Describe proximal and distal articulations • State angle of femoral torsion. • Demonstrate the anatomical position of bone • Describe muscle attachment and ossification • Discuss fractures with special reference to the fracture of neck of femur in old age. • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 20,435,510,516-518,527,659-660). https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/chapter/10.1007/978-981-13-8468-4_10
Anterolateral Compartment Of Thigh	• Describe the origin and insertion of muscles in anteriolateral compartment of thigh. • Describe the nerves and vessels of anterolateral compartment of thigh • Discuss the femoral triangle and adductor canal with contents • Identify these muscles. • Correlate the clinical aspects • Read relevant research article	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510, 545-548,557-558). https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/article/10.1186/s10195-023-00691-w

	• Use digital library	
Medial Compartment Of Thigh	• Describe the muscles of medial compartment of thigh • Discuss origin, insertion and nerve supply of medial compartment of thigh • Describe the course relations and branches of obturator nerve. • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 548-551). https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/article/10.1186/s10195-023-00691-w
Gluteal Region	• Tabulate the he various muscles of gluteal region with origin, insertion, action nerve supply. • List various structures undercover of gluteal maximus i.e. muscles, vessels, nerves, bones and joints, ligaments, bursae. • Describe trochanteric anastomosis and cruciate anastomosis. • Enumerate the structures passing through greater sciatic foraman. • Discuss the formation course relations, branches, distribution of sciatic nerve with applied anatomy.. • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510, 562-563,575-583). https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/chapter/10.1007/978-3-030-11033-8_5
Posterior Compartment Of Thigh	• Tabulate the Hamstring muscles • Discuss origin insertion, nerve supply and action • Describe the nerves and vessels of posterior compartment of thigh • Discuss course relations distribution and branches of neurovascular structures of posterior compartment • Identify these structures • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 569-572). https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/article/10.1186/s10195-023-00691-w
Hip Joint	• Describe the type of joint • Describe articular surfaces, • Describe capsular attachments.	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510-626,629-632,660-661). https://www.youtube.com/watch?v=AeuLBN5ouwo

	• Discuss synovial membrane and its folding. • Enlist ligaments and their attachments • Discuss movements possible at hip joint and muscles producing them • Describe blood supply and nerve supply. • Correlate the clinical aspects • Read relevant research article • Use digital library	https://link.springer.com/referenceworkentry/10.1007/978-3-030-43240-9_2
Tibia	• Identify bone • Demonstrate its side. • Demonstrate its normal anatomical position. • Describe bony features. • Discuss attachment of muscle and ligament • Describe articular surfaces • Identify nutrient foramen • Describe its ossification • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 19, 510,520-521,604). https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/chapter/10.1007/978-3-030-93685-3_14 https://link.springer.com/chapter/10.1007/978-3-319-78387-1_69
Fibula	• Identify bone • Demonstrate its side. • Demonstrate its normal anatomical position. • Describe bony features. • Discuss attachment of muscleS and ligamentS • Describe articular surfaces • Identify nutrient foramen • Describe its ossification • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 20,510,513,521,528,687,790). https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/chapter/10.1007/978-3-030-93685-3_14 https://link.springer.com/chapter/10.1007/978-3-319-78387-1_69

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 system and its importance in muscle contraction	- Ganong's Review of Medical Physiology. 25TH Edition. Section 01, Excitable tissue: Muscle (Chapter 05, Page 103) - Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 36) - Human Physiology by Dee Unglaub Silverthorn. 8TH Edition. Muscle (Chapter 12, Page 413, 421) - Physiological Basis of Medical Practice by Best & Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04, page 68) ❖ Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 81) (Chapter 07, Page 93, 97)	https://www.sciencedirect.com/science/article/abs/pii/S0197018687901070 https://youtu.be/8iklTDlra5Q https://link.springer.com/article/10.1007/s12551-013-0135-x
Molecular Mechanism of skeletal muscle contraction, Rigor	Define motor unit Discuss recruitment and its effect on force of contraction	- Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 36) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 413, 421) - Physiological Basis of Medical Practice by Best & Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04, page 68) - Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 81) (Chapter 07, Page 93, 97)	https://youtu.be/RTnKBt2sDf0 https://youtu.be/NvV2xTrShvg

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	- Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 36) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 413, 421) - Physiological Basis of Medical Practice by Best & Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, , (Chapter 04, page 70) - Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 82, 88)	https://youtu.be/RTnKBt2sDf0 https://youtu.be/NvV2xTrShvg
Length tension curve, Load and velocity of contraction, diseases of muscle	Draw and describe Length duration curve Load and velocity of contraction	- Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 39) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 431, 435) - Physiological Basis of Medical Practice by Best & Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, , (Chapter 04, page 74) - Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 91)	https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=85&ContentID=P00792 https://www.sciencedirect.com/topics/engineering/length-tension-curve
Energetics, efficiency and types of contraction, heat production in muscle	Elaborate Energetic and efficiency of contraction. Discuss heat production in nerve and muscle	- Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 431) - Physiological Basis of Medical Practice by Best & Taylor's. 13th Edition. Section 01, Excitation and Contraction of Skeletal muscle, , (Chapter 04, page 77, 84) - Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 85, 87)	https://www.sciencedirect.com/topics/engineering/length-tension-curve https://youtu.be/3ntulKD4kvY

Properties of skeletal muscles, Tetanus & Fatigue	Discuss various properties of skeletal muscle in detail Tetanus and fatigue	• Ganong's Review of Medical Physiology.25TH Edition.Section 01,Excitable tissue:Muscle (Chapter 05, Page 110) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 422,424,428) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 74,86)	• https://youtu.be/v5Nm_LaAQVo • https://www.sciencedirect.com/science/article/abs/pii/S2387020622003485
Introduction to CVS	Introduction to Cardiovascular system. Classify blood vessels	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,Cardiovascular physiology (Chapter 29, Page 519) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Cardiovascular physiology (Chapter 14,Page 469) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 02, Introduction to Cardiovascular system.(Chapter 05,page 101)	• https://youtu.be/28CYhgjrBLA • https://litfl.com/cardiovascular-physiology-overview/
Physiologic anatomy, types and properties of Smooth Muscle	Enlist type of smooth muscles and explain their characteristics Explain the properties of smooth muscle	• Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 40) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 436) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.Excitation and Contraction of Smooth muscle.Section 02. (Chapter 08, Page 101)	• https://www.kenhub.com/en/library/anatomy/smooth-musculature • https://youtu.be/qEVRoKuoJ4U
Introduction to pericardium Properties of myocardium & endocardium, myocardial action	Describe the physiologic anatomy of myocardium Discuss properties of myocardium Discuss in detail various properties of myocardium	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 14. Page 131) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 482)	• https://youtu.be/L2Gf9cj7jBw • https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential

potential	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	Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 09, Page 114)	
Mechanism of smooth muscle contraction & its control	Explain the chemical and physical basis of smooth muscle contraction	- Ganong's Review of Medical Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter 1. Page 42) - Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 439, 443) - Textbook of Medical Physiology by Guyton & Hall.14th Edition. Excitation and Contraction of Smooth muscle. Section 02. (Chapter 08, Page 103, 105)	https://www.kenhub.com/en/library/anatomy/smooth-musculature https://youtu.be/qEVRoKuoJ4U
Regulation of myocardial activity	Describe the regulation of pumping activity of heart	Textbook of Medical Physiology by Guyton & Hall.14th Edition. Excitation and Contraction of Smooth muscle. Section 02. (Chapter 09, Page 123)	https://pubmed.ncbi.nlm.nih.gov/1661829/ https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential
Comparison of 3 types of muscle	Discuss differences among three types of muscle in detail	Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 444)	https://training.seer.cancer.gov/anatomy/muscular/types.html https://youtu.be/eShBZ3-RxHA
Excitatory & Conducting system of heart	- Describe the conductive system of heart in detail - Enlist the various components of conductive system of heart - Describe the mechanism of production of action potential in SA node, AV node, ventricles. also describe its propagation	- Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Muscle (Chapter 12, Page 488) - Physiological Basis of Medical Practice by Best & Taylor's. 13th Edition. (Chapter 08, page 155, 162) - Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 02. (Chapter 10, Page 127, 133)	https://youtu.be/TnFoJ7Hhi-M https://teachmeanatomy.info/thorax/organs/heart/conducting-system/

Biochemistry Self Directed Learning (SDL)

Topic	Learning Objectives At the end of lecture students should be able to	References
Protein chemistry		
Properties of amino acids& Important peptides	- Describe amphoteric properties of amino acids - Discuss Post transitional amino acids and location of amino acids in proteins - Explain Important peptides	Textbook of Mushtaq 8th Eidtion Chapter No. 4 pg 97
Proteins	- Discuss Importance of proteins - Classify proteins - Describe Functions of proteins	Textbook of Mushtaq 8th Eidtion Chapter No. 4 pg 97, 98
Primary structure of proteins	- Describe Primary structure of protein - Discuss Peptide bond	Textbook of Lippincott 8th Eidtion Chapter No. 2 pg 14
Secondary structure of proteins	- Enlist Types of secondary structure. - Describe Secondary structure of proteins. - Elaborate Significance of secondary structure	Textbook of Lippincott 8th Eidtion Chapter No. 2 pg 16
Tertiary and quaternary structure	- Describe Tertiary and quaternary structure of proteins - Understand the forces stabilizing protein structure	Textbook of Lippincott 8th Eidtion Chapter No. 2 pg 19
Protein folding And denaturation	- Discuss Folding of proteins - Describe protein misfolding - Interpret the clinical cases related to protein misfolding - Discuss denaturation of proteins	Textbook of Lippincott 8th Eidtion Chapter No. 2 pg 20, 21
Collagen and Elastin	- Describe structure of collagen and elastin - Discuss differences between collagen and elastin - Explain Synthesis of collagen - Enlist Factor regulating and helping in strengthening of collagen - Interpret defects of collagen synthesis and elastin	Textbook of Lippincott 8th Eidtion Chapter No. 4 pg 45,97
Techniques for separation of proteins	Describe Techniques for separation of proteins	Textbook of Mushtaq 8th Eidtion Chapter No. 4 pg 104

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	- Identify muscle under microscope - Illustrate microscopic structure of muscle - Write two points of identification - Focus the slide	P C2 C1 P	Skill Lab	OSPE
Cardiac muscle Smooth muscle	- Identify muscles under microscope - Illustrate microscopic structure of muscles - Write two points of identification - Focus the slide	P C2 C1 P	Skill Lab	OSPE
Thick skin	- Identify thick skin under microscope - Illustrate microscopic structure of thick skin - Write two points of identification - Focus the slide	P C2 C1 P	Skill Lab	OSPE
Thin skin	- Identify thin skin under microscope - Illustrate microscopic structure of thin skin - Write two points of identification - Focus the slide	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:	Learning Domain	Teaching Strategy	Assessment Tools	References
Determination of RBC count	Apparatus identification	P	Skill Lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	Principle	C1			
	Procedure	C1			
	Recall composition of Diluents	C1			
	Comprehend				
	Calculation on hemocytometer	C3			
Determination of TLC	Recall Normal values	C1	Skill Lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	Apparatus identification	P			
	Principle	C1			
	Procedure	C1			
	Recall composition of Diluents	C1			

	- Comprehend Calculation on hemocytometer - Recall Normal values	C2 C1			
Determination of Platelet Count	- Apparatus identification - Principle	P C1	Skill Lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	Procedure	C1			
	Recall composition of Diluents	C1			
	Comprehend, Calculation on hemocytometer	C2			
	Recall Normal values	C1			
Determination of ABO, Blood groups	- Principle - Procedure - Methods - Types of blood groups - Clinical Correlations of blood transfusion	C1 C1 C1 C2 C3	Skill Lab	OSPE	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**
- **PBLs**
- **Vertical Integration LGIS**

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
X rays of Hip Bone	• Interpret normal x-rays of Hip bone & Lower Limb	C2	LGIS	MCQs
	• Discuss features of different Fractures of Hip Bone & Lower Limb	C2		

Orthopedics

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Fractures of Lower Limb	• Understand the anatomical and biomechanical principles underlying fractures of the lower limb.	C2	LGIS	MCQs
	• Identify and classify fractures of the lower limb through clinical assessment and radiographic interpretation			

List of MSK-II Module Vertical Courses Lectures

Sr. #	Date/Day	Week	Department	Time	Topic Of Lectures	Teachers Name & Contact #
1.	Thursday 30-05-2024	1 st	Radiology	10:20 AM – 11:20 AM	X rays of Hip Bone	
2.	Tuesday 25-06-2024	5 th	Orthopedics	10:30 AM – 11:20 AM	Fractures of Lower Limb	

SECTION – IV

Spiral Courses

Content

- **Longitudinal Themes**
 - **The Holy Quran Translation**
 - **Seerat Mubarak**
 - **Biomedical Ethics & Professionalism**
 - **Family Medicine**
 - **Artificial Intelligence (Innovation)**
 - **Early Clinical Exposure (ECE)**

Introduction to Spiral Courses

The Holy Quran Translation

A course of Islamic Studies provides students with a comprehensive overview of the fundamental aspects of Islam, its history, beliefs, practices, and influence on society and familiarize students with a solid foundation in understanding the religion of Islam from an academic and cultural perspective. Ethics, in integrated form will shape the core of the course to foster among students the universal ethical values promoted by Islam.

Bioethics

Biomedical ethics, also known as bioethics, is a field of study that addresses the ethical, social, and legal issues arising from medicine and the life sciences. It applies moral principles and decision-making frameworks to the practice of clinical medicine, biomedical research, and health policy. Biomedical ethics seeks to navigate the complex ethical dilemmas posed by advances in medical technology, research methodologies, and healthcare practices. Key areas of focus include patient rights and autonomy, confidentiality, informed consent, end-of-life care, resource allocation, and the ethics of genetic engineering, among others.

Biomedical ethics within medical universities plays a pivotal role in shaping the moral framework through which future healthcare professionals navigate the complex and often challenging decisions they will face in their careers. This critical discipline integrates ethical theories and principles with clinical practice, research, and healthcare policy, fostering a deep understanding of the ethical dimensions of medicine. By embedding biomedical ethics into the curriculum, Rawalpindi medical university equips students with the tools to critically analyze and address ethical dilemmas, ranging from patient confidentiality and informed consent to end-of-life care and the equitable distribution of healthcare resources.

This education goes beyond theoretical knowledge, encouraging students to apply ethical reasoning in practical scenarios, thus preparing them for the moral complexities of the medical field. Biomedical ethics also promotes a culture of empathy, respect, and integrity, ensuring that future medical practitioners not only excel in their technical skills but also uphold the highest ethical standards in patient care and research. Through seminars, case studies, and interdisciplinary collaborations, students are encouraged to engage in ethical discourse, reflecting on the societal impact of medical advancements and the responsibility of medical professionals to society. This foundational aspect of medical education cultivates a generation of healthcare professionals committed to ethical excellence, patient advocacy, and the pursuit of equitable healthcare for all.

Professionalism

Professionalism in medicine refers to the set of values, behaviors, and relationships that underpin the trust the public has in doctors and other healthcare professionals. It encompasses a commitment to competence, integrity, ethical conduct, accountability, and putting the interests of patients above one's own. Professionalism involves adhering to high standards of practice, including maintaining patient confidentiality, communicating effectively and respectfully with patients and colleagues, and continually engaging in self-improvement and professional development. It also includes a responsibility to improve access to high-quality healthcare and to contribute to the welfare of the community and the betterment of public health. In essence, professionalism in medicine is foundational to the quality of care provided to patients and is critical for maintaining the trust that is essential for the doctor-patient relationship.

Rawalpindi Medical University emphasizes the importance of professionalism in medicine, integrating it throughout its curriculum to ensure that students embody the core values of respect, accountability, and compassion in their interactions with patients, colleagues, and the community. This focus on professionalism is designed to prepare students for the complexities of the healthcare environment, instilling in them a deep sense of responsibility to their patients, adherence to ethical principles, and a commitment to continuous learning and improvement. Through a combination of theoretical learning, practical training, and mentorship, RMU encourages its students to exemplify professionalism in every aspect of their medical practice. Workshops, seminars, and clinical rotations further reinforce these values, providing students with real-world experiences that highlight the importance of maintaining professional conduct in challenging situations. RMU's approach to professionalism not only shapes competent and ethical medical professionals but also contributes to the broader mission of improving healthcare standards and patient outcomes. By prioritizing professionalism, Rawalpindi Medical University plays a crucial role in advancing the medical profession and ensuring that its graduates are well-equipped to meet the demands of a rapidly evolving healthcare landscape with honor and integrity.

Communication Skills

Communication skill for health professionals involves the ability to effectively convey and receive information, thoughts, and feelings with patients, their families, and other healthcare professionals. It encompasses a range of competencies including active listening, clear and compassionate verbal and non-verbal expression, empathy, the ability to explain medical conditions and treatments in an understandable way, and the skill to negotiate and resolve conflicts. Effective communication is essential for establishing trust, ensuring patient understanding and compliance with treatment plans, making informed decisions, and providing holistic care. It directly impacts patient satisfaction, health outcomes, and the overall efficiency of healthcare delivery.

At Rawalpindi Medical University (RMU), the development of communication skills is regarded as a fundamental aspect of medical education, recognizing its critical importance in enhancing patient care, teamwork, and interdisciplinary collaboration. RMU is dedicated to equipping its students with exceptional communication abilities, enabling them to effectively interact with patients, their families, and healthcare colleagues. The curriculum is thoughtfully designed to incorporate various interactive and experiential learning opportunities, such as role-playing, patient interviews, and group discussions, which allow students to practice and refine their communication skills in a supportive environment.

By integrating communication skills training throughout its programs, RMU not only enhances the interpersonal competencies of its future healthcare professionals but also contributes to improving the overall quality of healthcare delivery. Graduates from RMU are distinguished not just by their clinical expertise but also by their ability to connect with patients and colleagues, making them highly effective and compassionate practitioners.

Behavioral Sciences

Behavioral sciences in medicine focus on understanding and addressing the psychological and social aspects of health and illness. This interdisciplinary field combines insights from psychology, sociology, anthropology, and other disciplines to enhance medical care and patient outcomes. It explores how behavior, emotions, and social factors influence health, disease, and medical treatment. By incorporating behavioral science principles into medical practice, healthcare professionals can better understand patients' perspectives, improve communication, and promote positive health behaviors, ultimately contributing to more comprehensive and effective patient care.

Family Medicine

Family medicine is a medical specialty dedicated to providing comprehensive health care for people of all ages and genders. It is characterized by a long-term, patient-centered approach, building sustained relationships with patients and offering continuous care across all stages of life. It focuses on treating the whole person within the context of the family and the community, emphasizing preventive care, disease management, and health promotion.

The Family Medicine Curriculum at Rawalpindi Medical University (RMU) marks a significant stride towards holistic healthcare education, aiming to prepare medical graduates for the comprehensive and evolving needs of family practice. This curriculum is designed to offer a broad perspective on healthcare, focusing on preventive care, chronic disease management, community health, and the treatment of acute conditions across all ages, genders, and diseases. Emphasizing a patient-centered approach, the curriculum ensures that students develop a deep understanding of the importance of continuity of care, patient advocacy, and the ability to work within diverse community settings.

RMU's Family Medicine Curriculum integrates theoretical knowledge with practical experience. Students are exposed to a variety of learning environments, including community health centers, outpatient clinics, and inpatient settings, providing them with a well-rounded understanding of the different facets of family medicine. This hands-on approach is complemented by interactive sessions, workshops, and seminars that cover a wide range of topics from behavioral health to geriatric care, ensuring students are well-equipped to address the comprehensive health needs of individuals and families.

Artificial Intelligence

To realize the dreams and impact of AI requires autonomous systems that learn to make good decisions. Reinforcement learning is one powerful paradigm for doing so, and it is relevant to an enormous range of tasks, including robotics, game playing, consumer modeling and healthcare. This class will provide a solid introduction to the field of reinforcement learning and students will learn about the core challenges and approaches, including generalization and exploration. Through a combination of lectures, and written and coding assignments, students will become well versed in key ideas and techniques for RL. Assignments will include the basics of reinforcement learning as well as deep reinforcement learning — an extremely promising new area that combines deep learning techniques with reinforcement learning. In addition, students will advance their understanding and the field of RL through a final project.

Integrated Undergraduate Research Curriculum

The integrated undergraduate research curriculum (IUGRC) of RMU occupies a definite space in schedule of each of the five years in rational and incremental way. It has horizontal harmonization as well as multidisciplinary research work potentials. In the first-year teachings are more introductory & inspirational rather than instructional. The teachings explain what & why of research and what capacities are minimally required to comprehend research & undertake research. Some research dignitaries' lecture are specifically arranged for sharing their experiences and inspiring the students. Students are specifically assessed through their individual compulsory written feedback (reflection) after the scheduled teachings end.

Entrepreneurship

Entrepreneurship is the process of designing, launching, and running a new business, which typically starts as a small enterprise offering a product, process, or service for sale or hire. It involves identifying a market opportunity, gathering resources, developing a business plan, and managing the business's operations, growth, and development.

Entrepreneurship in medical universities represents a burgeoning field where the innovative spirit intersects with healthcare to forge advancements that can transform patient care, medical education, and healthcare delivery. This unique amalgamation of medical expertise and entrepreneurial acumen empowers students, faculty, and alumni to develop groundbreaking medical technologies, healthcare solutions, and startups that address critical challenges in the health sector. By integrating entrepreneurship into the curriculum, Rawalpindi Medical university is not only expanding the traditional scope of medical education but also fostering a culture of innovation and problem-solving. This enables future healthcare professionals to not only excel in clinical skills but also in business strategies, leadership, and innovation management.

Such initiatives often lead to the creation of medical devices, digital health platforms, and therapeutic solutions that can significantly improve patient outcomes and make healthcare more accessible and efficient. Through incubators, accelerators, and partnerships with the industry, medical universities are becoming hotbeds for healthcare innovation, driving economic growth, and contributing to the broader ecosystem of medical research and entrepreneurial success.

Digital Literacy Module

Digital literacy means having the skills one needs to live, learn, and work in a society where communication and access to information is increasingly through digital technologies like internet platforms, social media, and mobile devices.

Early Clinical Exposure (ECE)

Early clinical exposure helps students understand the relevance of their preclinical studies by providing real-world contexts. This can enhance motivation and engagement by showing students the practical application of their theoretical knowledge. Early exposure allows students to begin developing essential clinical skills from the start of their education. This includes not only technical skills but also crucial soft skills such as communication, empathy, and professionalism. Direct interaction with patients early in their education helps students appreciate the complexities of patient care, including the psychological and social aspects of illness. Early exposure to various specialties can aid students in making informed decisions about their future career paths within medicine.

Early clinical experiences contribute to the development of a professional identity, helping students see themselves as future physicians and understand the responsibilities and ethics associated with the profession. This can help reduce the anxiety associated with clinical work by familiarizing students with the clinical environment. It can build confidence in their abilities to interact with patients and healthcare professionals. Engaging with real-life clinical situations early on encourages the development of critical thinking and problem-solving skills, which are essential for medical practice. It helps bridge the gap between theoretical knowledge and practical application, leading to a more integrated and holistic approach to medical education. It allows students to observe and understand how healthcare systems operate, including the challenges and limitations faced in different settings. Early patient interaction emphasizes the importance of patient-centered care from the outset, underscoring the importance of treating patients as individuals with unique needs and

backgrounds. Practical experiences can enhance long-term retention of knowledge as students are able to connect theoretical learning with clinical experiences.: Early clinical experiences often involve working in multidisciplinary teams, which fosters a sense of collaboration and understanding of different roles within healthcare.

In summary, early clinical exposure in medical education is pivotal for the holistic development of medical students, providing them with a strong foundation of practical skills, professional attitudes, and a deep understanding of patient-centered care.

The Holy Quran Translation Lecture

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Imaniat	- Describe the Concept of Tauheed - Explain the attributes of pious. - Discuss the attributes of Allah Almighty - Explain Hazarat Uzair's and Hazarat Ibrahim's experience about resurrection	C2	LGIS	SAQ
Ibadat	Understand the concept of worship, mastering ritual acts, fostering a spiritual connection.	C2	LGIS	SAQ

Seerat Mubarak

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Importance of Hadees and Sunnah	- Discuss the meaning of Hadith and Sunnah - Describe the importance of Hadees and Sunnah	C2	LGIS	SAQ

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	MCQS

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	Understand the fundamental concepts and applications of Artificial Intelligence (AI) in healthcare, including medical image analysis, disease prediction, and personalized treatment recommendations.	C2	LGIS	MCQS
	Demonstrate the ability to critically evaluate AI algorithms and their ethical implications in medical decision-making, patient care, and privacy.			

Biomedical Ethics & Professionalism

Practical Session 1 Affective & Psychomotor Domain					
Introduction to Professional Ethics and PM&DC Code of Conduct	Discussion will cover; - Introduction to Professional Ethics and PM&DC Code of Conduct - Purpose of medical code of conduct by Regulatory body PM&DC; covering following subtopics - What Is the ‘Professional Ethics and Code of Conduct’? - Why to Have the Code of Conduct? - Who Needs to Follow the Code of Conduct? - Who is it for? What Are the Code of Conduct Requirements?	At the end of the session students should be able to - Cognizant with need for professional code of conduct by PM&DC.C1 - Elaborate the purpose and relevance for medical code of conduct at undergraduate level . C2	LGIS 1hr contact session in 2-4 parallel classes conducted by Senior faculty	1 MCQs of level C1 to C3 will cover this session teachings in relevant block examination in pool of total 04 MCQs. Result / marks obtained will contribute towards Internal assessment (IA) in 1 st Prof. MBBS exam.	PMDC Code of Ethics: http://www.pmdc.org.pk/LinkClick.aspx?fileticket=v5WmQYMvzh4%3D&tabid=102&mid=554
History of Medical Ethics	Discussion on Health Research ethics focusing; - Historical perspective of Tuskegee studies, Willow brook Experiment - Codes of medical ethics: traditional foundations and contemporary practice - Nuremburg code, Belmont report, Declaration of Helsinki and importance of historical background of ethics in current research trends - General ethical principles including explanation	At the end of the session students should be able to; - Explain the meaning of the term “ethics”.C1 - Describe the historical perspective of global development of medical ethics. C1	LGIS 1hr contact session in 2-4 parallel classes, Conducted by Senior faculty.	1 MCQs of level C1 to C3 will cover this session teachings in relevant block examination in pool of total 04 MCQs. Result / marks obtained will contribute towards Internal assessment (IA) in 1 st Prof. MBBS exam.	Guidelines and Teachers Handbook for Introducing Bioethics to Medical and Dental Students http://nbcPakistan.org.pk/assets/may-16-bioethics-facilitator-book---may-16%2C-2017.pdf The Nuremberg Code: http://www.hhs.gov/ohrp/archive/n

	of 04 basic principles of Beneficence, non-maleficence, respect and justice. - Interpretation research ethics for; - Informed consent and confidentiality in research HR	• Describe the codes of medical ethics and their implications. C1 • Recognize ethical issues relevant to the case situation and apply the ethical codes as appropriate. C2 • Discuss the development of indigenous ethical codes in the South-East Asian Region. C2. • Demonstrate sensitivity to cultural diversity in medical care. C3			urcode.html 10 WMA Declaration of Helsinki: http://www.wma.net/en/30publications/10policies/b3/ CIOMS Guidelines: http://www.cioms.ch/publications/layout_guide2002.pdf . Nuffield Council on Bioethics Guidelines: http://www.sirc.org/news/nuffield.shtml
Laboratory Ethics	Discussion will cover basic elements of Laboratory Ethics focusing; • Importance of medical professionalism for the medical student; including respect and gratitude towards colleagues • Code of conduct: Collaboration, partnership, Teamwork , Maintaining dress code, religion obligations of medical doctor , focus on physicians' character, virtues and duties • Delineate the ethical consideration while performing procedures on real patients or simulated patients in Laboratory setting	At the end of the session students should be able to ; • Understand the importance of taking permission before performing procedures (drawing blood, administering injections etc.) during laboratory sessions .A1 • Show Respects other health professional team members and complete assigned task in professional manner. A1 • Employ collaborative negotiation to resolve conflict, anger, confusion and misunderstanding. A2	Case based discussion in 2 hr contact session in 4-6 parallel classes conducted by faculty of respective departments Role plays Reflective writing	Assignment based assessment under aggregate Marks (Internal Assessment) Assignment to be uploaded on LMS	- Real life scenarios in form of Case base learning /problem based learning (PBL) To be share with students one week before the session Introduction to criteria for assessment of behavior, code of conduct and professionalism at RMU

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	

List of MSK-II Module Spiral Courses Lectures

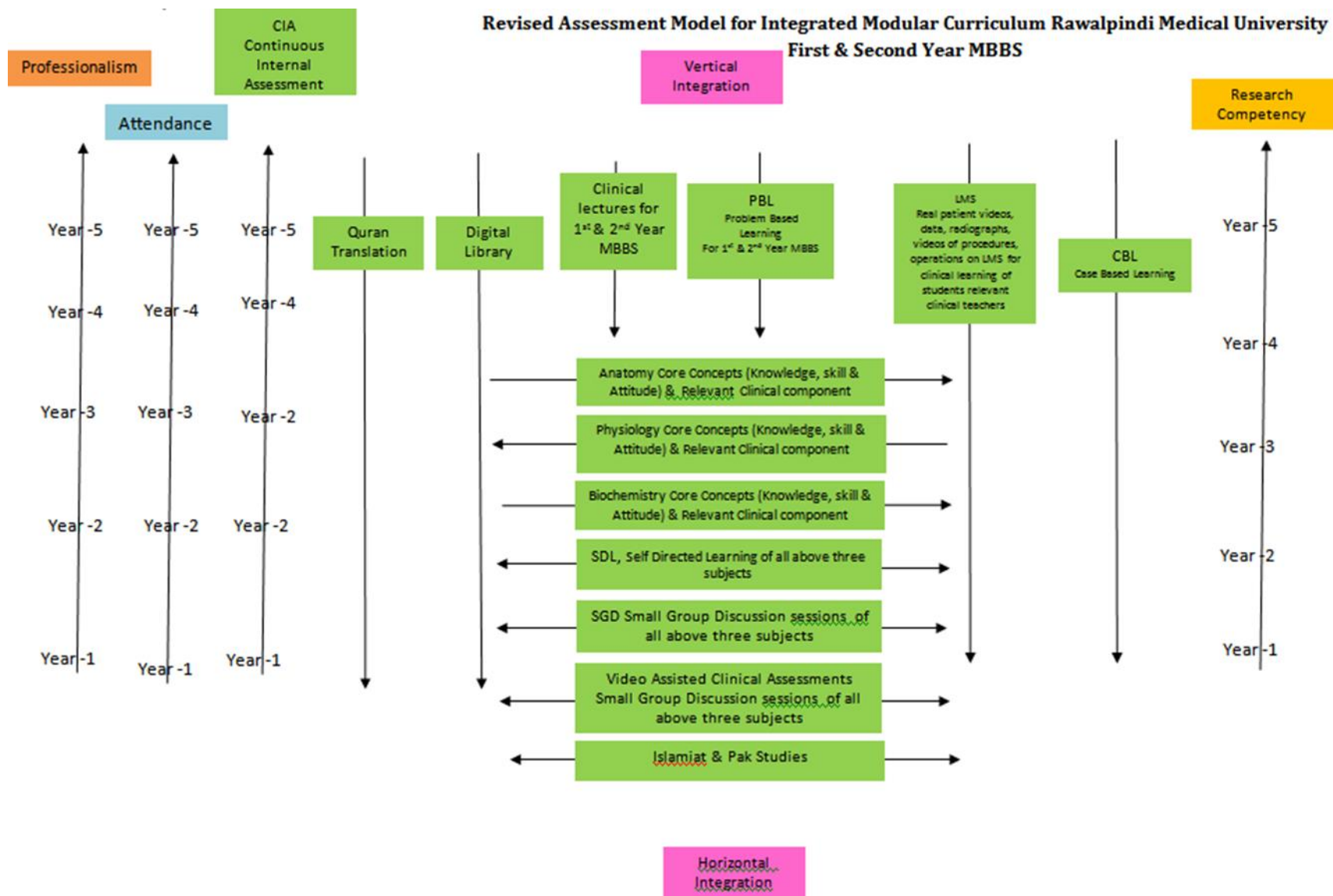
Sr. #	Date/Day	Week	Department	Time	Topic Of Lectures	Teachers Name & Contact #
1.	Friday 31-05-2024	1 st	Seerat Mubarak	09:00 AM – 10:00 AM	Importance of Hadees and Sunnah	Molana Abdul Waahid (0341-5444667)
2.	Friday 31-05-2024	1 st	Family Medicine	11:00 AM – 12:00 PM	Communication and consultation skills in Family Medicine Practice	Dr. Sadia Azam Khan
3.	Friday 07-06-2024	2 nd	Quran Translation	11:00 AM – 12:00 PM	Imaniat-I, Ibadat-II	Molana Abdul Waahid (0341-5444667) Mufti Naeem Sherazi (0300-5580299)
4.	Friday 14-06-2024	3 rd	Quran Translation	10:00 AM – 11:00 AM	Imaniat -I , Ibadat-II	Mufti Naeem Sherazi (0300-5580299) Molana Abdul Waahid (0341-5444667)
5.	Thursday 20-06-2024	4 th	Behavioral Sciences	11:20 AM – 12:10 PM	Communication Skills	Dr. Arsalan Manzoor
6.	Friday 21-06-2024	4 th	Quran Translation	09:00 AM – 10:00 AM	Ibadat-III Immaniat-II	Molana Abdul Waahid (0341-5444667) Mufti Naeem Sherazi (0300-5580299)
7.	Friday 21-06-2024	4 th	Quran Translation	10:00 AM – 11:00 AM	Ibadat-IV, Immaniat-III	Mufti Naeem Sherazi (0300-5580299) Molana Abdul Waahid (0341-5444667)
8.	Saturday 22-06-2024	4 th	Biomedical Ethics	11:20 AM – 12:10 PM	Introduction to Professional Ethics and PM&DC Code of Conduct	Dr. Aneela (Even) Dr. Kashif (Odd)
9.	Monday 24-06-2024	5 th	Artificial Intelligence	10:30 AM – 11:20 AM	Introduction to Artificial Intelligence	Prof. Dr. Riaz Ahmed
10.	Tuesday 25-06-2024	5 th	Behavioral Sciences	09:00 AM – 10:10 AM	Rights and responsibilities of patients and doctors	
11.	Tuesday 26-06-2024	5 th	Biomedical Ethics	11:20 AM – 12:10 PM	History of Medical Ethics	Dr. Arsalan Even Dr. Maria Odd

SECTION - V

Assessment Policies

Contents

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



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%

60% 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 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 rd 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-II	1	Weekly LMS Based Assessments (Anatomy, Physiology & Biochemistry)	Formative	2 Hours	3 Hours 45 Minutes	3 Hours	2 Formative	6 Summative
	2	End Module Examinations (SEQ, SAQ, EMQ & MCQs Based)	Summative	2 Hours				
	3	Audio Vissual (AV) OSPE (10 slides) 5 minutes per slide	Summative	50 Minutes				
	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 & Spiral Curriculum	Formative	60 Minutes				

Learning Resources

Subject	Resources
Anatomy	A. Gross Anatomy - Gray's Anatomy by Prof. Susan Standring 42th edition, Elsevier. - Clinical Anatomy for Medical Students by Richard S. Snell 10th edition. - Clinically Oriented Anatomy by Keith Moore 9th edition. - Cunningham's Manual of Practical Anatomy by G.J. Romanes, 16th edition, Vol-I, II and III B. Histology B. Young J. W. Health Wheather's Functional Histology 6th edition. - Medical Histology by Prof. Laiq Hussain 7th edition. C. Embryology - Keith L. Moore. The Developing Human 11th edition. - Langman's Medical Embryology 14th edition.
Physiology	A. Textbooks - Textbook Of Medical Physiology by Guyton And Hall 14th edition. - Ganong ' S Review of Medical Physiology 26th edition. B. Reference Books - Human Physiology by Lauralee Sherwood 10th edition. - Berne & Levy Physiology 7th edition. - Best & Taylor Physiological Basis of Medical Practice 13th edition. - Guyton & Hall Physiological Review 3rd edition.
Biochemistry	Textbooks - Harper's Illustrated Biochemistry 32th edition. - Lehninger Principle of Biochemistry 8th edition. - Biochemistry by Devlin 7th edition.
Community Medicine	Textbooks - Community Medicine by Parikh 25th edition. - Lippincott's Biochemistry 32 edition - Community Medicine by M Illyas 8th edition. - Basic Statistics for the Health Sciences by Jan W Kuzma 5th edition.
Pathology/Microbiology	Textbooks - Robbins & Cotran, Pathologic Basis of Disease, 10th edition. - Rapid Review Pathology, 5th edition by Edward F. Goljan MD. http://library.med.utah.edu/WebPath/webpath.html
Pharmacology	Textbooks - Lippincot Illustrated Pharmacology 9th edition. - Basic and Clinical Pharmacology by Katzung 5th edition.

SECTION - V

Time Table

Integrated Spiral Clinically Oriented Modular Curriculum for First Year MBBS

MSK-II Module Time Table
First Year MBBS

Session 2023 - 2024

Batch- 51

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 Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Fahd Anwar (Demonstrator of Physiology)
2.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	2.	DME Focal Person	Dr. Farzana Fatima
3.	Director DME	Prof. Dr. Ifra Saeed	3.	Co-coordinator	Sajjad Hussain (Senior Demonstrator of Anatomy)
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Almas (Senior Demonstrator Biochemistry)
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Fareed Ullah Khan (Senior Demonstrator Physiology) & Clinical Co- Coordinator
6.	Focal Person Anatomy First Year MBBS	Asso. Prof. Dr. Mohtashim Hina			
7.	Focal Person Physiology	Dr. Sidra Hamid			
			DME Implementation Team		
8.	Focal Person Biochemistry	Dr. Aneela Jamil	1.	Director DME	Prof. Dr. Ifra Saeed
9.	Focal Person Pharmacology	Dr. Zunera Hakim	2.	Assistant Director DME	Dr. Farzana Fatima
10.	Focal Person Pathology	Dr. Asiya Niazi	3.	Implementation Incharge 1st & 2 nd Year MBBS	Prof. Dr. Ifra Saeed Dr. Farzana Fatima
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir	4.	Editor	Muhammad Arslan Aslam
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
13.	Focal Person Quran Translation Lectures	Dr. Fahad Anwar			
14.	Focal Person Family Medicine	Dr. Sadia Khan			

Discipline Wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
II	Anatomy	- Muscles - Skin	- Development of Axial Skeleton - Development of limbs - Development of muscles	- Muscles - Skin - Skin appendages	Gluteal Region to Lateral compartment of leg
	Biochemistry	Protein chemistry, Protein separation techniques, Collagen and Elastin			
	Physiology	- Sarcotubular system, excitation contraction coupling mechanism inskeletal muscle. - Molecular Mechanism of skeletal muscle contraction, Rigormortis, Muscular dystrophies - Introduction to muscle physiology, Structure of sarcomere - Energetics, efficiency and types of contraction, heat production in muscle - Physiologic anatomy, types and properties of Smooth Muscle - Mechanism of smooth muscle contraction & its control - Introduction to pericardium Properties of myocardium & endocardium,myocardial action potential - Regulation of myocardial activity - Comparison of 3 types of Muscle - Introduction to CVS - Excitatory & Conducting system of heart			
	Spiral Courses				
	Bioethics & Professionalism	- Introduction to Professional Ethics and PM&DC Code of Conduct - History of Medical Ethics			
	Behavioural Sciences	Communication Skills			
		Rights and Responsibilities of patients and doctors			
	Artificial Intelligence	Introduction to Atificial Intelligence			
	Family Medicine	Communication and consultation skills in Family Medicine Practice			
	The Holy Quran Translation	- Imaniat-I - Ibadat-II - Ibadat-III - Immaniat-II - Immaniat-III - Ibadat-IV			
	Seerat Mubarak	Importance of Hadees and Sunnah			

Vertical Integration			
	Fractures of Lower Limb (Orthopedics)		
	x-rays of hipbone lower limb (Radiology)		
	Early Clinical Exposure (ECE)		
	Clinical Rotations	- Cases of myopathies/ muscular dystrophy - Polymyositis/Muscle atrophy - Muscle enzyme interpretation	Medicine
		- Burns and Plastic Surgery - Management of superficial and deep burns	Surgery
		- X-Ray of Hip Bone and Hip Joint - X ray of pelvis - X ray of long Bones	Radiology

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
- Development of Axial Skeleton - Development of limbs - Development of muscles	- Muscles-I - Muscles-II - Skin - Appendages	- Muscles-I - Muscles-II - Skin	Gross Anatomy: - Hip bone - Femur - Anterolateral compartment of thigh (muscles) - Anterolateral compartment of thigh (neurovascular organization) - Medial compartment of thigh - Gluteal region (muscles) - Gluteal region (neurovascular organization) - Posterior compartment of thigh (muscles) - Posterior compartment of thigh (neurovascular organization) - Hip joint - Tibia - Fibula - Popliteal fossa - Knee joint - Anterior compartment of leg (muscles) - Anterior compartment of leg (neurovascular organization) - Lateral compartment of leg - Surface marking and radiology	- Skeletal muscles - Smooth muscle and cardiac muscle - Thick skin - Thin skin	- Hip Dislocation - Fracture of neck of femur	- Hip bone - Femur - Anterolateral compartment of thigh - Medial compartment of thigh - Gluteal region - Posterior compartment of thigh - Hip joint, Tibia & Fibula

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 (Prof. Dr. Samia Sarwar/Dr Aneela) (Even)	Introduction to pericardium Properties of myocardium & endocardium, myocardial action potential (By Dr. Sidra)	Length tension curve, Load and velocity of contraction, diseases of muscle (By Dr. Nayab) Properties of skeletal muscles, Tetanus & Fatigue (By Dr. Nayab)
Molecular Mechanism of skeletal muscle contraction, Rigormortis, Muscular dystrophies (Prof. Dr. Samia Sarwar/ Dr Aneela) (Even)	Regulation of myocardial activity (By Dr Sidra)	Practical: 1. Determination of RBC count 2. Determination of TLC 3. Determination of Platelet Count 4. Determination of ABO, Blood groups
	Introduction to muscle physiology, Structure of sarcomere (By Dr Aneela) (Even)	SGD: 1. Sliding filaments of skeletal muscle, sarcotubular system 2. Physiology of smooth muscle, mechanism of smooth muscle contraction 3. Properties of myocardium, myocardial action potential, Excitatory and conduction system of heart 4. Comparison of three types of muscle
	Physiologic anatomy, types and properties of Smooth Muscle (By Dr Aneela)	SDL: (ON CAMPUS) 1. Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle 2. Molecular Mechanism of skeletal muscle contraction, Rigor mortis, Muscular dystrophies 3. Length tension curve, Load and velocity of contraction, diseases of muscle 4. Physiological properties and types of Smooth Muscle 5. Mechanism of smooth muscle contraction & its control 6. Regulation of myocardial activity 7. Excitatory & Conducting system of heart 8. Comparison of 3 types of muscle
	Mechanism of smooth muscle contraction & its control (By Dr Aneela)	
	Comparison of 3 types of Muscle (By Dr Aneela)	

	Introduction to muscle physiology, Structure of sarcomere (By Dr Uzma) (Odd)	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 (By Dr Uzma) (Odd)	
	Molecular Mechanism of skeletal muscle contraction , Rigormortis, Muscular dystrophies (By Dr Uzma)(Odd)	
	Energetics, efficiency and types of contraction, heat production in muscle (By Dr Uzma)	
	Introduction to CVS (By Dr Fahad)	
	Excitatory & Conducting system of heart (By Dr Fahad)	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 Alpha -1 Antitrypsin deficiency	Color tests for detection of proteins	Protein structure
	Classification of protein and function of protein			Detection of proteins by Isoelectric pH	
	Primary sturcutres of protiens				
Collagen and elastin	Secondary structure of protein			Fractional precipitation of proteins	Collagen
Techniques of separation of protein	Tertiary and quarternary structure of proteins			Chromatography	Elastin

Category A*: By Assistant Professor and Senior Demonstrator with Postgraduate Qualification.

Category B:** By Senior Demonstrators

Category C*:** By Senior Demonstrators and 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	01
2.	Demonstrators of biochemistry department	06

Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	5 * 2 = 10 hours
2.	Small Group Discussions (SGD)	6 * 5 = 30 hours
3.	Case Based Learning (PBL)	2 * 1 = 2 hours
4.	Practical / Skill Lab	6 * 5 = 30 hours

Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	5
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)

(27-05-2024 To 01-06-2024)

Date/Day	8:00 AM - 11:20 AM				11:20 AM - 11:40 AM		11:40 AM - 12:30 PM		12:30pm – 2:00pm	Home Assignment				
Monday 27-05-2024	LMS Based Assessment of Block - I				B r e a k		PBL 1 (Session-I)		Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Sarcotublar system, excitation contraction coupling mechanism in skeletal muscle				
							PBL Team							
Date/Day	8:00 AM – 09:00 AM		09:00 AM – 10:00 AM	10:00am – 10:20am	10:20am-11:20am		11:20am-12:10pm		12:10pm-12:30pm	12:30pm – 2:00pm	Home Assignment			
Tuesday 28-05-2024	Biochemistry LGIS		PBL 1 (Session-II)		B r e a k	Anatomy LGIS		Physiology LGIS		B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Molecular Mechanism of skeletal muscle contraction rigor mortis, Muscular dystrophies		
	Properties of amino acids & important peptides	Collagn structure, synthesuis and related disorders	PBL Team			General Anatomy (Muscle I)	Histology (Skeletal Muscle)	Introduction to muscle physiology,Structure ofsarcomere	Introduction to muscle physiology, Structure of sarcomere					
	Dr. Rahat Even	Dr. Aneela Odd				Assoc. Prof. Dr Arsalan (Even)	Assoc. Prof. Dr Mohtasham (Odd)	Dr Aneela (Even)	Dr. Uzma (Odd)					
Wednesday 29-05-2024	SGD/Dissection						Anatomy LGIS		Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Classification of proteins	
	Hip bone					Histology (Skeletal Muscle)	General Anatomy (Muscle I)	Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle	Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle					
						Assoc. Prof. Dr Mohtasham Even	Assoc. Prof. Dr Arsalan Odd	Prof. Dr. Samia Sarwar/ Dr Aneela (Even)	Dr. Uzma (Odd)					
Thursday 30-05-2024	CBL/Dissection						Radiology		Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Introduction to proteins and amino acids	
	Hip bone					X rays of Hip Bone		Molecular Mechanism of skeletal muscle contraction rigor mortis, Muscular dystrophies	Molecular Mechanism of skeletal muscle contraction rigor mortis, Muscular dystrophies					
						Dr. Qurat Ul Ain (Odd)	Dr. Aneeqa (Even)	Prof. Dr. Samia Sarwar/ Dr. Aneela (Even)	Dr. Uzma (Odd)					
Date/Day	8:00 AM – 09:00 AM		09:00AM – 10:00 AM		10:00 AM – 11:00 AM		11:00 AM – 12:00 PM		SDL Anatomy Hip bone.					
Friday 31-05-2024	CBL / Dissection		Seerat Mubarak		Anatomy LGIS		Family Medicine							
	Femur	Importance of Hadees and Sunnah		General Anatomy (Muscle II)	Histology (Cardiac & Smooth Muscles)	Communication and consultation skills in Family Medicine Practice								
		Molana Abdul Wahid		Assoc. Prof. Dr Arsalan (Even)	Assoc. Prof. Dr Mohtasham (Odd)	Dr. Sadia Azam Khan								
Saturday 01-06-2024	SGD / Dissection				B r e a k	Biochemistry LGIS		Physiology LGIS		B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Anatomy Femur		
	Femur / Patella					Collagn structure, synthesuis and related disorders	Properties of amino acids & important peptides	Length tension curve, Load and velocity of contraction, diseases of muscle	Energetics, efficiency and types of contraction, heat production in muscle					
						Dr. Aneela Even	Dr. Rahat Odd	Dr. Nayab Even	Dr. Uzma Odd					

Table No. 1 (Time: 12:20pm – 02:00pm)

Batch Distribution for Practical Skills (all subjects) CBL / Small Group Dissscusion (Biochemistry and Physiology)			Topics for Skill Lab with Venue	Schedule for Practical / Small Group Discussion										
				Day	Histology Practical		Biochemistry Practical			Physiology Practical		Physiology SGD		
Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name			
Sr. No	Batch	Roll No.	- Anatomy Histology Practical: Skeletal Muscles (Dr. Kashif) - Physiology Practical: Determination of Red blood cell count - Biochemistry Practical: Color tests for detection of proteins	Monday	C	Supervised by HOD	B	Dr. Rahat	E	Dr. Farid/ Dr. Ali Zain	A	Dr. Sheena/Dr. Ali Zain	D	Dr. Uzma
1.	A	01-70		Tuesday	D		C	Dr. Nayab	A	Dr. Sheena/ Dr..Nazia	B	Dr. Uzma/Dr. Nazia	E	Dr. Almas
2.	B	71-140		Wednesday	E		D	Dr. Uzma	B	Dr. Uzma/ Dr. Farhat	C	Dr. Fahd	A	Dr. Romessa
3.	C	141-210		Thursday	B		A	Dr. Almas	D	Dr. Maryam/ Dr. Afsheen	E	Dr. Farid/ Dr. Ali Zain	C	Dr. Nayab
4.	D	211-280		Saturday	A		E	Dr. Romessa	C	Dr. Fahd	D	Dr. Maryam/ Dr. Afsheen	B	Dr. Rahat
5.	E	281-onwards												

Topics for Skill Lab with Venue				Table No. 2 Batch Distribution and Venues for Anatomy Small Group Discussion SGDs / Dissections			
				Batches	Roll No	Anatomy Teacher	Venue
- Physiology SGD: Sliding filaments of skeletal muscle, sarcotubular system (Lecture Hall 5) - Biochemistry SGD: Protein structure - Anatomy CBL: Fracture Neck of Femur				A	01-90	Dr Sajjad	New Lecture theatre complex no.2
				B	91-180	Dr Ali Raza	Anatomy Lecture Hall No.03
				C	181-270	Dr Zeneara	Anatomy Lecture Hall No.04
				D	271- onwards	Dr Qurat ul Ain	New Lecture theatre complex no.3
				Supervised by Prof. Dr. Ayesha Yousaf			

Table No. 3 Batch Distribution with Venues and Teachers Name for Problem Based Learning (PBL) Sessions									
Sr No.	Batches	Roll No	Venue	Teachers	Sr No.	Batches	Roll No	Venue	Teachers
1.	A1	(01-35)	Lecture Hall no.05 Physiology	Dr. Farhat Jabeen (PGT Physiology)	6.	C2	(176-210)	Lecture Hall no.04 (Basement)	Dr. Nayab Zonish (PGT Physiology)
2.	A2	(36-70)	Lecture Hall #.04 (1st Floor Anatomy)	Prof. Dr. Ifra Saeed (Professor of Anatomy)	7.	D1	(210-245)	Lecture Hall no.02 (Basement)	Dr. Iqra Ayub (PGT Physiology)
3.	B1	(71-105)	Anatomy Museum (First Floor Anatomy)	Dr. Afsheen Batool (PGT Physiology)	8.	D2	(246-280)	Conference Room (Basement)	Dr. Muhammad Usman (PGT Physiology)
4.	B2	(106-140)	Lecture Hall no.03 (First Floor)	Prof. Dr. Ayesha Yousaf (Professor of Anatomy)	9.	E1	(281-315)	New Lecture Hall no.01	Dr. Ramsha (PGT Physiology)
5.	C1	(141-175)	Lecture Hall no.05 (Basement)	Dr. Nayab (PGT Physiology)	10	E2	(315 onwards)	Lecture Hall no.04	Dr. Jawad Hassan (Demonstrator Physiology)

Table No. 6 Venues for Large Group Interactive Session (LGIS)

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 03
Even Roll Number	New Lecture Hall Complex Lecture Theater # 02

Time Table For Module MSK-II (Second Week)
(03-06-2024 To 08-06-2024)

Date/Day	8:00am-9:00am		9:00am – 10:00am		10:00am – 10:20am	10:20am-11:20am		11:20am-12:10pm		12:10pm-12:30pm	12:30pm – 2:00pm		Home Assignment		
Monday 03-06-2024	SGD / Dissection			B r e a k	Anatomy LGIS			Physiology LGIS			B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	SDLPhysiology Rigor mortis, Muscular dystrophies		
	Anterolateral compartment of thigh (Muscles & Neurovascular organization)				Histology (Cardiac & Smooth Muscles)		General Anatomy (Muscle II)	Energetics, efficiency and types of contraction, heat production in muscle		Length tension curve, Load and velocity of contraction, diseases of muscle					
					Assoc. Prof. Dr Mohtasham Even	Assoc. Prof. Dr Arsalan Odd	Dr. Uzma Even	Dr. Nayab Odd							
Tuesday 04-06-2024	SGD / Dissection	Anatomy LGIS			Biochemistry LGIS			Physiology LGIS				Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Length tension curve, Load and velocity of contraction, diseases of muscle		
		Dissection	Embryology (Development of Axial Skeleton)		Histology (Skin)	Classification and functions of proteins		Elastin structure and related disorders	Properties of skeletal muscles, Tetanus & Fatigue					Introduction to CVS	
	Prof. Dr Ayesha Even		Assoc. Prof. Dr. Mohtasham Odd		Dr. Rahat Even		Dr. Aneela / Dr. Uzma Odd	Dr. Nayab Even		Dr. Fahd Odd					
	SGD / Dissection				Biochemistry LGIS			Physiology LGIS						Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Collagen and related disorders
	Medial Compartment of thigh				Elastin structure and related disorders		Classification and functions of proteins	Introduction to CVS		Properties of skeletal muscles, Tetanus & Fatigue					
Dr. Aneela Dr. Uzma Even					Dr. Rahat Odd	Dr. Fahd Even		Dr. Nayab Odd							
Wednesday 05-06-2024	SGD / Dissection	Anatomy LGIS			Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Secondary Structure of protiens						
		Dissection	Histology		Embryology	Physiologic anatomy, types and properties of Smooth muscle				Introduction topericardium Properties of myocardium & endocardium myocardial action potential					
	(Skin)		(Development of Axial Skeleton)		Dr. Aneela (Even)		Dr. Sidra Odd								
	SGD / Dissection				Anatomy LGIS					Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Secondary Structure of protiens	
	Dissection				Histology		Embryology			Physiologic anatomy, types and properties of Smooth muscle		Introduction topericardium Properties of myocardium & endocardium myocardial action potential			
(Skin)				(Development of Axial Skeleton)	Dr. Aneela (Even)		Dr. Sidra Odd								
Thursday 06-06-2024	SGD / Dissection			Anatomy LGIS			Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Secondary Structure of protiens				
	Dissection			Histology		Embryology	Physiologic anatomy, types and properties of Smooth muscle		Introduction topericardium Properties of myocardium & endocardium myocardial action potential						
				(Skin)		(Development of Axial Skeleton)	Dr. Aneela (Even)		Dr. Sidra Odd						
Friday 07-06-2024	SGD / Dissection			Anatomy LGIS			Quran Translation			SDL Anatomy Anterolateral compartment of thigh					
	Gluteal Region (muscles)			Histology		Embryology	Imaniat-I		Ibadat-II						
				(Skin appendages)		(Development of limbs)	Mufti Naeem Sherazi Even		Molana Abdul Waahid Abbasi Odd						
Saturday 08-06-2024	SGD / Dissection			B r e a k	Anatomy LGIS			Physiology LGIS			B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Anatomy Medial Compartment of thigh		
	Gluteal Region (Neurovascular organization)				Embryology		Histology	Introduction topericardium Properties of myocardium & endocardium myocardial action potential		Physiologic anatomy, types and properties of Smooth muscle					
					(Development of limbs)		(Histology of Skin appendages)	Dr. Sidra Even		Dr. Aneela Odd					
					SGD / Dissection			Anatomy LGIS						Physiology LGIS	
Gluteal Region (Neurovascular organization)			Embryology		Histology	Introduction topericardium Properties of myocardium & endocardium myocardial action potential		Physiologic anatomy, types and properties of Smooth muscle							
			(Development of limbs)		(Histology of Skin appendages)	Dr. Sidra Even		Dr. Aneela Odd							

Table No. 1 (Time: 12:20pm – 02:00pm)

Batch Distribution for Practical Skills (all subjects) CBL / Small Group Dissscusion (Biochemistry and Physiology)			Topics for Skill Lab with Venue	Schedule for Practical / Small Group Discussion										
				Day	Histology Practical		Biochemistry Practical			Physiology Practical		Physiology SGD		
Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name			
Sr. No	Batch	Roll No.	- Anatomy Histology Practical: Smooth and cardiac muscles (Dr. Kashif) - Physiology Practical: Determination of Total leukocyte Count (TLC) - Biochemistry practical: Detection of proteins by Isoelectric pH	Monday	C	Supervised by HOD	B	Dr. Rahat	E	Dr. Farid/ Dr. Ali Zain	A	Dr. Sheena/Dr. Ali Zain	D	Dr. Uzma
1.	A	01-70		Tuesday	D		C	Dr. Nayab	A	Dr. Sheena/ Dr..Nazia	B	Dr. Uzma/Dr. Nazia	E	Dr. Almas
2.	B	71-140		Wednesday	E		D	Dr. Uzma	B	Dr. Uzma/ Dr. Farhat	C	Dr. Fahd	A	Dr. Romessa
3.	C	141-210		Thursday	B		A	Dr. Almas	D	Dr. Maryam/ Dr. Afsheen	E	Dr. Farid/ Dr. Ali Zain	C	Dr. Nayab
4.	D	211-280		Saturday	A		E	Dr. Romessa	C	Dr. Fahd	D	Dr. Maryam/ Dr. Afsheen	B	Dr. Rahat

			Topics for SGDs / CBL with Venue		Table No. 2 Batch Distribution and Venues for Anatomy Small Group Discussion SGDs / Dissections			
					Batches	Roll No	Anatomy Teacher	Venue
			- Physiology SGD: Physiology of smooth muscle, mechanism of smooth muscle contraction (Lecture Hall 5) - Biochemistry CBL: Protein folding and misfolding		A	01-90	Dr Sajjad	New Lecture theatre complex no.2
					B	91-180	Dr Ali Raza	Anatomy Lecture Hall No.03
					C	181-270	Dr Zeneara	Anatomy Lecture Hall No.04
					D	271- onwards	Dr Qurat ul Ain	New Lecture theatre complex no.3
					Supervised by Prof. Dr. Ayesha Yousaf			

Table No. 3 Batch Distribution with Venues and Teachers Name for Problem Based Learning (PBL) Sessions									
Sr No.	Batches	Roll No	Venue	Teachers	Sr No.	Batches	Roll No	Venue	Teachers
1.	A1	(01-35)	Lecture Hall no.05 Physiology	Dr. Sana Latif (Demonstrator Biochemistry)	6.	C2	(176-210)	Lecture Hall no.04 (Basement)	Dr. Nayab Zonish (PGT Physiology)
2.	A2	(36-70)	Lecture Hall #.04 (1st Floor Anatomy)	Dr. Farah (Demonstrator of Physiology)	7.	D1	(210-245)	Lecture Hall no.02 (Basement)	Dr. Iqra Ayub (PGT Physiology)
3.	B1	(71-105)	Anatomy Museum (First Floor Anatomy)	Dr. Rohina Khalid (Demonstrator Biochemistry)	8.	D2	(246-280)	Conference Room (Basement)	Dr. Muhammad Usman (PGT Physiology)
4.	B2	(106-140)	Lecture Hall no.03 (First Floor)	Prof. Dr. Ayesha Yousaf (Professor of Anatomy)	9.	E1	(281-315)	New Lecture Hall no.01	Dr. Ramsha Zafar (PGT Physiology)
5.	C1	(141-175)	Lecture Hall no.05 (Basement)	Dr. Ali Zain (PGT Physiology)	10	E2	(315 onwards)	Lecture Hall no.04	Dr. Jawad Hassan (Demonstrator Physiology)

No PBL in this week

Table No. 6 Venues for Large Group Interactive Session (LGIS)	
Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 03
Even Roll Number	New Lecture Hall Complex Lecture Theater # 02

Time Table For Module MSK-II (Third Week) (10-06-2024 To 15-06-2024)

Date/Day	8:00 am – 10:00 am		10:00am – 10:20am	10:20am-11:20am		11:20am-12:10pm		12:10pm-12:30pm	12:30pm – 2:00pm	Home Assignment		
Monday 10-06-2024	08:00 AM – 09:00 AM	09:00 AM – 10:00 AM	B r e a k	Anatomy LGIS		Physiology LGIS		B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Physiologic anatomy, types and properties of Smooth muscle		
	SGD / Dissection	PBL 2 (Session-I)		Embryology (Development of Muscles)	(General Anatomy of Skin)	Mechanism of smooth muscle contraction & its control	Regulation of myocardial activity					
	Dissection	PBL Team		Prof. Dr Ayesha Even	Assoc. Prof. Dr Arsalan Odd	Dr..Aneela Even	Dr. Sidra Odd					
	SGD / Dissection			Biochemistry LGIS		Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Mechanism of smooth muscle contraction & its control		
Posterior compartment of thigh (muscles)		Primary protein structure		Protein folding and misfolding	Regulation of myocardial activity	Mechanism of smooth muscle contraction & its control						
		Dr. Rahat Even		Dr. Kashif (odd)	Dr..Sdra Odd	Dr. Aneela Odd						
Tuesday 11-06-2024	SGD / Dissection			B r e a k	Anatomy LGIS		Physiology LGIS		B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	Biochemistry Protein misfolding disorders	
	Posterior compartment of thigh (Neurovascular organization)				(General Anatomy of Skin)	Embryology (Development of Muscles)	Excitatory &Conducting system ofheart					Comparison of 3 types of muscle
					Assoc. Prof. Dr Arsalan Even	Prof. Dr Ayesha Odd	Dr. Fahd Even					Dr. Aneela Odd
	SGD / Dissection				Anatomy LGIS		Physiology LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Anatomy Gluteal Region	
Posterior compartment of thigh (Neurovascular organization)		(General Anatomy of Skin)			Embryology (Development of Muscles)	Excitatory &Conducting system ofheart	Comparison of 3 types of muscle					
		Assoc. Prof. Dr Arsalan Even			Prof. Dr Ayesha Odd	Dr. Fahd Even	Dr. Aneela Odd					
Thursday 13-06-2024	Early Clinical Exposure									Biochemistry Protein Denaturation		
Date/ Day	08:00AM- 09:00AM	9:00 AM – 10:00 AM			10:00 AM – 11:00 AM		11:00 AM – 12:00 PM			SDL Anatomy Gluteal Region		
Friday 14-06-2024	SGD/ Dissection	Biochemistry LGIS			Quran Tranlation		Practical & SGD/CBL Topics & venue mentioned at the end. Thursday Batch (13-06-2024)					
	Tibia	Protein folding and misfolding	Protein folding and misfolding		Ibadat-II	Imaniat -I						
		Dr. Kashif (Even)	Dr.Rahat (Odd)		Mufti Naeem Sherazi Even	Molana Abdul Waahid Abbasi Odd						
Saturday 15-06-2024	CBL / Dissection		B r e a k		Biochemistry LGIS		Physiology LGIS		B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Anatomy Posterior compartment of thigh Online Clinical evaluation	
	Hip joint			Protein separation techniques	Secondary protein structure	Comparison of 3 types of muscle	Excitatory &Conducting system of heart					
				Dr. Kashif Even	Dr. Rahat Odd	Dr. Aneela Even	Dr. Fahd Odd					

Table No. 1 (Time: 12:20pm – 02:00pm)

Batch Distribution for Practical Skills (all subjects) CBL / Small Group Dissscusion (Biochemistry and Physiology)			Topics for Skill Lab with Venue	Schedule for Practical / Small Group Discussion												
				Day	Histology Practical		Biochemistry Practical			Physiology Practical		Physiology SGD			Biochemistry SGD	
Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name					
Sr. No	Batch	Roll No.	- Anatomy Histology Practical: Thick Skin (Dr. Kashif) - Physiology Practical: Determination of platelet count - Biochemistry Practical: Fractional precipitation of proteins	Monday	C	Supervised by HOD	B	Dr. Rahat	Supervised by HOD	E	Dr. Farid/ Dr. Ali Zain	A	Dr. Sheena/Dr. Ali Zain	Supervised by HOD	D	Dr. Uzma
1.	A	01-70		Tuesday	D		C	Dr. Nayab		A	Dr. Sheena/ Dr..Nazia	B	Dr. Uzma/Dr. Nazia		E	Dr. Almas
2.	B	71-140		Wednesday	E		D	Dr. Uzma		B	Dr. Uzma/ Dr. Farhat	C	Dr. Fahd		A	Dr. Romessa
3.	C	141-210		Thursday	B		A	Dr. Almas		D	Dr. Maryam/ Dr. Afsheen	E	Dr. Farid/ Dr. Ali Zain		C	Dr. Nayab
4.	D	211-280		Saturday	A		E	Dr. Romessa		C	Dr. Fahd	D	Dr. Maryam/ Dr. Afsheen		B	Dr. Rahat

Table No. 3 Batch Distribution with Venues and Teachers Name for Problem Based Learning (PBL) Sessions

Sr No.	Batches	Roll No	Venue	Teachers	Sr No.	Batches	Roll No	Venue	Teachers
1.	A1	(01-35)	Lecture Hall no.05 Physiology	Dr. Sana Latif (Demonstrator Biochemistry)	6.	C2	(176-210)	Lecture Hall no.04 (Basement)	Dr. Nayab Zonish (PGT Physiology)
2.	A2	(36-70)	Lecture Hall #.04 (1st Floor Anatomy)	Dr. Farah (Demonstrator of Physiology)	7.	D1	(210-245)	Lecture Hall no.02 (Basement)	Dr. Iqra Ayub (PGT Physiology)
3.	B1	(71-105)	Anatomy Museum (First Floor Anatomy)	Dr. Rohina Khalid (Demonstrator Biochemistry)	8.	D2	(246-280)	Conference Room (Basement)	Dr. Muhammad Usman (PGT Physiology)
4.	B2	(106-140)	Lecture Hall no.03 (First Floor)	Dr. Zeneera Saqib (Senior Demonstrator of Anatomy)	9.	E1	(281-315)	New Lecture Hall no.01	Dr. Ramsha Zafar (PGT Physiology)
5.	C1	(141-175)	Lecture Hall no.05 (Basement)	Dr. Ali Zain (PGT Physiology)	10	E2	(315 onwards)	Lecture Hall no.04	Dr. Jawad Hassan (Demonstrator Physiology)

Table No. 6 Venues for Large Group Interactive Session (LGIS)

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 03
Even Roll Number	New Lecture Hall Complex Lecture Theater # 02

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Eid Ul Adha & Summar Vacations	17 June 2024 to 21 July 2024
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Time Table For Module MSK-II (Fourth Week) (22-07-2024 To 27-07-2024)

Date/Day	8:00 am – 10:10 am	10:10am – 10:30am	10:30am-11:20am			11:20am-12:10pm		12:10pm-12:30pm	12:30pm – 2:00pm	Home Assignment
Monday 22-07-2024	SGD / Dissection	B r e a k	Biochemistry LGIS			Behavioral Sciences		B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Regulation of Myocardial Activity
	Fibula		Protein folding & denaturation	Tertiary and quaternary structure	Communication Skills					
			Dr. Aneela / Dr. Uzma even	Dr. Rahat odd	Dr. Sadia Yasir					
Tuesday 23-07-2024	SGD / Dissection		Orthopedics			Biochemistry LGIS			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Physiology Excitatory & Conducting system of heart Comparison of 3 types of muscle
	Popliteal Fossae		Fractures of Lower Limb		Tertiary and quaternary structure	Protein denaturation				
			Dr. Muhammad Hassan (Odd)	Dr. A. Rahman Rasool Akhtar (Even)	Dr. Rahat Even	Dr. Aneela Dr. Uzma Odd				
Wednesday 24-07-2024	SGD / Dissection		Physical Activity			Biomedical Ethics			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Anatomy Tibia, Fibula
	Introduction to Professional Ethics and PM&DC Code of Conduct									
	Dr. Aneela Even					Dr. Kashif Odd				
Thursday 25-07-2024	SGD / Dissection		Artificial Intelligence			Family Medicine			Practical & SGD/CBL Topics & venue mentioned at the end	SDL Biochemistry Importance of variousclasses of protein
	Anterior compartment of leg (muscles and neurovascular organization)	Introduction to Artificial Intelligence		Communication and consultation skills in Family Medicine Practice						
		Prof. Dr. Riaz Ahmed			Dr. Sadia Azam Khan					
Date/ Day	8:00 AM – 09:00 AM	09:00 AM – 10:00 AM		10:00 AM – 11:00 AM		11:00 AM – 12:00 PM		SDL Biochemistry Elastin and relateddisorders		
Friday 26-07-2024	SGD / Dissection	Quran Tranlation		Quran Tranlation		PBL 2 (Session-II)				
	Lateral compartment of leg (muscles and neurovascular organization)	Ibadat-III	Immaniat-II	Ibadat-IV	Immaniat- III	PBL Team				
		Molana Abdul Waahid (Even)	Mufti Naeem Sherazi (Odd)	Molana Abdul Waahid (Even)	Mufti Naeem Sherazi (Odd)					
Saturday 27-07-2024	SGD / Dissection	B r e a k	Behavioural Sciences			Biomedical Ehtics		B r e a k	Practical & SGD/CBL Topics & venue mentioned at the end	SDL Anatomy Hip joint, Knee Joint
	Cross Sectional Anatomy / Radiology		Rights and responsibilities of patients and doctors	Rights and responsibilities of patients and doctors	History of Medical Ethics					
			Dr. Mehboob Ali Shah (Odd)	Dr. Mehmood Ali (Even)	Dr. Arsalan (Even)	Dr. Maria (Odd)				

Table No. 1 (Time: 12:20pm – 02:00pm)

Batch Distribution for Practical Skills (all subjects) CBL / Small Group Discussion (Biochemistry and Physiology)			Topics for Skill Lab with Venue	Schedule for Practical / Small Group Discussion												
				Day	Histology Practical		Biochemistry Practical			Physiology Practical		Physiology SGD			Biochemistry SGD	
Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name					
Sr. No	Batch	Roll No.	- Anatomy Histology Practical: Thick Skin (Dr. Kashif) - Physiology Practical: Determination of ABO, Blood groups - Biochemistry Practical: Chromatography	Monday	C	Supervised by HOD	B	Dr. Rahat	Supervised by HOD	E	Dr. Farid/ Dr. Ali Zain	A	Dr. Sheena/Dr. Ali Zain	Supervised by HOD	D	Dr. Uzma
1.	A	01-70		Tuesday	D		C	Dr. Nayab		A	Dr. Sheena/ Dr..Nazia	B	Dr. Uzma/Dr. Nazia		E	Dr. Almas
2.	B	71-140		Wednesday	E		D	Dr. Uzma		B	Dr. Uzma/ Dr. Farhat	C	Dr. Fahd		A	Dr. Romessa
3.	C	141-210		Thursday	B		A	Dr. Almas		D	Dr. Maryam/ Dr. Afsheen	E	Dr. Farid/ Dr. Ali Zain		C	Dr. Nayab
4.	D	211-280		Saturday	A		E	Dr. Romessa		C	Dr. Fahd	D	Dr. Maryam/ Dr. Afsheen		B	Dr. Rahat

5.	E	281-onwards	Topics for SGDs / CBL with Venue	Table No. 2 Batch Distribution and Venues for Anatomy Small Group Discussion SGDs / Dissections			
- Physiology SGD: Comparison of three types of muscle (Physiology Lecture 05) - Biochemistry CBL: Alpha-1 Antitrypsin Deficiency				Batches	Roll No	Anatomy Teacher	Venue
				A	01-90	Dr Sajjad	New Lecture theatre complex no.2
				B	91-180	Dr Ali Raza	Anatomy Lecture Hall No.03
				C	181-270	Dr Zeneara	Anatomy Lecture Hall No.04
				D	271- onwards	Dr Qurat ul Ain	New Lecture theatre complex no.3
				Supervised by Prof. Dr. Ayesha Yousaf			

Table No. 3 Batch Distribution with Venues and Teachers Name for Problem Based Learning (PBL) Sessions									
Sr No.	Batches	Roll No	Venue	Teachers	Sr No.	Batches	Roll No	Venue	Teachers
1.	A1	(01-35)	Lecture Hall no.05 Physiology	Dr. Sana Latif (Demonstrator Biochemistry)	6.	C2	(176-210)	Lecture Hall no.04 (Basement)	Dr. Nayab Zonish (PGT Physiology)
2.	A2	(36-70)	Lecture Hall #.04 (1st Floor Anatomy)	Dr. Farah (Demonstrator of Physiology)	7.	D1	(210-245)	Lecture Hall no.02 (Basement)	Dr. Iqra Ayub (PGT Physiology)
3.	B1	(71-105)	Anatomy Museum (First Floor Anatomy)	Dr. Rohina Khalid (Demonstrator Biochemistry)	8.	D2	(246-280)	Conference Room (Basement)	Dr. Muhammad Usman (PGT Physiology)
4.	B2	(106-140)	Lecture Hall no.03 (First Floor)	Dr. Zeneara Saqib (Senior Demonstrator of Anatomy)	9.	E1	(281-315)	New Lecture Hall no.01	Dr. Ramsha Zafar (PGT Physiology)
5.	C1	(141-175)	Lecture Hall no.05 (Basement)	Dr. Ali Zain (PGT Physiology)	10	E2	(315 onwards)	Lecture Hall no.04	Dr. Jawad Hassan (Demonstrator Physiology)

No PBL in this week

Table No. 6 Venues for Large Group Interactive Session (LGIS)

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 03
Even Roll Number	New Lecture Hall Complex Lecture Theater # 02

Schedule for LMS Based Weekly Online Assessments for First Year MBBS (Musculoskeletal-II Module)

The online assessment for Musculoskeletal -II Module for First Year MBBS will be as per following schedule:

Class	Module	Day & Date	Time of Assessment	Focal person	Department Responsible
First Year MBBS	MSK-II Module	Monday 3 rd June,2024	7:00 pm-7:30pm	Prof. Dr Ayesha Yousaf	Anatomy
		Tuesday 4 th June,2024	7:00 pm-7:30pm	Prof. Dr Samia Sarwar	Physiology
		Wednesday 5 th June,2024	7:00 pm-7:30pm	Dr Aneela Jamil	Biochemistry
		Monday 10 th June,2024	7:00 pm-7:30pm	Prof. Dr Ayesha Yousaf	Anatomy
		Tuesday 11 th June,2024	7:00 pm-7:30pm	Prof. Dr Samia Sarwar	Physiology
		Wednesday 12 th June,2024	7:00 pm-7:30pm	Dr Aneela Jamil	Biochemistry

Assessment Week
(29-07-2024 To 03-08-2024)

Date & Day		8:00 AM – 02:00 PM
Monday	29-07-2024	Assessment Week
Saturday	30-07-2024	
Monday	31-07-2024	
Tuesday	01-08-2024	
Wednesday	02-08-2024	
Thursday	03-08-2024	

SECTION VII

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

Domains: C-Core Subject (70%) Levels C1-C2, HV- Horizontal & Vertical Integration (20%) Levels C2-C3, S- Spiral Integration (10%) Levels C2-C3																																			
End of Module Assessment	Subject	Theory (Cognitive) Assessment																		Practical (Skill & Attitude) Assessment										Grand Total	Total Time of Module Assessment				
		MCQs					EMQs			SAQs					SEQs					Marks	Total Marks Theory	Total Time	AV OSPE					Time	AED Reflective Writing			OSVE			Total Practical Marks
		C	HV	S	Total	Marks	C	Total	Marks	C	HV	S	Total	Marks	C	HV	S	Total	C				HV	S	Total	Marks	Viva					Copy	Total		
First Module	Anatomy	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS	
	Physiology	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS	
	Biochemistry	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS	
Formative- Weekly LMS Based Assessment of 30 MCQs (10 MCQs per Subject)																																			
End of Module Assessment	Subject	Theory (Cognitive) Assessment																		Practical (Skill & Attitude) Assessment										Grand Total	Total Time of Module Assessment				
		MCQs					EMQs			SAQs					SEQs					Marks	Total Marks Theory	Total Time	AV OSPE					Time	AED Reflective Writing			OSVE			Total Practical Marks
		C	HV	S	Total	Marks	C	Total	Marks	C	HV	S	Total	Marks	C	HV	S	Total	C				HV	S	Total	Marks	Viva					Copy	Total		
Second Module	Anatomy	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS	
	Physiology	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS	
	Biochemistry	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS	
Formative- Weekly LMS Based Assessment of 30 MCQs (10 MCQs per Subject)																																			

Block	Subjects	LMS Based Assessment					OSPE						Grand Total	Total Block Time
		MCQs					LabOSPE	IOSPE	COSPE	Total	Marks	Time		
		C	HV	S	Total	Time	C	HV	S					
BLOCK	Anatomy	21	6	3	30	30 min	14	4	2	20	60	6 HRS	90	10 HRS
	Physiology	21	6	3	30	30 min	14	4	2	20	60	6 HRS	90	10 HRS
	Biochemistrv	21	6	3	30	30 min	14	4	2	20	60	6 HRS	90	10 HRS

50% Questions/OSPE Stations/Viva Stations will be from Foundation Module and 50% Questions will be from MSK-1 Module

For Each assessment student will have to individually pass Theory and Practical components

Marks per Item

MCQ=1	EMQ= 5	SAQ= 5	SEQ= 9	AVOSPE= 5	OSPE= 3
OSPE Time=1 Round of 40 Students =80 min					
3 Round of 40 Students =240 min					
OSVE=Time per student=5mins					

Weekly LMS Assessment			
Subjects	Anatomy	Physiology	Biochemist
No of MCQs*	30	30	30
Marks/MCQ	30	30	30
*MCQ=1 Mark each, 1 min each			

Annexure-I

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

RAWALPINDI MEDICAL UNIVERSITY, RWP
ANATOMY DEPARTMENT
1st 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. Medial 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
1st 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 | 1.5 |
| | b. Discuss unhappy triad of knee | 1.5 |

RAWALPINDI MEDICAL UNIVERSITY, RWP
PHYSIOLOOGY DEPARTMENT
1st 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
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
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
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
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

RAWALPINDI MEDICAL UNIVERSITY, RWP
PHYSIOLOOGY DEPARTMENT
1st 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
1st Year MBBS SEQs Module Exam (MSK-II)

- | | |
|---|---|
| <p>1. Each turn of α-helix contains the amino acid residues:</p> <ul style="list-style-type: none">a. 3.0b. 3.6c. 4.2d. 4.5e. 4.8 <p>3. In protein structure, alpha helix and beta sheets are examples of:</p> <ul style="list-style-type: none">a. Primary structureb. Secondary structurec. Tertiary structured. Quaternary structuree. Protein folding | <p>2. One of the following proteins is chromoprotein as well as metalloprotein</p> <ul style="list-style-type: none">a. Ferritinb. Albuminc. Myoglobind. Hemoglobine. Transferrin <p>4. Disulfide bond is formed between sulfhydryl groups of</p> <ul style="list-style-type: none">a. Alanineb. Methioninec. Cysteined. Valinee. 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

Sample Paper of EMQ

Theme: Diagnosis of Musculoskeletal Disorders

Directions:

For each case scenario below, select the most appropriate diagnosis from the list of options provided.

Options:

- A. Rheumatoid Arthritis
- B. Osteoarthritis
- C. Gout
- D. Fibromyalgia
- E. Osteoporosis
- F. Tendonitis
- G. Bursitis
- H. Fracture
- I. Scoliosis
- J. Muscular Dystrophy

Case Scenarios:

Case 1: A 55-year-old woman presents with pain and stiffness in her hands, especially in the mornings. The stiffness usually lasts for about an hour. On examination, there is noticeable swelling in the finger joints.

Case 2: A 65-year-old male reports severe pain in the big toe, which appeared suddenly overnight. The toe is red, swollen, and extremely tender on examination.

Case 3: A 70-year-old female has been experiencing back pain. Recent bone density scans show significantly reduced bone mass, making her susceptible to fractures.

Case 4: A 30-year-old male presents with pain in the shoulder that worsens when lifting objects overhead. There is tenderness on palpation over the shoulder joint.

Case 5: A 45-year-old woman complains of widespread body pain, including muscle aches, fatigue, and problems with sleep. She mentions that these symptoms have been persistent for months.

**OSPE
DEPARTMENT OF ANATOMY**

**Section I: Core Concept
A. Gross Anatomy**

Station No. 1

Time Allowed: 3mins

- I. Identify Red on model/ cadaver (1)
- II. Identify Green & name the most common artery involved in Myocardial Infarction (1)

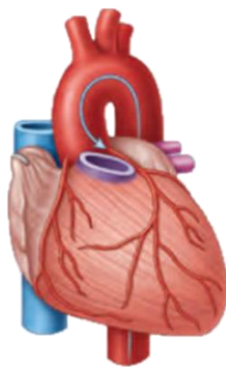
Station No. 1 Key

- I. Coronary Sinus
- II. Posterior Interventricular artery & LAD /LCA

C.Vertical Integration (Cardiology)

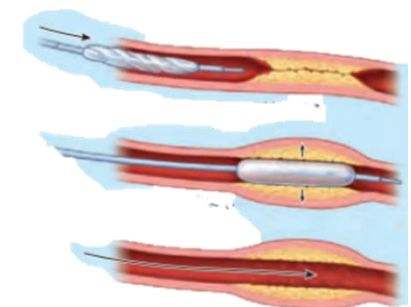
Station No. 15

Time Allowed: 3mins



Look at the picture given below

- (0.5) I. Identify the procedure in the given image.
- (0.5) II. Name any one indication for this procedure
- (01) III. Give 2 sites of cardiac catheterization



**OSPE
DEPARTMENT OF BIOCHEMISTRY**

Station 1 (Core Concept - Skill Based)

Perform Lead Sulphide Test on the given sample.

- Procedure (01)
- Result (01)
- Inference (01)

Key Station 1 (3 Marks)

Procedure (01)

- Take 2ml of the given solution in a clean dry test tube
- Add 2ml of 40% NaOH
- Boil for 1-2 minutes. Sodium sulphide is formed.
- Add 1ml of Lead Acetate

Result (01)

- Black precipitate appears

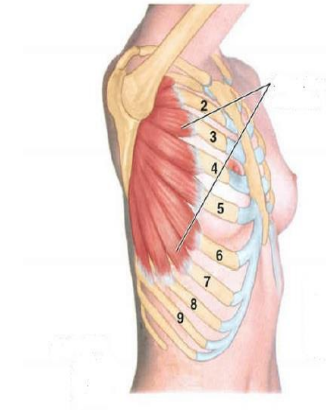
Inference (01)

- Black precipitate of Lead Sulphide confirms the presence of sulphur containing amino acids

**AV OSPE
DEPARTMENT OF ANATOMY**

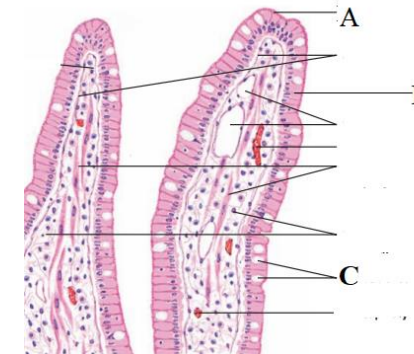
Gross Anatomy

- I. Identify structure A and give its attachments. (2)
- II. What is the nerve supply of structure A. (1)
- III. Name the clinical condition which results due to paralysis of structure A. (2)



Histology

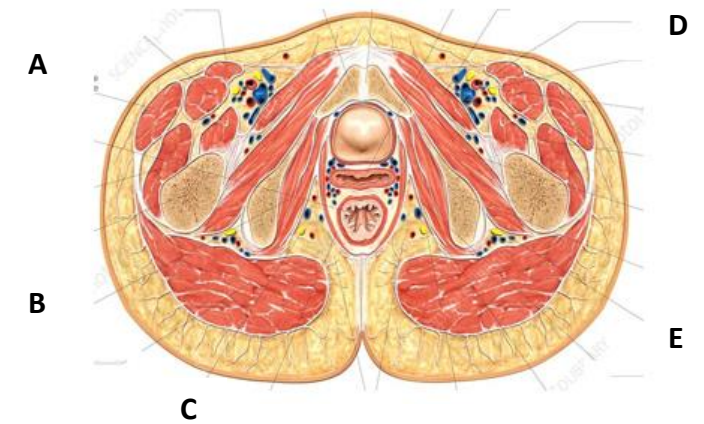
- Identify structure A. (1)
- Identify structure B. (1)
- Identify structure C. (1)
- Give two locations in body of epithelium shown in image. (2)



**AV OSPE
DEPARTMENT OF ANATOMY**

Cross Sectional Anatomy

- | | |
|----------------------------------|-----|
| Q.1) Identify A, B, C, D & E | 2.5 |
| Q.2) Give Nerve Supply of Uterus | 2.5 |



**AV OSPE
DEPARTMENT OF BIOCHEMISTRY**

Q1. What are the causes of Protein Misfolding? 2.5

Q2. What are the biochemical changes in Alzheimer's disease? 2.5

