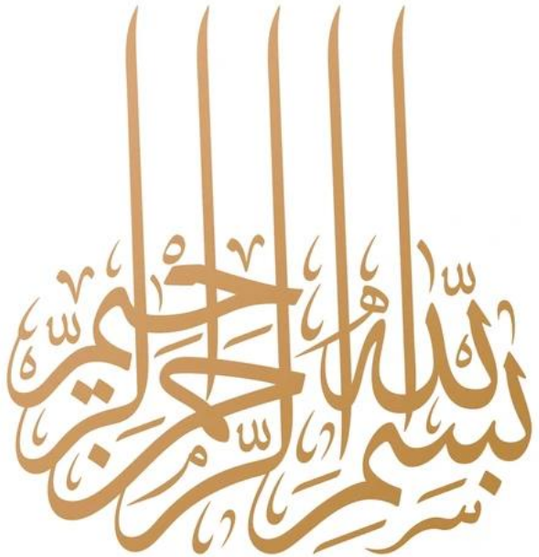
Rawalpindi Medical University
Clinically Oriented Integrated Modular Curriculum 2024
First Year MBBS

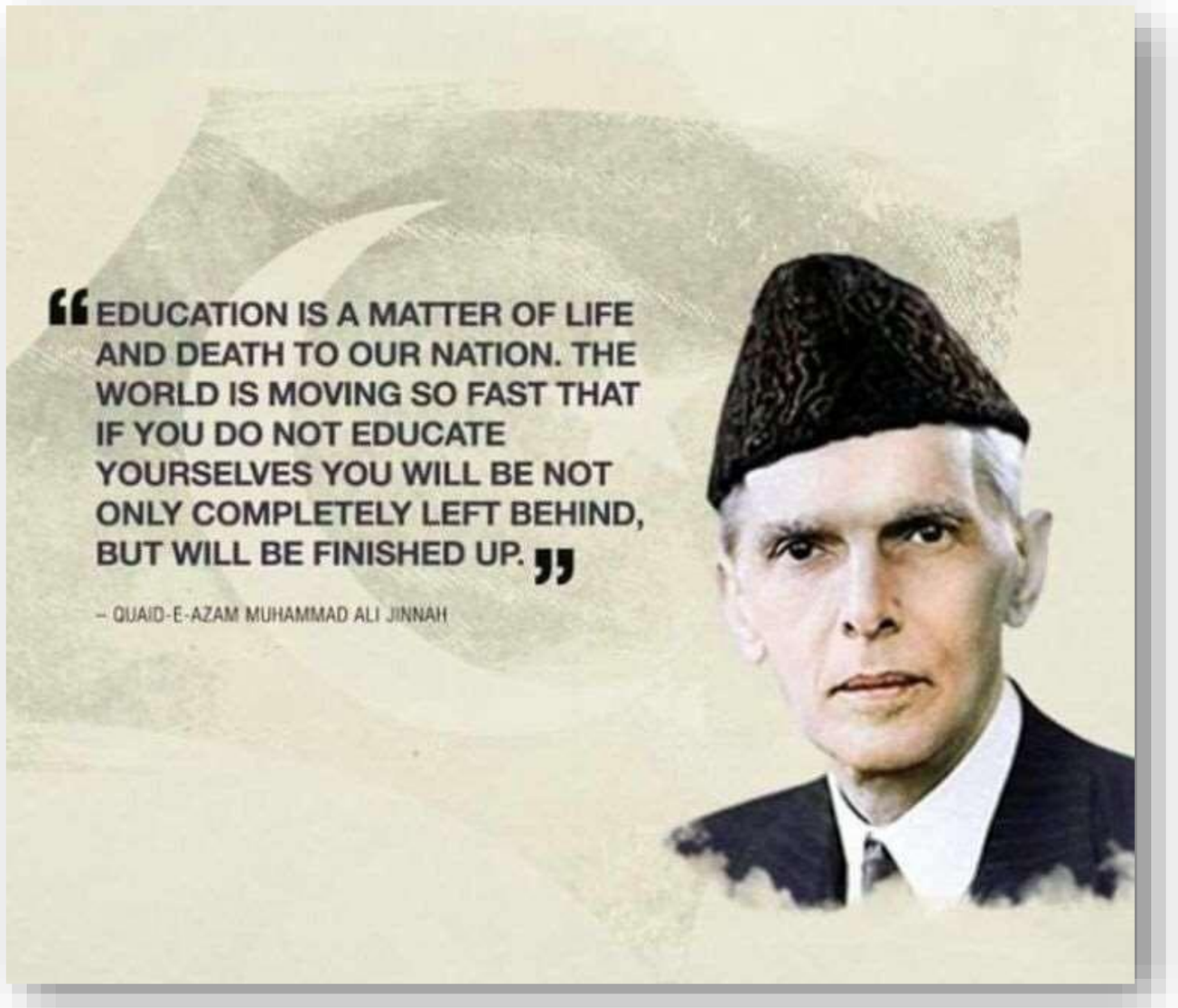


Dedicated to Hazrat Muhammad (S.A.W)

1st Year MBBS
Clinically Oriented Integrated Modular Curriculum 2024

Revised September 2024

Quote by Quaid-e-Azam Muhammad Ali Jinnah



Sardar Saleem Haider Khan

Governor Punjab

It is with great pleasure that I extend my congratulations to Rawalpindi Medical University on the introduction of its Integrated Curriculum. This progressive step reflects the university's commitment to shaping the future of medical education inPakistan, ensuring that our future healthcare professionals are equipped with the skills and knowledge needed to meet the evolving demands of healthcare, both locally and globally.

The integrated curriculum represents a significant shift in how medical education is delivered, focusing on the interconnection between various disciplines and emphasizing patient-centered care. By blending theoretical knowledge with practical application from the early stages of their education, students are better prepared to understand the complexities of human health and the diverse challenges they will face in their medical careers. This holistic approach is criticalin nurturing well-rounded professionals who are not only adept clinicians but alsocompassionate caregivers.

Rawalpindi Medical University has always been at the forefront of medical education, and this curriculum reflects its visionary leadership in preparing graduates who are ready to confront the future of healthcare with confidence andcompetence. I am confident that this initiative will greatly contribute to the advancement of healthcare in Punjab and beyond, ensuring that our doctors are not only skilled but also compassionate and ethical leaders in their field.

Mr. Khawaja Salman Rafique

Minister, Specialized Healthcare & Medical Education Department

The Rawalpindi Medial University, Rawalpindi has consistently evolved and adapted to support its learners, uphold academic standards, and maintain its status as a globally recognized institution. The launch of the ‘Modular Curriculum 2024 marks a significant step forward in advancing public health and addressing future healthcare needs. By embracing this curriculum, students and professionals alike will gain the toolsto turn knowledge into practical expertise, positioning themselves as leaders in research, public service, sustainable healthcare, and accessible medical care.

A curriculum’s success hinges on the dedication of those who implement it. The true impact of this program will be realized through the joint efforts of educators and learners. I am confident that this integrated educational framework will equip our futuredoctors to confront global health challenges, including emerging disease trends, healthcare equity, and solutions for underserved communities.

Prof. Dr. Muhammad Umar
Vice Chancellor RMU

Prof Jahangir Sarwar Khan
Principal RMC

There is no subject which will require more careful consideration in the settlement of the educational details of the University of which RMU is to be the center than that of the choice andarrangement of the curriculum to be required for the degree in medicine. An exceptionalopportunity presents itself, you have, within certain limits, a tabula rasa, and it behooves the authorities of the future university to mark it in the manner best calculated to promote the advanceof medical science and the efficiency of medical teaching. If, from an experience acquired as a teacher and examiner in various universities during a period of more than a quarter of a century,I can help in the promotion of these objects, by pointing out virtues which may be emulated here,and failings which may be avoided there. I shall at least feel I have done something to assist in the modelling of what will, we all hope, become one of the great centers of learning of Pakistan.

But whilst endeavoring to sketch out what subjects should form part of the medical curriculum of a university, and to appraise their relative order and value, I do not propose to place before youan ideal which is unattainable under the circumstances of place and time, in which you find yourselves, although it would be easier to construct an ideal curriculum than to plan one out within the limits of present-day practicability. I suppose that the integrated modular curricula nowbeing established in our university will more nearly approach the ideal.

The diverse faculty and student body make our programs earn top national and international reputation. I can say with complete confidence that what makes our university exceptional are the faculty & staff who are dedicated to help our aspiring students to become the compassionate,highly skilled health-care providers of tomorrow.

Prof, Dr. Ifra Saeed
Professor of Anatomy
Director DME

Prof, Dr. Ayesha Yousaf
Dean Basic Sciences

This is a great prospect for RMU and curriculum committee to formulate the modular curriculum of basic medical sciences. It is a task, well meant for its contribution in medical education. Hopefully it will go a long way in training the medical graduates, as per required national and international standards of medical education. The Modular teaching is likely to give a fresh and varied approach to learning process and at the end optimizing maximum learning outcomes. This entails coordination, patience, commitment and diligence from all those who are on board, either the faculty or the students. All this seems to be encouraging, yet limited resources, inadequate manpower, and difficulty in breaking traditional shackles are tangible obstacles.

The preparation and implementation of modular curriculum provides the faculty an opportunity to design and reorientate and reconceptualize health –illness process. Transforming academic stakeholders' learning perspectives and then to translate it in students' development as an effective force of society, well versed with modern day problems, is an uphill task. This is a humble effort in this regard. Still there is lot to distill, crystallize and narrate. Hopefully from this marathon, the curiosity will emerge like a fresh breeze, from here the character will arise in the horizon, as all this at the end is meant to serve the ailing humanity and to accomplish the dream of a healthy society.

At the end, it will be great injustice not to acknowledge the unwavering and untiring support of Prof Dr Muhammad Umar, Vice Chancellor RMU, who is an ardent supporter and promoter of anything which gives a fresh impetus to medical education and practice. It's all because of his continuous input and persuasion, that the modular curriculum achieved fruition.

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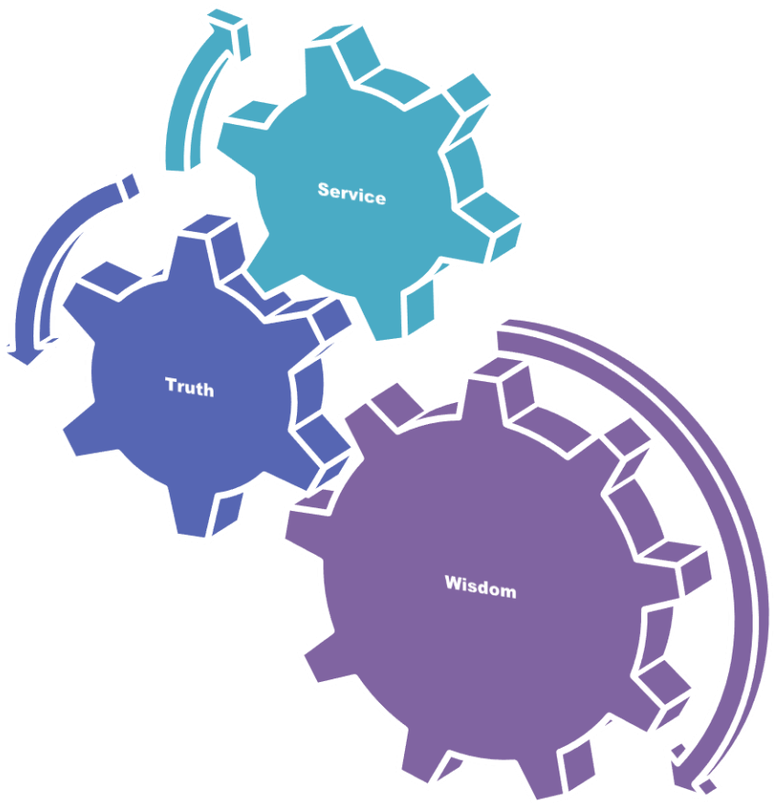
University Moto, Vision, Values & Goals

RMU Motto



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Highly recognized and accredited center of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are critical thinkers, experiential self-directed lifelong learners and are socially accountable

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.

Outcomes 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 evidence-based knowledge to help you attain personal and professional growth & excellence.

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Dr Tehzeeb, Dr Samia Sarwar, Dr Ifra Saeed, Dr. Ayesha Yousaf, Dr Tehmina Qamar, Dr Sidra Hamid	2019-2020	2nd	Developed for First & Second MBBS. Horizontally and vertically integrated Learning objectives updated
Dr Tehzeeb, Dr Samia Sarwar, , Dr Ifra Saeed, Dr Ayesha Yousaf , Dr Tehmina Qamar, Dr Sidra Hamid	2021-2022	3rd	Developed for First & Second MBBS. Horizontally and vertically integrated Learning objectives updated, Research curriculum incorporated
Dr Tehzeeb, Dr Samia Sarwar, Dr Ifra Saeed, Dr Ayesha Yousaf, Dr Tehmina Qamar, Dr Sidra Hamid	2022-2023	4th	Developed for First & Second MBBS. Horizontally and vertically integrated Learning objectives updated, Research, Bioethics, Family Medicine curriculum incorporated along with Professionalism
Dr Samia Sarwar, Dr Ifra Saeed, Dr Ayesha Yousaf, Dr Tehmina Qamar, Dr Sidra Hamid	2023-2024	5th	Developed for First & Second MBBS. Horizontally and vertically integrated Learning objectives updated, Research curriculum revamped Bioethics, Family Medicine curriculum incorporated along with Professionalism. Entrepreneurship curriculum incorporated

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SECTION-I

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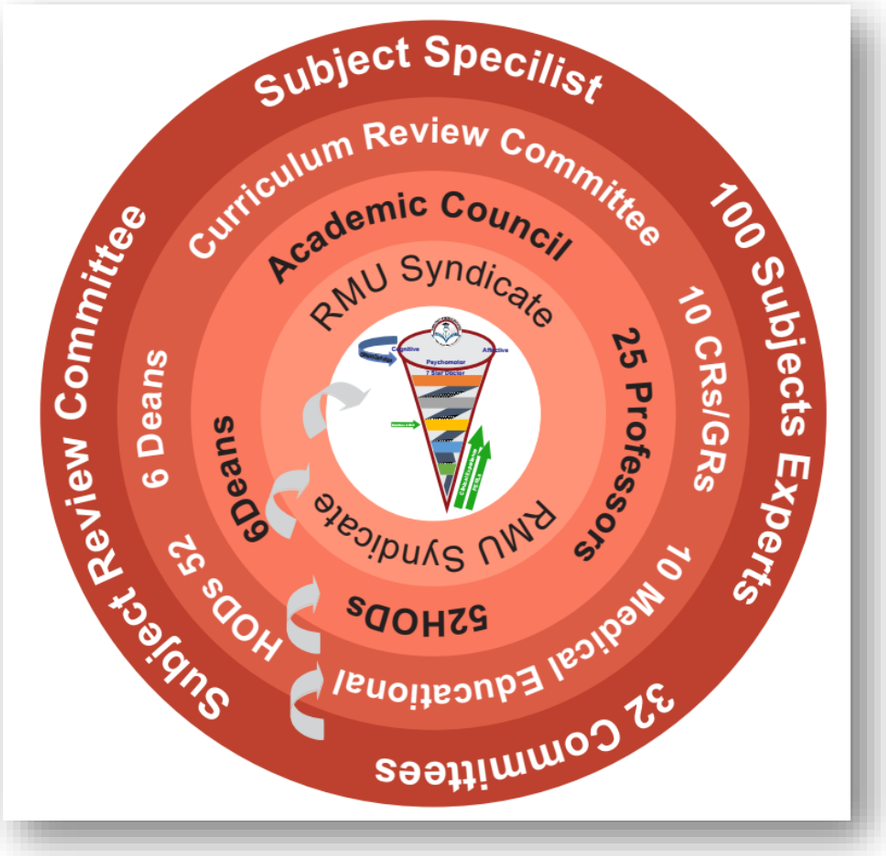

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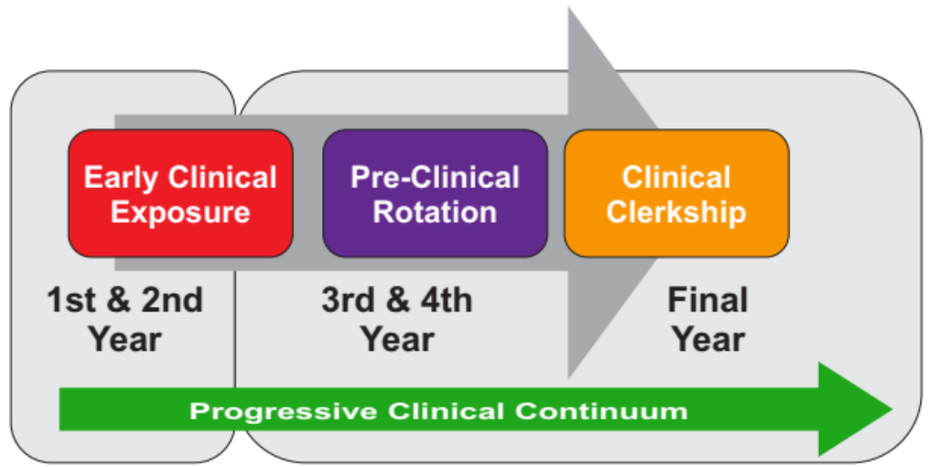
Dr. Moniba Iqbal PGT	Dr Saira Aijaz Demonstrator	**Department of Family Medicine**
Dr. Bushra Farooq PGR		Assistant Prof. Dr. Sadia Azam Khan
Dr. Zaira Azhar PGR		**Department of Neurology**
Dr. Saba Maryam PGR		Assistant Prof. Dr. Waqas Ahmed
Dr. Ayesha zujaja PGR		**Department of Pulmonology**
Dr. Maria Jabeen PGR		Assistant Prof. Dr. Zaid Umar
Dr. Mehreen Noor PGR		

SECTION-II

Foreword to Curriculum 2024

- Introduction
- Levels of Integration
- PMDC Seven Star Doctor Competencies
- Contextualization in the curriculum
- Context Facets of Curriculum 2024 at Rawalpindi Medical University
- Process of Curriculum Development
- Curricular Organization and Structure



Integrated Curriculum Design

Introduction

Welcome to the fourth edition of the Clinically Oriented Integrated Modular Curriculum for the MBBS students at Rawalpindi Medical University. This revised version is tailored to integrate clinical insights from the very beginning, ensuring a more practical and application-focused approach to the fundamental medical sciences. At Rawalpindi Medical University, we are committed to providing a curriculum that not only covers the essential theoretical knowledge but also emphasizes the development of critical clinical skills necessary for future medical professionals. This curriculum is designed to foster a deep understanding of human biology and the pathophysiological processes, combined with hands-on clinical experiences that contextualize theoretical knowledge in real-world medical settings.

Version IV of the curriculum incorporates the latest advancements in medical education and reflects changes in the medical landscape, ensuring our students are well-prepared to meet the challenges of modern healthcare environments. With a focus on interdisciplinary learning and ethical practice, we aim to equip our students with the competence and compassion required to excel in their future careers.

We trust that this curriculum will inspire and challenge you to reach new heights in medical education and beyond. Welcome to a journey of learning that promises to be as rewarding as it is demanding.

What is curriculum?

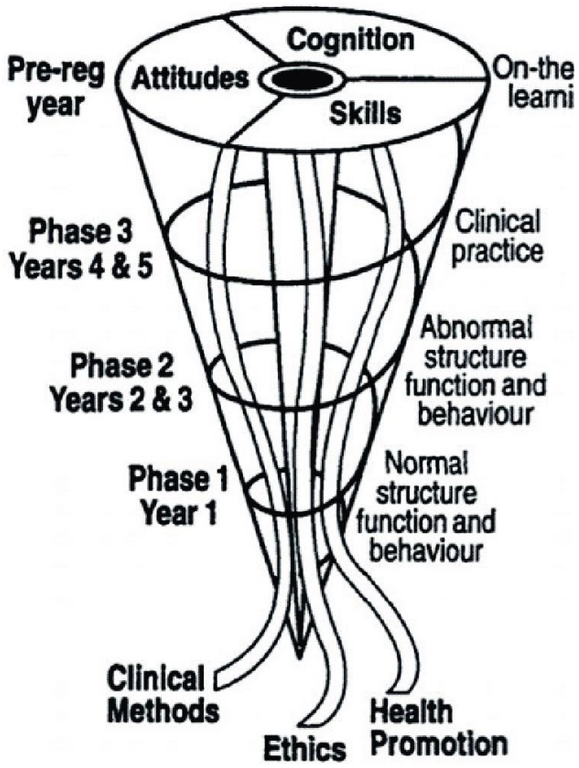
According to definition curriculum can be classified into five categories:

1. Curriculum as a product - program, document, electronic media, or multimedia
2. Curriculum as a program of study - usually courses offered, curriculum sequences of study instandards as benchmarks, gateways,
3. Curriculum as intended learnings - goals, content, concepts, generalizations, outcomes
4. Curriculum as experiences of the learner - activities, planned and unplanned.
5. Hidden curriculum - what students learn that isn't planned - unless you plan for this - or is itpossible?

What is a Integrated Medical Curriculum?

Shoemaker defines an integrated curriculum as “education that is organized in such a way that it cuts across subject matter lines, bringing together various aspects of the curriculum into meaningful association to focus upon broad areas of study.” There is an ongoing discussion aboutwhether medical curriculum should be discipline based or integrated.

Most curricula for medical education have been integrated horizontally and vertically–-vertically between basic and clinical sciences. The Flexnerian curriculum has disappeared to permit integration between basic sciences and clinical sciences, which are taught throughout the curriculum. We have proposed a different form of integration where the horizontal axis representsthe defined learning outcomes and the vertical axis represents the teaching of the sciences throughout the courses. We believe that a mere integration of basic and clinical sciences is not enough because it is necessary to emphasize the importance of humanism as well as health population sciences in medicine. It is necessary to integrate basic and clinical sciences, humanism,and health population in the vertical axis, not only in the early years but also throughout the curriculum, presupposing the use of active teaching methods based on problems or cases in small groups.



A Spiral Curriculum

The method of teaching medicine, since Flexner's days, implies that students should first learn basic and biomedical sciences and then move to clinical sciences; however, this is not how patientsare presented. A common criticism of this approach is that students will not see the relevance of basic and biomedical sciences applied to clinical practice, and it is preferable to encourage studentsto think as doctors from the day they enter medical school.

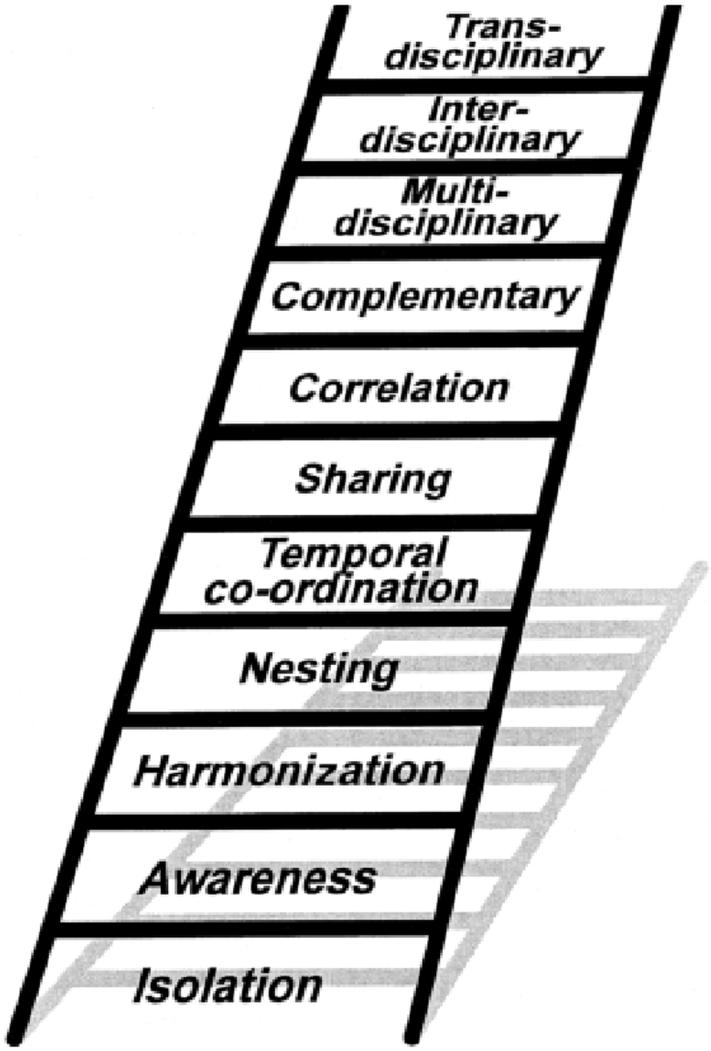
Integration is therefore of key importance for medical education because basic science learning isplaced in the context of clinical and professional practice and is considered by students to be moremeaningful and relevant. In the vast majority of curriculum reforms, vertical integration combinesbasic and clinical sciences, early clinical experience, clinician–scientist partnerships, and incorporation of sciences in the later years of the course. This is undoubtedly an advantage, but isbased on a biologist's vision of the health-illness process

Levels of Integration

At Rawalpindi Medical University, our curriculum for the MBBS program adheres to the sophisticated model of Correlation, recognized as level 7 on Harden's scale of integration. This approach is foundational throughout the initial four years of the medical education journey. Our emphasis predominantly remains on discipline-specific education, where courses focused on individual subjects constitute the majority of the curriculum. This traditional structure ensures a robust foundation in the core medical sciences.

Within this discipline-oriented framework, we introduce an innovative element—an integrated teaching session. These sessions are strategically designed to bridge various subjects by identifying and connecting areas of mutual relevance. This method facilitates a holistic learning experience by correlating distinct disciplines and embedding them within a clinical context. This integration enhances the students' understanding and application of medical concepts, making the learning process both comprehensive and applicable to real-world scenarios.

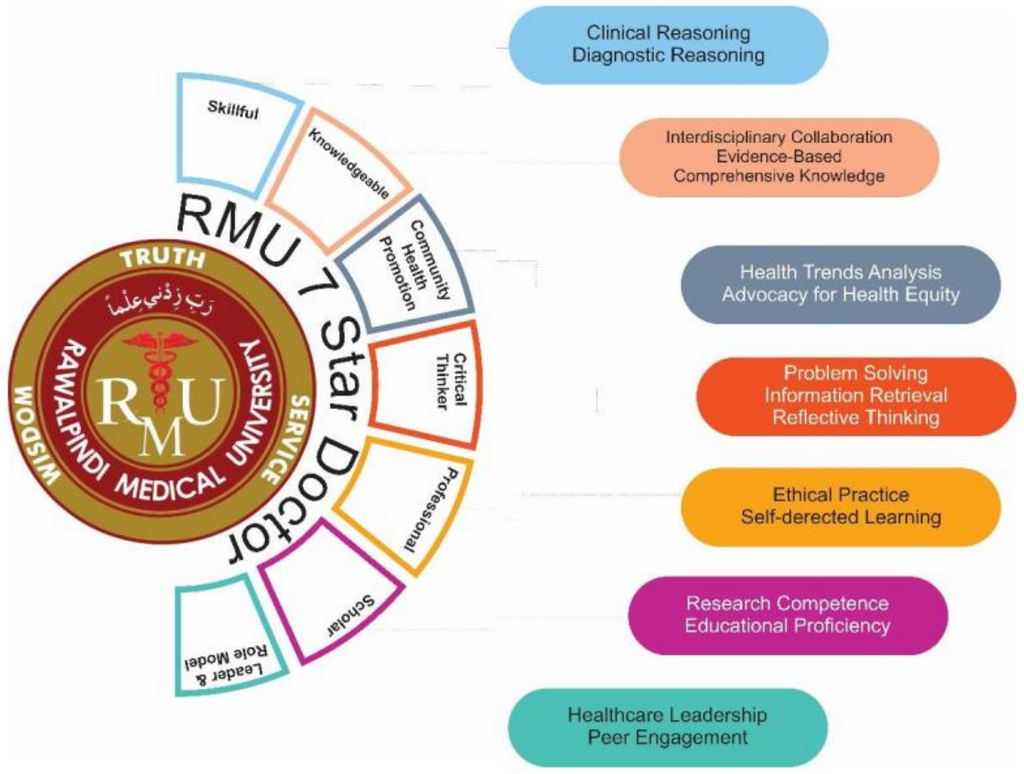
As our students progress through their education, the degree of clinical teaching intensifies. This gradual increase is deliberate, ensuring that by the time our students reach their final year, they are well-prepared to engage in extensive clerkships. Year V is exclusively devoted to these clerkships, offering students hands-on, practical experience in a variety of clinical settings. This exposure is crucial for the development of competent and empathetic future physicians who are equipped to meet the diverse needs of their patients and the healthcare system at large.



Harden's Integration Ladder

PMDC Seven Star Doctor Competencies

At RMU we aim to produce seven-star doctor according to PMDC Competencies having the generic competencies of “Skill,Knowledge, Community Health Promoter, Critical Thinker, Professional, Scholar, Leader and Role Model”, Rawalpindi Medical University has introduced modular integrated undergraduate curriculum as being first public sector university. These competencies are further outlined by various enabling traits specifying knowledge, skills, and attitude.



RMU 7 Star Doctor

Contextualization in the curriculum

It involves incorporating both local needs and global standards. This ensures the curriculum's relevance to the local community while adhering to international benchmarks. For health professionals, this is crucial as it equips students to effectively serve diverse populations in real-world healthcare settings.

Content identification, contextualization, and validation during curriculum development require a balanced consideration of local and global requirements, overseen by relevant leaders and experts. To this end, Rawalpindi Medical University has engaged subject experts and medical educationists, planning to incorporate feedback from local stakeholders to address the current needs effectively.

In Pakistan, the shift towards contextualization is essential, particularly due to the country's unique healthcare challenges like infectious diseases, malnutrition, and maternal and child mortality, compounded by socioeconomic factors. The prevalence of various diseases, limited healthcare resources, and cultural diversity necessitate a customized approach to medical education.

Contextualizing the curriculum is expected to positively influence graduate performance. By blending basic and clinical subjects, introducing early clinical exposure, and emphasizing practical, context-aware learning, graduates will be better equipped to tackle health challenges in their communities, enhancing their competence, confidence, and ability to deliver high-quality healthcare.

Context Facets of Curriculum 2024 at Rawalpindi Medical University

Rawalpindi Medical University adheres to globally recognized best practices in curriculum development. The Department of Medical Education at RMU has structured the process of syllabi identification, thematic structuring, content validation, and contextualization. This process integrates existing teaching and learning practices with global recommendations for change.

Key perspectives for the context of change include:

•The exponential growth in course content due to educational advancements, technological innovations, and scientific discoveries requires prioritization, removal of outdated concepts, and modern information transfer methods.

•Evolving societal expectations of healthcare workers necessitate balancing patient satisfaction with health system responsiveness. The curriculum should address societal needs, healthcare access, resource equity, and system awareness.

•The post-pandemic era's shift towards hybrid learning and online methodologies necessitates a curriculum that accommodates these new educational paradigms.

•The curriculum revision is aligned with global standards of Basic Medical Education and conforms to national regulations, ensuring international recognition and employability.

•The curriculum incorporates training in the affective domain to address societal expectations, legal awareness, and community interaction. This includes a dedicated ‘spiral’ for affective training, with assessments for the ‘PERLs’ domain.

•Student-centered approaches, such as Problem-Based Learning, electives, self-directed learning, and portfolio development, empower students in their educational journey.

Process of Curriculum Development

The curriculum development process at Rawalpindi Medical University was an intricate and well-orchestrated endeavor, meticulously designed to create an advanced and relevant curriculum. This process maintained a strong linkage with existing educational norms and professional practices while introducing innovative elements. Here's a more detailed breakdown of the process:

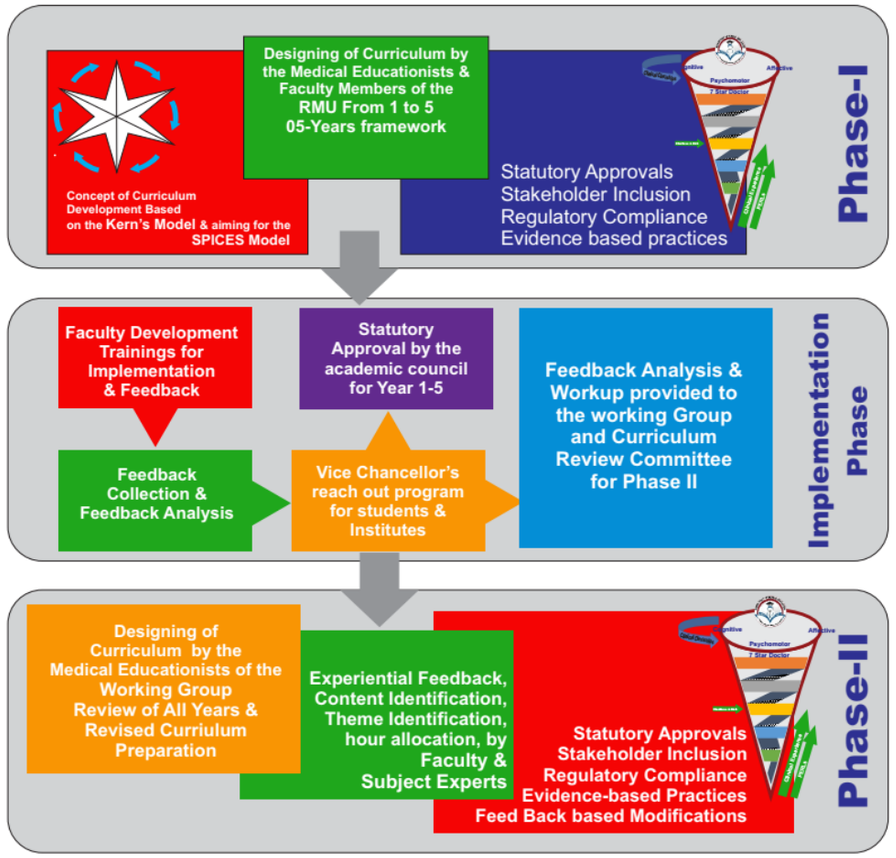
1. **Syllabi Development and Expert Consultation**: The first stage involved the formation of subject-specific advisory committees, engaging over 34 experts. Each committee focused on curating and refining the syllabi for their respective subjects. Their primary task was to incorporate all critical elements pertinent to each subject while discarding any obsolete or irrelevant content.
2. **Curricular Committee Review**: The next phase brought together a 26-member Curricular Steering Committee, consisting of medical educationists This committee played a pivotal role in scrutinizing and endorsing the overarching structure for a 'Modular Integrated Curriculum' spanning five years. Their focus areas included the identification and placement of modules, clerkship planning, and ensuring that the curriculum aligned seamlessly with various assessment techniques.
3. **Theme Identification and Modular Design**: In this phase, 18 medical educators engaged in a dynamic and collaborative exercise. They meticulously arranged syllabi elements into specific modules according to these themes. This step was crucial in determining the topics for each learning objective and allocating appropriate hours for each curriculum component.

4. **Finalization of Modules**: A select group comprising Lead Medical Educationists and members from the Department of Medical Education undertook the final step of module finalization. This involved setting the structure, themes, time allocation, syllabi content, and emphasizing clinical relevance for each module.

5. **Statutory Approval and Integration**: The finalized modules and their associated assessment policies underwent a rigorous approval process through the Academic Council, and the Syndicate. Feedback and recommendations gathered during this statutory process were meticulously integrated into the curriculum guidelines.

6. **Adaptive and Feedback-Oriented Approach**: Recognizing the importance of adaptability and continuous improvement, the university incorporated a system for regular feedback and curricular evaluations. This system ensures that the curriculum remains dynamic, accommodating necessary updates and refinements as needed.

7. **Curriculum 2024 - A Modular Integrated Outcome-Based Approach**: The developed Curriculum is a testament to a comprehensive, outcome-based educational strategy. This strategy enables affiliated colleges to implement the curriculum effectively, respecting each institution's unique identity and vision, despite variations in available resources.



Phases of Curriculum Development

8. **Integrative and Contemporary Educational Strategies**: The curriculum emphasizes both horizontal integration across various disciplines and vertical integration throughout different educational stages. This integrative approach is in line with modern educational theories, like Meizrow's concept of transformative learning and strategies for early clinical exposure. Such an approach is aimed at promoting professional growth and practical knowledge application among students.

In essence, the curriculum development at Rawalpindi Medical University was a detailed, step-by-step process involving extensive expert input, iterative refinement, and a focus on adaptability and modern educational practices

Curricular Organization and Structure

RMU will follow the Correlation approach, corresponding to level 7 of Harden's levels of integration. The emphasis remains on disciplines or subjects, with subject-based courses occupying most of the curriculum time. Within this framework, an integrated teaching session or course is introduced, in addition to the subject-based teaching. This session brings together areas of interest common to each of the subjects. Although the teaching is discipline-based, topics are correlated and taught within a clinical context for better understanding and application of concepts. However, clinical teaching increases gradually with advancing years. The fifth year of the MBBS program is dedicated to clerkships.

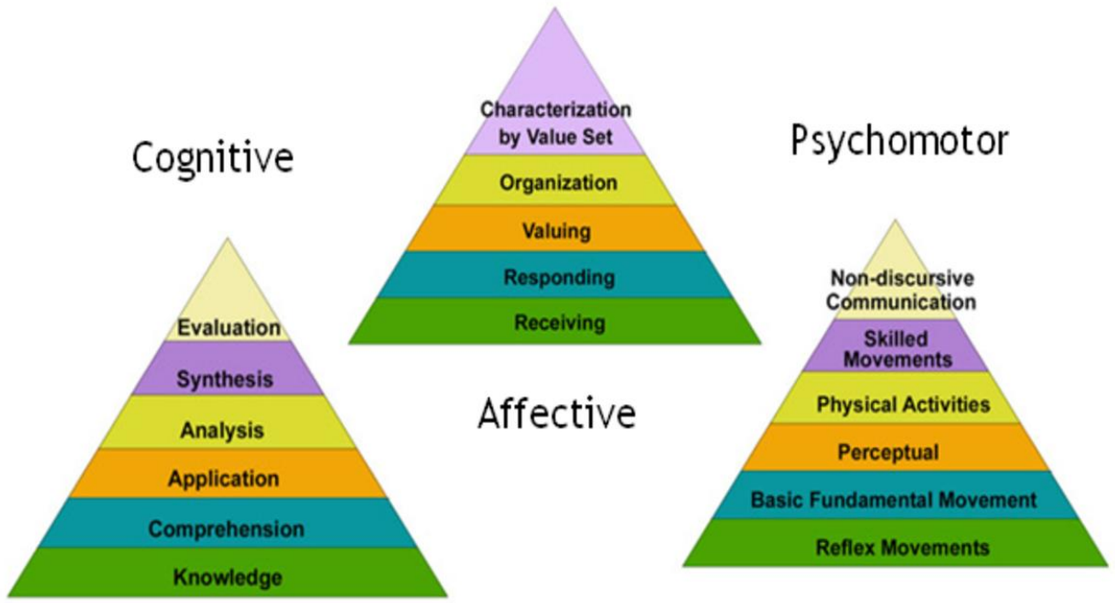
Integrated Curriculum Design of RMU MBBS Program

Two designs of the MBBS curriculum are acceptable by PMDC. System Based (Preferred) with horizontal and vertical integration. The curriculum of each Clinical Discipline must emphasize–Health Promotion and Disease Prevention‖, besides Curative Health Care. RMU has opted for system based modular curriculum.

The Module: Module is the smallest unit of Curriculum both in the System- Based and Subject-Base (topic-based) Curricula. Modules are taught as a continuous block or as a longitudinal theme and assessments is carried out at the end of each module. The System-Based Curriculum made up of ―Modules, where each module is based upon organ-system(s) of the body. In each module, the Basic and Clinical Sciences are taught and learned in an integrated manner.

Components of a Module:

1)Title of Module/System 2) Learning Objectives, 3) Allocated Time in weeks/Hours and Credit Hours, 4) the name of the Coordinator, 5) Teaching Faculty (regular/visiting) 6) Learning Sites, 8) Modes of Information Transfer, 9) List of the Recommended Books, 10) Assessment strategies, and 11) Strategies for Monitoring and Improvement.



Integrated Curriculum Design

Learning Objectives: Learning Objectives are defined for each module. They are Specific, Measurable, Achievable, Relevant to the desired competencies (Outcomes) of the PMDC Curriculum and Time bound (SMART), related to level of the learner and the three main domains.

Level of the Learner: While developing the curriculum, the learning objectives are according to the desired level of the learner, and formative and summative assessment is done to assess the knowledge, skills and attitudes to be achieved for that level.

Roles and Responsibilities:

a. The RMU MBBS curriculum in the first four years is delivered in a System-Based Modular Format with clinical relevance and early clinical Exposure. However, in the third and fourth years, students will gain clinical exposure through rotations in the wards and outpatient departments (OPDs), and in the fifth year through clerkships.

b. The curriculum is delivered by modular teams consisting of multidisciplinary basic science faculty and relevant clinical faculty.

d. The planning and delivery is coordinated by Module Team who will guide module coordinators of their respective modules for efficient implementation.

e. The Modular Coordinator is responsible for teaching and assessment during each module. The coordinator will be appointed by the Heads of Departments (HODs) in coordination with the Health Professions Education (HPE) team.

f. The Clinical Coordinator is responsible for placement, teaching, and assessment during clinical rotations

SECTION-III

RMU Undergraduate Curriculum Competency Framework

- **Undergraduate Competency Model**
- **Outcomes of the Curriculum**

Competence refers to the ability of a medical student or professional to perform tasks or roles to a defined standard in a real-world setting. It encompasses the integration of knowledge, skills, behaviors, and attitudes required to deliver effective patient care. Competence is often described in terms of observable behaviors and is measured at various stages of medical education, ensuring that learners are capable of safely applying their training in clinical practice.

Competency Framework

RMU Undergraduate Competency Model

The Rawalpindi Medical University (RMU) Undergraduate Competency Model is designed to prepare medical students to meet the evolving challenges of modern healthcare. Grounded in the principles of patient-centered care, ethical practice, and community engagement, this model outlines the core competencies that every RMU graduate must attain. These competencies are carefully aligned with the needs of Pakistan's healthcare system and the broader global context, ensuring that RMU graduates are not only skilled clinicians but also ethical leaders, compassionate caregivers, and innovative problem-solvers.

The RMU Undergraduate Competency Model emphasizes a holistic approach to medical education, integrating scientific knowledge with practical skills, critical thinking, and a deep commitment to lifelong learning. Each competency is complemented by specific sub competencies that provide a clear roadmap for students' development, guiding them from foundational knowledge to advanced clinical practice.

Through this competency-based framework, RMU aims to cultivate graduates who are capable of delivering high-quality, safe, and effective care, while also advancing the health and well-being of the communities they serve. By adhering to these competencies, RMU students will be equipped to excel in diverse medical environments, adapt to the rapidly changing landscape of healthcare, and contribute positively to the society they serve.

Competency 1: Patient Care Deliverer

The "Patient Care Deliverer" competency focuses on the practical aspects of delivering patient care. It emphasizes the importance of applying clinical skills, knowledge, and compassion in providing high-quality healthcare to patients. Students are expected to develop a strong foundation in patient-centered care, practice-based learning, and a commitment to continuous improvement in their clinical practice.

- **Practice-Based Learning:** Students should engage in continuous learning through practical experience, applying evidence-based medicine and reflecting on their clinical practice to improve patient care.
    - Apply evidence-based medicine in clinical practice.
    - Reflect on clinical experiences to improve patient care.
    - Engage in self-directed learning to enhance clinical skills.
- **Service Orientation:** A commitment to serving others is fundamental to the practice of medicine. Students should prioritize the well-being of patients and the community, demonstrating a strong dedication to providing compassionate and effective care.
    - Demonstrate a commitment to patient-centered care.
    - Engage in community service activities.
    - Reflect on the role of service in medical practice.

Competency 2: Ethical & Professional

The "Ethical & Professional" competency encompasses the foundational principles of medical ethics and professional behavior. It requires students to uphold the highest standards of legal and ethical responsibility in their practice. They must demonstrate empathy, integrity, and accountability, treating all individuals with respect and maintaining a commitment to continuous improvement.

- **Professional & Ethical & Legal Responsibility:** Students are expected to understand and apply ethical principles and legal requirements in medical practice. They should be able to identify and analyze ethical dilemmas in healthcare settings and make decisions that prioritize patient well-being.
    - Explain ethical frameworks in medical decision-making.
    - Apply legal standards in patient care.
    - Demonstrate professionalism in all interactions.
- **Capacity for Improvement:** Students should continuously strive to improve their clinical skills, knowledge, and patient care practices through self-assessment and reflective learning.
    - Assess personal strengths and weaknesses.
    - Implement strategies for self-improvement.
    - Seek feedback from peers and mentors.
- **Empathy:** Understanding and sharing the feelings of patients is crucial for building trust and providing compassionate care. Students must develop the ability to empathize with patients from diverse backgrounds.
    - Demonstrate empathy in patient interactions.
    - Reflect on the emotional and psychological aspects of patient care.
    - Integrate empathy into clinical practice.
- **Integrity:** Students must practice medicine with honesty and adhere to moral and ethical principles, ensuring that their actions align with the values of the medical profession.
    - Maintain honesty in patient interactions.
    - Uphold ethical standards in clinical decision-making.
    - Demonstrate transparency in communication with patients and colleagues.
- **Accountability:** Medical students must be accountable for their actions, taking responsibility for their decisions and outcomes in patient care.

    - Take responsibility for clinical decisions.
    - Reflect on the outcomes of patient care.
    - Ensure accountability in teamwork.
- **Respect:** Respect for patients, colleagues, and the broader healthcare team is fundamental. Students should treat everyone with dignity and consideration, regardless of differences in background or beliefs.
    - Demonstrate respect in patient interactions.
    - Collaborate respectfully with team members.
    - Address cultural differences in a respectful manner.

Competency 3: Scholar & Life-Long Learner

The "Scholar & Life-Long Learner" competency highlights the importance of continuous learning and scholarly inquiry in medical practice. Students are encouraged to engage in scientific research, develop critical thinking skills, and commit to lifelong learning to stay current in their field and contribute to the advancement of medical knowledge.

- **Living Systems:** Students should have a deep understanding of living systems and their functions, enabling them to apply this knowledge to patient care.
    - Explain the principles of living systems.
    - Apply knowledge of living systems to clinical practice.
    - Evaluate the impact of living systems on health and disease.
- **Human Behavior:** Understanding human behavior is crucial for effective patient care and communication. Students should be able to analyze behavioral factors that influence health and apply this understanding in clinical settings.
    - Analyze the impact of behavior on health outcomes.
    - Apply behavioral principles in patient care.
    - Reflect on the role of behavior in health and disease.
- **Diagnose and Manage:** Students must be proficient in diagnosing and managing medical conditions, using evidence-based approaches to ensure the best possible outcomes for patients.
    - Diagnose medical conditions accurately.

    - Develop management plans for patient care.
    - Evaluate the effectiveness of treatment interventions.
- **Scientific Inquiry:** Engaging in scientific inquiry is essential for advancing medical knowledge. Students should be able to conduct research, critically appraise evidence, and contribute to the scientific community.
    - Conduct research on medical topics.
    - Critically appraise scientific literature.
    - Disseminate research findings effectively.
- **Quantitative Reasoning:** Quantitative reasoning skills are necessary for interpreting data and making informed decisions in medical practice. Students should be able to analyze and apply quantitative data in clinical settings.
    - Interpret quantitative data in clinical practice.
    - Apply statistical methods to medical research.
    - Reflect on the role of quantitative reasoning in decision-making.
- **Critical Thinker:** Developing critical thinking skills is vital for solving complex medical problems. Students should be able to analyze information, evaluate evidence, and make reasoned decisions in patient care.
    - Analyze clinical scenarios critically.
    - Evaluate evidence in medical practice.
    - Make informed decisions based on critical thinking.

Competency 4: Team Worker & Communicator

The "Team Worker & Communicator" competency emphasizes the importance of effective communication and teamwork in healthcare settings. Students are expected to develop strong oral and written communication skills, work collaboratively as part of a healthcare team, and demonstrate leadership when necessary. Reliability, adaptability, and resilience are key qualities that support their ability to function effectively in diverse and dynamic clinical environments.

- **Oral and Written Communication:** Students must be able to convey medical information clearly and effectively, both verbally and in writing, to patients, families, and colleagues.

    - Communicate medical information clearly.
    - Develop patient-centered communication strategies.
    - Write accurate and comprehensive patient records.
- **Team Member:** Students should actively participate as members of the healthcare team, contributing to collective problem-solving and decision-making processes.
    - Collaborate effectively with team members.
    - Participate in interdisciplinary case discussions.
    - Contribute to team-based patient care.
- **Team Leader:** When required, students should be able to take on leadership roles within the healthcare team, guiding and coordinating the efforts of others.
    - Lead a healthcare team in clinical settings.
    - Make decisions as a team leader.
    - Facilitate effective team communication.
- **Reliability and Dependability:** Students must consistently demonstrate reliability and dependability in fulfilling their clinical responsibilities, ensuring that they are trusted members of the healthcare team.
    - Fulfill clinical duties reliably.
    - Demonstrate dependability in patient care.
    - Maintain consistency in performance under pressure.
- **Resilience & Adaptability:** Students need to develop resilience to cope with the challenges of medical practice and adapt to changes in clinical settings.
    - Demonstrate resilience in stressful situations.
    - Adapt to changes in clinical practice.
    - Reflect on challenges and adapt strategies accordingly.

Competency 5: Community Health Promoter

The "Community Health Promoter" competency focuses on the role of medical students in promoting health within the community. It involves educating and empowering communities, conducting assessments, and engaging with diverse populations to address public health challenges. Cultural competence and advocacy are essential in promoting health equity and improving community health outcomes.

- **Health Education and Promotion:** Students should be able to design and implement health education programs that address the specific needs of the community.
    - Develop health education materials.
    - Implement community health promotion activities.
    - Evaluate the effectiveness of health education programs.
- **Community Assessment and Engagement:** Students must be capable of assessing the health needs of communities and engaging with community members to identify and address public health issues.
    - Conduct community health assessments.
    - Engage with community stakeholders.
    - Identify public health priorities based on community needs.
- **Cultural Competence:** Understanding and respecting cultural differences is crucial in providing effective community health promotion. Students should be able to work with diverse populations and tailor health interventions accordingly.
    - Demonstrate cultural sensitivity in community interactions.
    - Adapt health interventions to cultural contexts.
    - Reflect on cultural influences in health behaviors.
- **Advocacy and Empowerment:** Students should advocate for policies and practices that promote community health and empower individuals and communities to take control of their health.
    - Advocate for community health initiatives.
    - Empower individuals to make informed health decisions.
    - Promote policies that address social determinants of health.

Competency 6: Quality & Safety Practitioner

The "Quality & Safety Practitioner" competency emphasizes the importance of patient safety and quality improvement in healthcare. Students are trained to understand and apply patient safety principles, comply with regulatory requirements, and collaborate with interdisciplinary teams to ensure the highest standards of care.

- **Patient Safety Principles:** Students must understand and apply patient safety principles to prevent medical errors and enhance the quality of care.
    - Identify potential safety risks in clinical practice.
    - Implement strategies to prevent medical errors.
    - Evaluate the effectiveness of patient safety interventions.
- **Regulatory Compliance:** Knowledge of and adherence to regulatory standards is essential in maintaining patient safety and quality care. Students must be familiar with relevant regulations and ensure compliance in their practice.
    - Understand and apply healthcare regulations.
    - Ensure compliance with legal and regulatory standards.
    - Reflect on the impact of regulations on patient safety.
- **Interdisciplinary Collaboration:** Effective collaboration with professionals from various disciplines is necessary to achieve optimal patient outcomes. Students should develop skills in working within interdisciplinary teams to enhance patient care.
    - Collaborate with interdisciplinary teams in patient care.
    - Contribute to interdisciplinary case discussions.
    - Reflect on the impact of interdisciplinary collaboration on patient outcomes.

Competency 7: Digital & Artificial Intelligence Literate

The "Digital & Artificial Intelligence Literate" competency prepares students to navigate the rapidly evolving landscape of digital health and artificial intelligence. Students are trained to use AI-based systems ethically and effectively in diagnosis and decision-making, ensuring that technological advancements are integrated into patient care responsibly.

- **Technology and AI-Based Diagnosis and Decision-Based Systems:** Students should be proficient in using technology and AI tools for diagnosis and decision-making, ensuring that these tools enhance patient care.
    - Use AI-based tools for diagnosis.

    - Evaluate the effectiveness of technology in clinical decision-making.
    - Integrate digital tools into patient care responsibly.
- **Ethical Usage of AI:** Ethical considerations are paramount when using AI in healthcare. Students must understand the ethical implications of AI and ensure that its application respects patient rights and autonomy.
    - Identify ethical issues in AI usage.
    - Apply ethical principles to AI-based decisions.
    - Reflect on the impact of AI on patient care.

This framework ensures that undergraduate medical students at Rawalpindi Medical University are well-prepared to excel as competent, ethical, and compassionate healthcare professionals. By meeting these competencies and their corresponding learning objectives, students will be equipped to navigate the complexities of modern medical practice and contribute meaningfully to patient care and community health.

Outcomes of the Curriculum

Outcomes in medical education are the specific knowledge, skills, and attitudes that learners are expected to demonstrate by the end of their educational program. These outcomes are typically framed in terms of the goals of the curriculum, which align with the needs of the healthcare system and patient care. Educational outcomes serve as benchmarks for assessment and evaluation of student progress and help ensure that training programs produce competent healthcare professionals.

Outcomes 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.

SECTION-IV

Five Year Structured Framework of Clinically Oriented Integrated Modular Curriculum 2024

Sr. No	Class	Module	Duration	Block
1.	First Year MBBS	Foundation Module	6 weeks	Block-I
		MSK-I Module	5 weeks	
		MSK-II Module	5 weeks	Block -II
		Blood & immunity Module	5 weeks	
		CVS Module	6 weeks	Block -III
		Respiration Module	5 weeks	
		General Education Cluster Module	1 week	
2.	Second Year MBBS	Gastrointestinal tract Module	5 weeks	Block-IV
		Renal module	5 weeks	
		Reproduction Module	4 weeks	Block -V
		Central nervous system module	6 weeks	
		Special Senses Module	4 weeks	Block -VI
		Endocrinology Module	5 weeks	
3.	Third Year MBBS	Foundation 1	4 weeks	Block- VII
		Foundation II	4 weeks	
		GIT, Hepatobiliary & Parasitology	5 weeks	Block - VIII
		Microbes & Antimicrobials	7 weeks	
		Hematology, Immunology & Research	5 weeks	Block - IX
		CVS & Respiration	5 weeks	
4.	Fourth Year MBBS	Otorhinolaryngology 1	2.5 weeks	Block- X
		Otorhinolaryngology II	3 weeks	
		Ophthalmology I	2.5 weeks	Block - XI
		Ophthalmology II	3 weeks	
		Endocrinology	5 weeks	Block -XII
		Population Health & Reproduction	6 weeks	
		Renal	4 weeks	Block – XIII
		CNS & Psychiatry	6 weeks	
5.	Final Year MBBS	Medicine & Allied	12 weeks	Block- XIV
		Surgery & Allied	12 weeks	Block- XV
		Gynae & Peads	12 weeks	Block- XVI

About the Structured Framework

The five-year structured framework for the MBBS program at Rawalpindi Medical University follows a highly integrated approach in both horizontal and vertical alignment of subjects. In the first year, core subjects like Anatomy, Physiology, and Biochemistry are taught alongside foundational modules. The year is divided into blocks covering musculoskeletal systems (MSK I & II), blood and immunity, cardiovascular systems (CVS), and respiratory systems. These blocks are also spirally integrated with general education cluster courses such as Ethics and Artificial Intelligence, as well as early clinical exposure to provide a balanced mix of theory and clinical practice. In each block, core subjects are vertically integrated with preclinical subjects like Community Medicine, Pathology, and Pharmacology and clinical subjects like medicine, surgery, gynecology and pediatrics.

In the second year, students delve deeper into systems such as the gastrointestinal tract (GIT), renal system, reproductive system, and central nervous system (CNS). Vertical integration becomes more pronounced, with clinical exposure integrated into practical aspects of these modules. Horizontal integration continues with courses like Behavioral Sciences and Bioethics, and students continue to take spirally integrated courses like Family Medicine and Digital Literacy. The curriculum maintains continuity by revisiting previously covered topics through spiral integration, reinforcing concepts across the academic years.

In the third year, the MBBS curriculum at Rawalpindi Medical University introduces students to more advanced clinical and biomedical concepts. Key systems covered include the gastrointestinal (GIT) and hepatobiliary systems, parasitology, microbiology, and hematology. Horizontally, students continue to engage with clinical subjects like pathology, pharmacology, and community medicine. The curriculum remains horizontally integrated, combining clinical rotations with system-based learning ensuring that theoretical knowledge is continuously reinforced with practical clinical exposure. Spirally integrated subjects like research methodology and bioethics further complement the learning process by revisiting concepts from earlier years.

In the fourth year, the curriculum intensifies with modules in otorhinolaryngology (ENT), ophthalmology, endocrinology, population health, renal medicine, and psychiatry. Horizontal integration ensures that core clinical concepts are covered alongside biomedical sciences, while vertical integration deepens students' practical knowledge as they spend more time in clinical settings. Modules on population health and reproductive health introduce broader public health perspectives. Spirally integrated courses continue to reinforce learning outcomes, addressing essential soft skills, leadership, and ethics.

The final year focuses almost entirely on clinical clerkships in medicine and allied specialties, surgery and allied fields, gynecology, and pediatrics, representing the culmination of the horizontal and vertical integration model. Students apply their knowledge and skills comprehensively in real-world clinical environments. They work directly with patients under supervision, allowing them to gain hands-on experience. Spirally integrated subjects continue to emphasize ethical decision-making, professionalism, and patient safety. This year ensures that students are fully prepared for their future roles as competent, ethical, and compassionate healthcare providers.

SECTION-V

Structured Framework of First Year MBBS Curriculum

Blocks	Block-I								Block II						Block III					General Education Cluster (GEC) Module	Schedule of Send Up and Professional Examination			
Module	Foundation Module	Module Assessment	MSK-I (04 Weeks)						MSK - II	Summer Vacation	Module Assessments	Blood & Immunity Module			CVS	Module Assessment	Respiratory Module	Module Assessment	Block Assessment		Prep leaves for send up	Send up	Prep Leaves for Professional Examination	Professional Examination
			MSK-I	Spring Vacation	MSK-I	Student Week	MSK-I	Module Assessment				Blood & Immunity Module	Module Assessment	Block Assessment										
Duration in Weeks / Days	06 Weeks	03 Days	First Week	08 Days	First & Second Week	06 Days	Third- & Fourth Weeks	06 Days	04 Weeks	17th June – 20th July 2024	06 Days	04 Weeks	06 Days	03 Days	05 Weeks	06 Days	04 Weeks	06 Days	03 Days	06 Day	10 Days	13 Days	15 Days	20 Days
Dates	12th -Feb – 22nd March 2024	25th March – 27th March, 2024	1st April – 24th April 2024	05th April – 13th April 2024	25th April – 27th April 2024	29th April – 04th May 2024	05th May – 15th May 2024	16th May – 22nd May 2024	23rd May – 25th May 2024	27th May – 27th July 2024	29th July – 03rd August 2024	05th August – 31st August 2024	02nd Sep – 07th Sep 2024	09th Sep – 11th Sep 2024	12th Sep – 10th Oct 2024	12th Oct – 18th Oct 2024	21st Oct – 16th Nov 2024	18th Oct – 23rd Nov 2024	25th Nov – 27th Nov 2024	28th Nov – 04 Dec 2024	05th Dec – 14th Dec 2024	15th Dec – 27th Dec 2024	28th Dec 2024 – 11th Jan 2025	12th Jan 2024 –31st Jan 2025

*Note: All dates are subject to change.

Implementation TORs

In the first year MBBS teaching framework at Rawalpindi Medical University, the academic year is divided into three primary blocks, covering a total of 36 weeks of teaching. Each block focuses on core modules integrating basic sciences with early clinical exposure. The academic calendar begins with a 6-week Foundation Module, followed by two blocks focusing on the musculoskeletal system (MSK-I and MSK-II), blood and immunity, cardiovascular system (CVS), and respiratory system modules. In addition to core subjects such as Anatomy, Physiology, and Biochemistry, the first year includes spirally integrated general education courses such as Artificial Intelligence, Family Medicine, and Biomedical Ethics.

In terms of time allocation, 39% of the teaching hours are dedicated to Block I, which includes the Foundation Module and the MSK-I Module. The remaining hours are distributed across Block II (MSK-II and Blood/Immunity modules) with 27%, and Block III (CVS and Respiratory modules) accounting for 34% of the teaching time. Anatomy, Physiology, and Biochemistry are the core subjects taught across all blocks. In total, 38% of the total teaching hours are dedicated to Anatomy, 39% to Physiology, and 23% to Biochemistry. These subjects are horizontally integrated, ensuring that students learn them in conjunction with their clinical applications.

The clinical teaching hours are integrated into the curriculum from the first year, with 103 hours dedicated to disciplines such as Community Medicine, Pathology, Pharmacology, and Radiology, among others. Clinical subjects are vertically integrated into the system-based modules to provide context and relevance to theoretical concepts. Additionally, spirally integrated subjects like Behavioral Sciences and Family Medicine, introduced in the first year, ensure continuity and reinforce learning through subsequent years .

This framework ensures that first-year MBBS students at RMU not only gain a solid foundation in basic medical sciences but also begin to develop essential clinical skills early on. The integrated modular approach, combined with a balance of horizontal, vertical and spiral integration, allows for a cohesive and practical learning experience.

Contact Hour Distribution for Core Subjects

First Year MBBS

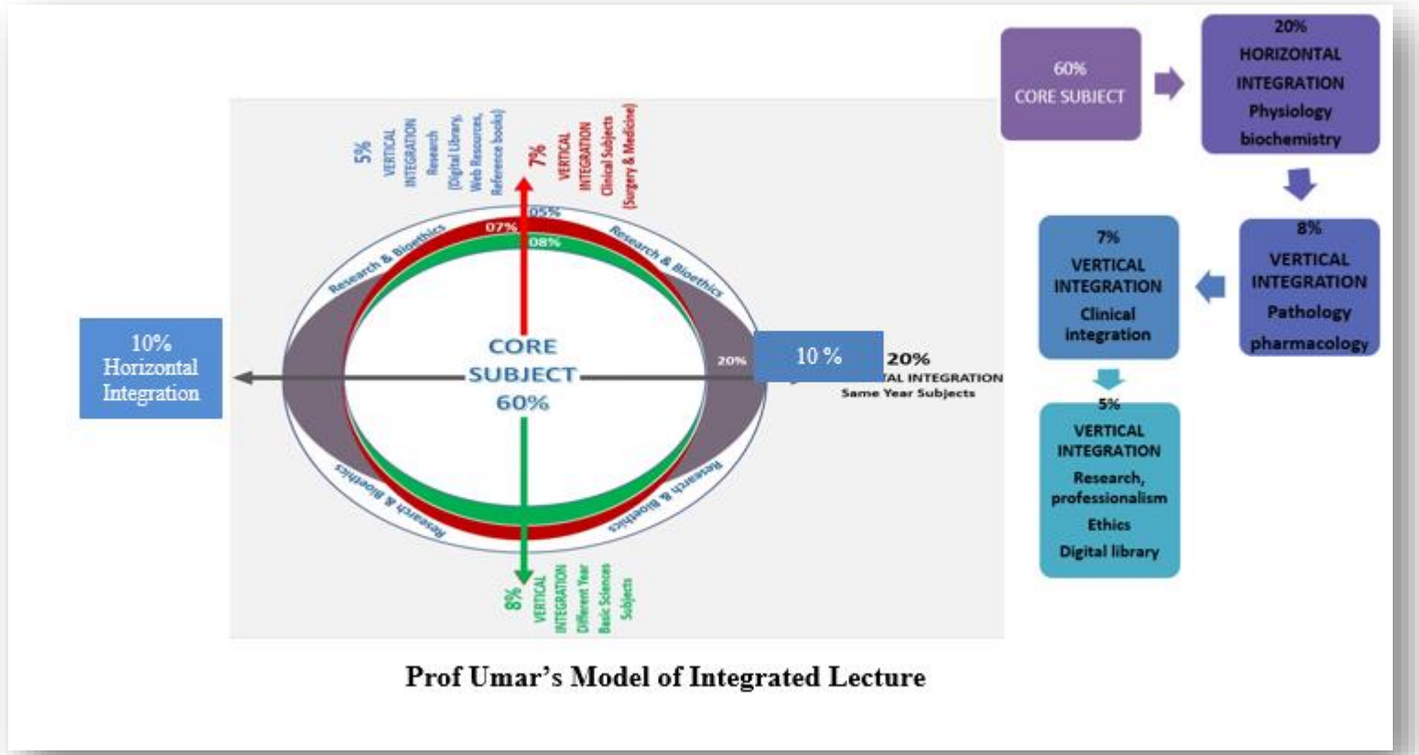
Teaching Hours 1st Year MBBS							
Blocks	**Modules**	**Anatomy**	**Physiology**	**Biochemistry**	**Total**	**Total Hours**	**Percentage**
Block-I	Foundation	86	111	56	253	469	39
	MSK-I	89	97	30	216		
Block-II	MSK-II	132	86	44	262	332	27
	Blood & Immunity	8	32	30	70		
Block-III	CVS	70	98	84	252	409	34
	Respiration	76	50	31	157		
Total Hours Per Subject		461	474	275	1210		
Percentage		38	39	23	100		100

Discipline Wise Clinical & Spiral Teaching Hours

Sr. No	**Discipline**	**Contact Hours**
1.	Behavioral sciences	05
2.	Community Medicine	09
3.	Pathology	13
4.	Pharmacology	08
5.	Medicine	13
6.	ENT	01
7.	DME	10
8.	Radiology	03
9.	Artificial Intelligence	01
10.	Family Medicine	03
11.	Gynae & Obs	01
12.	Quran translation	13
13.	Surgery	03
14.	Biomedical Ethics	05
15.	IUGRC	15
Total Hours		**103 Hours**

SECTION-VI

Teaching Strategies



Prof Umar's Model of Integrated Lecture

Introduction

The teaching strategies employed in the MBBS curriculum at Rawalpindi Medical University emphasize interactive and student-centered learning methods. A variety of instructional approaches are integrated into the program, ensuring that students not only grasp theoretical knowledge but also apply it in practical, real-world scenarios. The Large Group Interactive Sessions (LGIS) serve as the backbone of this approach, where the professor introduces critical medical topics using multimedia tools like patient videos, interviews, and clinical exercises. This format encourages active participation, allowing students to engage directly with complex concepts and clinical conditions .

In addition to LGIS, Small Group Discussions (SGD) play a crucial role in deepening students' understanding. These sessions involve structured exercises, such as patient case discussions or topic presentations, designed to promote peer-to-peer learning and critical thinking. The facilitator's role is to guide discussions, ask probing questions, and ensure that students apply their knowledge to real-world medical challenges. The small group format helps students clarify core concepts, acquire new skills, and develop the professional attitudes necessary for clinical practice .

The curriculum also incorporates Self-Directed Learning (SDL) and Problem-Based Learning (PBL), both of which foster autonomy and critical inquiry. In SDL, students take charge of their own learning by exploring predefined objectives and resources. This independent study approach empowers them to develop skills in managing their time and resources effectively. PBL, on the other hand, places students in group settings where they collaboratively solve open-ended clinical problems. This method emphasizes analytical thinking, communication, and collaboration, all key components in medical education and practice.

Finally, practical learning is reinforced through Skill Labs and Clinical Practicals, where students perform hands-on exercises to develop procedural skills. This experiential learning is essential for bridging the gap between theory and practice, ensuring that students gain the confidence and technical ability needed for clinical rotations. These strategies collectively create a well-rounded and engaging educational environment that prepares students to become competent, empathetic physicians .

Large Group Interactive Session (LGIS)

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will the 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.

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

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%

Steps of Implementation of Small Group Discussions

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

PBL (SDL)

- 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.

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

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.

Practical Sessions/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-VII

Course Contents

Block-I

Module No. 1- Foundation

Duration 6 Weeks

Foundation Module Team

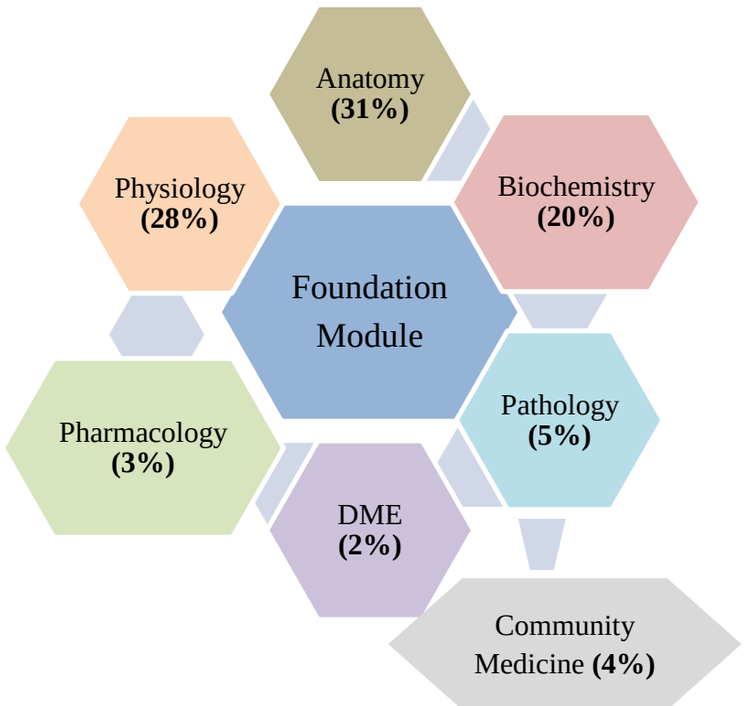
Module Name	:	Foundation Module
Duration of module	:	06 Weeks
Coordinator	:	Dr. Zenera Saqib
Co-coordinator	:	Dr. Qurat Ul Ain
Reviewed by	:	Module Committee

Module Committee		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar
2.	Director DME	Prof. Dr. Rai Muhammad Asghar
3.	Convener Curriculum	Prof. Dr. Naeem Akhter
4.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf
5.	Additional Director DME	Prof. Dr. Ifra Saeed
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar
7.	Chairperson Biochemistry	Dr. Aneela Jamil
8.	Focal Person Anatomy First Year MBBS	Asso. Prof. Dr. Mohtashim Hina
9.	Focal Person Physiology	Dr. Sidra Hamid
10.	Focal Person Biochemistry	Dr. Aneela Jamil
11.	Focal Person Pharmacology	Dr. Zunera Hakim
12.	Focal Person Pathology	Dr. Asiya Niazi
13.	Focal Person Behavioral Sciences	Dr. Saadia Yasir
14.	Focal Person Community Medicine	Dr. Afifa Kulsoom
15.	Focal Person Quran Translation Lectures	Dr. Uzma Zafar
16.	Focal Person Family Medicine	Dr. Sadia Khan

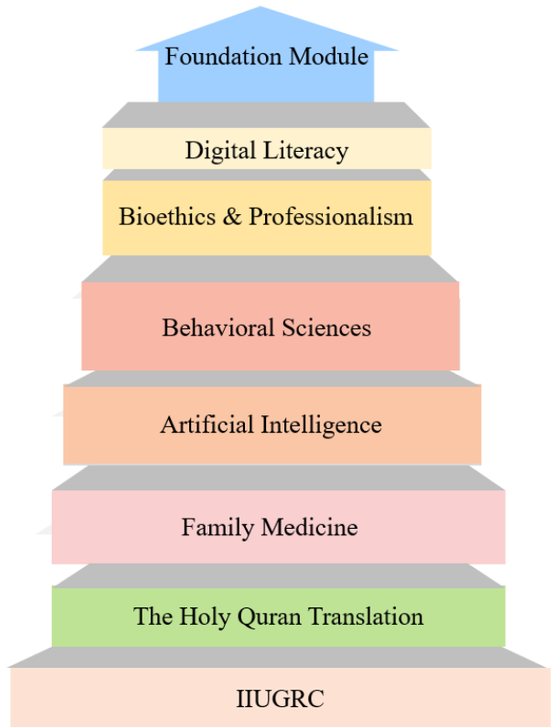
Module Task Force Team		
1.	Coordinator	Dr. Zenera Saqib (Demonstrator of Anatomy)
2.	DME Focal Person	Dr. Sidra Hamid
3.	Co-coordinator	Dr. Qurat Ul Ain (Senior Demonstrator of Anatomy)
4.	Co-Coordinator	Dr. Uzma Kiyani (Senior Demonstrator of Physiology)
5.	Co-coordinator	Dr. Nayab Ramzan (Senior Demonstrator of Biochemistry)

DME Implementation Team		
1.	Director DME	Prof. Dr. Rai Muhammad Asghar
2.	Implementation Incharge 1st & 2nd Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
3.	Assistant Director DME	Dr. Sidra Hamid
4.	Editor	Muhammad Arslan Aslam

Integration



Disciplines in Foundation Module



Spiral / General Education Cluster Courses (5%)

Integration					
Themes					
Block	**Module**	**General Anatomy**	**Embryology**	**Histology**	**Gross Anatomy**
I	• Anatomy	Introduction to General Anatomy	General Embryology • Introduction to Human Development • Oogenesis • Spermatogenesis • Female Reproductive Cycles • Ovulation and Fertilization • Cleavage and Blastocyst Formation • Development of Mammary Gland	General Histology • Types of Epithelium • Specialization of Apical Cell Surface • Intercellular Junctions and Adhesions • Glandular Epithelium • Mammary Gland	• Anatomicomedical Terminologies I (position & planes) • Anatomicomedical Terminologies II (Anatomical Terms and Axis of Movements) • Anatomicomedical Terminologies III (Cell and Tissues) • Anatomicomedical Terminologies IV (Skin & Body Systems) • Clavicle • Scapula • Humerus • Anterior Axioappendicular Muscles • Posterior Axioappendicular Muscles • Axilla • Brachial Plexus • Brachial Plexus Injuries • Breast • Sternoclavicular and Acromiclavicular Joints • Radiograph and Surface Anatomy of Axioappendicular Region
	• Biochemistry	• Cell and Cell Organelles, Cell Membrane and Transport Across Cell Membrane, Physicochemical Properties, Enzymes, Cancer, Nucleic Acid Chemistry, Genetics			
	• Physiology	• Functional Organization of The Human Body and Control of the “Internal Environment • The Cell and Its Functions • Genetic Control of Protein Synthesis, Cell Function, And Cell Reproduction • Transport of Substances Through the Cell Membrane			

	Orientation Sessions	
	• Opening Ceremony (DME) • Introduction to Digital Services Of RMU • Introduction to Integrated Modular Curriculum, Study Guide sand RMU Policies • Assessment Model of RMU & Continuous Internal Assessment • Research Model of RMU (IUGRC), Biomedical Ethics Family Medicine, Artificial Intelligence • Introduction to Different Teaching Strategies, Role of Team Leader Facilitator and Students SGD/LGIS/TBL/PAL/INTERNET & Literature Group activity (DME) • Orientation to Integrated Modular System for Pre-clinical Years (DME) • Lecture on Feedback (DME) • Mission and Vision (DME) • Introduction to Pharmacology • Introduction to Pathology • Introduction to Community Medicine (Community Medicine) • Introduction to Medicine (Medicine)	
	Spiral Courses	
	• The Holy Quran Translation	The Holy Quran Translation Component • Islam And Medical Science • Introduction to Quran Translation
	• Bioethics & Professionalism	• Introduction to history of medical ethics • Leadership Professionalism (DME)
	• Artificial Intelligence	• Introduction to Artificial Intelligence
	• Family Medicine	• Introduction to Family Medicine & its application in health care system
	• Integrated Under Graduate Research Innovation (IUGRC)	• Research I Introduction of health research process • Research II characteristic of research process • Research III Basis of ethics in health research • Research IV Basics of ethics in medical research
	• Behavioral Sciences	• Introduction to Behavioral Sciences • Management of stress
	• Digital Literacy Module	• How to use Higher Education Commission (HEC) digital library.
	• Life Style and Prevention	• Healthy Lifestyle: A Foundation for Medical Professionals
	Vertical Integration	
	Clinically content relevant to Foundation module	

	• Routs of drug administration (Pharmacology) • Absorption of drugs (Pharmacology) • Factors affecting drug absorption (Pharmacology) • Distribution of drugs (Pharmacology) • Cellular response to injury (Pathology) • Intracellular accumulations (Pathology) • Pigments (Pathology) • Free radical and reactive oxygen species (Pathology) • Irreversible cell injury/apoptosis (Pathology) • Genetic disorders (Pathology) • History of medicine (Medicine) • Medicine and allied subjects (Medicine) • Chromosomal abressions (Medicine) • History taking and general physical examination (Medicine)	
Early Clinical Exposure (ECE)		
	• Clinical Rotations	Rotation of students to • Medicine & Allied • Surgery and Trauma • Emergency Department
Hands on Workshop on Basic Life Support (BLS)		
	• Hands on Workshops on BLS	
Clinical Relevance		
	• Medical Ethics • Genetic Disorders • Understanding cellular and molecular mechanisms in disease (e.g., cancer and diabetes) • Importance of homeostasis in maintaining normal physiological function (e.g., dehydration and acid-base imbalances) • Application of medical ethics in real-life scenarios, such as patient confidentiality • Effective doctor-patient communication in history-taking and empathy	

Implementation of Terms of Reference (TORS)
• Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are predefined as per the guidelines of PMDC and to be strictly followed. • The hours mentioned within each module are the mandatory minimum required. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. However, the level of cognition can be kept at a higher level. • The Table of Specifications provided will be used for the three papers of the first professional examination. • The same table of specifications should be used for the respective block exams for internal assessment. • The criteria defined for continuous internal assessment is to be followed for each module and block respectively

Module No. 1 - Foundation

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

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

Module Outcomes

Each student will be able to:

Knowledge

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

Skills

- Identify different anatomical planes and correlate the importance of these with clinical medicine.
- Identify various apparatus used in lab.
- Preparation and identification of microscopic slides.
- Preparation of solutions of various strengths.
- **Basic Life Support (BLS)**
- **Early Clinical Exposure (ECE)**

Attitude

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

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

Orientation Week- Introduction to RMU and Disciplines

Medical Education and Integrated Disciplines				
Topic	**Facilitator**	**Learning Objectives**	**Teaching Strategy**	**Assessment Tool**
Introduction to RMU and Allied Hospitals	Vice Chancellor	Honorable VC will welcome and introduce the University and Allied Hospitals.	LGIS	MCQS
The students will be able to:				
Introduction to Medical Education Department Introduction to Integrated Modular System and Foundation Module	Assistant Director DME	• Introduce DME • Define Medical Education • Discuss its role • Describe CME • Appreciate role of DME in their curriculum • Appreciate role of DME in attendance monitoring • Illustrate the application • Leave submission process • Outline the RMU Curriculum structural organization, (integrated modular system) • Describe Learning resources used in study guides	LGIS	MCQS
Introduction to Basic Sciences	Lecture by HODs	• Define Anatomy • Define Physiology • Define Biochemistry • Define Pathology • Define Community Medicine • Define Forensic Medicine • Define Pharmacology	LGIS	MCQS
Introduction to Medicine & Allied	Lecture by Dean of Medicine & Allied	• Define medicine • Discuss History of medicine • Describe Islamic concepts of medicine • Identify Basic sciences involved in medicine • Identify Clinical subjects and their role • Describe practice of medicine	LGIS	MCQS
Introduction to Teaching And Learning Strategies With Emphasis On SGD/LGIS/TBL (Team base learning)/PAL (Peer	Basic Science Team & DME	• Differentiate between various Teaching & Learning strategies • Describe the process • Enlist different roles of students and facilitator in mentioned teaching sessions	LGIS	MCQS

Assisted learning)/Internet & Literature Search				
Introduction To Use Of Laboratory Facilities / Equipment And Safety Measures (Biochemistry and Pathology)	Team members (Biochemistry and Pathology)	• Recall precautionary measures mandatory during practical sessions and skill lab • Recall safety measures during blood handling • Demonstrate use of various glass ware • Demonstrate use of lab instruments	LGIS	MCQS
Study Skills-I (Medical Educationist and Behavioral Sciences)	Behavior Science and DME team member	• Define study skills or study strategies (how to study?) • Describe the: • Methods based on memorization such as rehearsal and rote learning • Methods to retain the content in long term memory • Methods based on communication skills e.g., reading and listening • Principles of TBL & PAL	LGIS	OSPE
Study Skills-II	Behavior Science and DME team member	• Describe the: • Methods based on condensing information, summarizing and the use of keywords • Methods based on visual imagery • Methods based on acronyms and pneumonics • Methods based on time management, organization and lifestyle changes	LGIS	MCQS
Islam and Medical Science	Mufti Naeem sab	• Discuss role of Islam and importance of Islam in Medical Science	LGIS	MCQS

Syllabus of Foundation (Module No. 1)

Anatomy				
Theory				
Topic	**Learning Objectives** **At The End Of One Hour The Lecture The Student Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Introduction to General Anatomy	• Define the term Anatomy and its various branches	C1	LGIS	SAQ MCQ VIVA
	• Define different terminologies related to Anatomy	C1		
	• Describe different Anatomical planes and directions in relation to anatomical position	C2		
	• Elaborate different phases in life span of man	C2		
	• Define basic tissues of human body	C1		
	• Discuss general outlines and functions of basic tissues	C2		
	• Describe formation of different systems of body	C2		
	• Understand the curative and preventive health care measures.	C3		
	• Practice the principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Read relevant research article	C3		
	• Use HEC digital library	C3		
Embryology				
Introduction to Human Development	• Discuss significance and importance of studying Embryology.	C2	LGIS	SAQ MCQ VIVA
	• Define different terminologies to describe developmental stages.	C1		
	• Describe series of critical events that take place during embryonic development.	C2		
	• Appreciate difference between embryonic and fetal period.	C2		
	• Discuss common chromosomal abnormalities.	C2		
	• Understand the curative and preventive health care measures.	C3		
	• Apply the strategic use of artificial intelligence in healthcare.	C3		
	• Practice principles of bioethics	C3		

	• Use HEC digital library.	C3		
	• Read relevant research article.	C3		
Oogenesis	• Discuss role of female hormones during oogenesis	C2	LGIS	SAQ MCQ VIVA
	• Describe different stages of oogenesis	C2		
	• Correlate clinical aspects of gametogenesis	C3		
	• To understand the bio-physiological aspects of gametogenesis	C2		
	• Understand the curative and preventive health care measures.	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Practice the principles of bioethics	C3		
	• Use HEC digital library	C3		
	• Read a relevant research article	C3		
Spermatogenesis	• Define spermatogenesis.	C1	LGIS	SAQ MCQ VIVA
	• Describe different phases of spermatogenesis	C2		
	• Discuss stages of spermiogenesis	C2		
	• Elaborate functions of male hormones during spermatogenesis	C2		
	• Understand the curative and preventive health care measures.	C3		
	• Practice the principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Able to read a relevant research article	C3		
	• Use HEC digital library	C3		
Female Reproductive	• Understand Ovarian and Uterine cycle	C1	LGIS	SAQ MCQ VIVA
	• Correlate Ovarian and Uterine cycles	C3		
	• Describe different phases of Ovarian and Uterine cycles	C2		
	• Enumerate female sex hormones	C1		
	• Discuss functional significance of female reproductive hormones in reproductive cycles	C2		
	• Discuss the anovulatory cycle in female	C3		

Cycles	• Understand the bio-physiological aspects female reproductive cycle	C2		
	• Focus on provision of curative and preventive health care services	C3		
	• Read a relevant research article	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Use HEC digital library	C3		
Ovulation and Fertilization	• Describe follicular development, ovulation and subsequent events in ovary	C2	LGIS	SAQ MCQ VIVA
	• Give an account on role of luteinizing hormone in ovulation	C1		
	• Discuss capacitation in female genital tract	C2		
	• Describe different phases and results of fertilization	C2		
	• Enlist causes of infertility.	C1		
	• Enlist different technologies of assisted fertilization	C1		
	• Discuss different techniques of assisted reproduction with special emphasis on IVF	C3		
	• Discuss the bio-physiological aspects of ovulation and fertilization	C2		
	• Focus on provision of curative and preventive health care services.	C3		
	• Practice principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Understand the curative and preventive health care measures.	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
Cleavage and Formation of Blastocyst	• Define cleavage	C1	LGIS	SAQ MCQ VIVA
	• Define compaction	C1		
	• Describe blastocyst formation	C2		
	• Understand the bio-physiological aspects of cleavage and blastocyst	C2		
	• Correlate clinical condition of cleavage and blastocyst formation	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Understand the curative and preventive health care measures.	C3		

	• Practice principles of bioethics	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
Development Of Mammary Gland	• Describe the Sources of development of mammary gland .	C2	LGIS	SAQ MCQ VIVA
	• Discuss different stages of activity of mammary gland .	C2		
	• Understand the bio-physiological aspects of mammary gland.	C2		
	• Correlate clinical conditions of mammary gland	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Practice principles of bioethics.	C3		
	• Understand the curative and preventive health care measures.	C3		
	• Read a relevant research article;	C3		
	• Use HEC digital library.	C3		
Histology				
Types of Epithelium	• Define Epithelium	C1	LGIS	SAQ MCQ VIVA
	• Discuss general features of Epithelial cells (basal, apical and lateral surfaces)	C2		
	• Classify epithelium	C2		
	• Explain the histological structure of simple epithelium	C2		
	• Describe the location and functions of simple epithelium	C2		
	• Classify stratified epithelium.	C2		
	• Describe the functions and distribution of stratified epithelium	C1		
	• Appreciate the differences between stratified and pseudostratified epithelium	C2		
	• Describe characteristics of transitional epithelium	C2		
	• Correlate clinical aspects of different types of epithelia	C3		
	• To understand the bio-physiological aspects of different types of epithelia	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		

	• Understand the curative and preventive health care measures.	C3		
	• Practice principles of bioethics	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
Specializations of Apical Cell Surface	• Enumerate different apical modifications of cells	C1	LGIS	SAQ MCQ VIVA
	• Describe histological structure of each apical modification.	C2		
	• Discuss functions of each type of apical modifications	C2		
	• Correlate clinical aspects of Specializations of apical cell surfaces	C3		
	• Understand the bio-physiological aspects of specializations of apical cell surface	C2		
	• Enlist causes of infertility.	C 1		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Practice principles of bioethics	C3		
	• Understand the curative and preventive health care measures.	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
Intercellular Junctions and Adhesions	• Enumerate different cell junctions	C1	LGIS	SAQ MCQ VIVA
	• Describe histological structure of different cell junctions	C2		
	• Understand the bio-physiological aspects of intercellular junctions and adhesions	C2		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Practice principles of bioethics	C3		
	• Understand the curative and preventive health care measures.	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
	• Define gland.	C1		
	• Compare between exocrine and endocrine glands with examples.	C2		

Glandular Epithelium	• Classify glands on the basis of morphology, secretory product, and mode of secretion.	C2	LGIS	SAQ MCQ VIVA
	• Understand the bio-physiological aspects of glands.	C2		
	• Practice principles of bioethics.	C3		
	• Apply the strategic use of artificial intelligence in healthcare.	C3		
	• Understand the curative and preventive health care measures.	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
Development and Histology Of Mammary Gland	• Describe the Sources of development of mammary gland	C2	LGIS	SAQ MCQ VIVA
	• Discuss the ultra structure of mammary gland	C2		
	• Discuss different stages of activity of mammary gland	C2		
	• Understand the bio-physiological aspects of mammary gland	C2		
	• Correlate clinical conditions of mammary glands.	C3		
	• Practice principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Understand the curative and preventive health care measures.	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		

Demonstration/Dissection	At the End Of The Demonstration Student Should Be Able To	Learning Domains	Teaching Strategy	Assessment Tool
Anatomicomedical Terminology I (Anatomical Position and Planes)	• Describe different anatomical planes of human body and correlate with radiological anatomy	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Demonstrate anatomical position of human body • Apply the strategic use of artificial intelligence in healthcare • Practice principles of bioethics • Read a relevant research article	P C3 C3		
	• Define different terms related to body parts	C1		
	• Describe axis of movement	C2		
	• Demonstrate axis of movement	P		

Anatomicomedical Terminology -II (Anatomical Terms and Axis of Movements)	• Strategic use of artificial intelligence in healthcare	C3	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Focus on provision of curative and preventive health care services	C3		
	• Practice principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Understand the curative and preventive health care measures.	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
Anatomicomedical Terminology -III (Cell and Tissues)	• Define cell	C1	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Define tissue	C1		
	• Describe basic tissues of human body	C2		
	• Practice principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Understand the curative and preventive health care services	C3		
	• Read a relevant research article	C3		
	• Use digital library	C3		
Anatomicomedical Terminology-IV (Skin and Body Systems)	• Describe general organization of different systems of body	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Discuss concepts of skin and fascia	C2		
	• Describe the classification of blood vessels	C2		
	• Describe the concepts of divisions of nervous system	C1		
	• Describe the formation of spinal nerve	C2		
	• Practice principles of bioethics	C3		
	• Understand the curative and preventive health care measures.	C3		
	• Read a relevant research article • Apply strategic use of artificial intelligence in healthcare	C3		
	• Use HEC digital library	C3		
Clavicle	• Determine the side	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Demonstrate anatomical position, general features, attachments and articulations (medial and lateral).	P		
	• Describe Intramembranous development and cleido-cranial dysostosis.	C3		
	• Elaborate pectoral girdle formation movement and dislocation.	C3		
	• Describe ossification in detail and Fracture Of clavicle.	C2, C3		
	• Practice principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		

	• Understand the curative and preventive health care measures.	C3		
	• Use HEC digital library	C3		
	• Read a relevant research article	C3		
Scapula	• Determine the side	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Demonstrate anatomical position, general features, attachments, and articulation. (clavicle and shoulder joints)	P		
	• Describe scapular anastomosis and its clinical significance	C3		
	• Demonstrate Scapular movements.	P		
	• Practice principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Focus on provision of curative and preventive health care services	C3		
	• Use HEC digital library.	C3		
	• Read a relevant research article	C3		
Humerus	• Determine the side	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Demonstrate anatomical position, general features, attachments and articulation (shoulder and elbow).	P		
	• Describe the importance of anatomical and surgical neck of humurus	C2		
	• Correlate axillary, radial, median and ulnar nerve damage with respect to various fractures of humerus.	C2		
	• Describe Significance of bicipital groove, angle of humeral torsion and carrying angle	C2		
	• Discuss Ossification and fractures	C3		
	• Understand the curative and preventive health care measures.	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Practice principles of bioethics	C3		
	• Use HEC digital library	C3		
	• Read a relevant research article	C3		
Anterior Axioappendicular Region	• Describe Superficial fascia with cutaneous nerve and vessels of anterior axioappendicular region and tabulate muscles of the anterior axioappendicular region	C2	Skill lab SGD	MCQ SAQ VIVA
	• Understand the bio-physiological aspects of anterior axioappendicular region.	C1		
	• Strategic use of artificial intelligence in healthcare	C3		
	• Understand the curative and preventive health care measures	C3		

	• Practice principles of bioethics			OSPE
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Use HEC digital library	C3		
	• Read a relevant research article	C3		
Posterior Axioappendicular Muscles	• Tabulate muscles of the pectoral region (origin, insertion, nerve supply, action and applied).	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Identify and describe the pectoral and clavipectoral fascia	C2		
	• Use HEC digital library	C3		
	• Understand the curative and preventive health care measures	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Read a relevant research article	C3		
Axilla	• Define axilla	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe its boundaries.	C2		
	• Enumerate the Contents of axilla, (axillary artery with its branches, axillary vein and tributaries, axillary lymphatics, lymph nodes and brachial plexus).	C2		
	• Describe the clinical significance of axillary lymph nodes	C3		
	• Practice principles of bioethics	C3		
	• Understand the curative and preventive health care measures	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
Brachial Plexus	• Describe the formation of brachial plexus its roots and trunks.	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe the origin and root value of different nerves arising	C2		
	• Understand the curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Read a research article on brachial plexus	C3		
	• Use HEC digital library	C3		
Brachial Plexus Injuries	• Describe the different neurological deficits arising as a result of damaged to roots, trunks and branches of brachial plexus at different levels.	C3	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe the origin and root value of different nerves arising	C3		
	• Read a research article on brachial plexus	C3		
	• Understand the curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		

	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
Breast	• Describe the extent of breast	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe the relations of breast	C2		
	• Describe structure of gland.	C2		
	• Discuss the blood supply, venous drainage and lymphatics.	C2		
	• Correlate Clinical picture and lymphatic spread in breast carcinoma.	C3		
	• Discuss congenital anomalies of breast	C3		
	• Practice principles of bioethics	C3		
	• Understand the curative and preventive health care measures	C3		
	• Read a relevant research article	C3		
	• Apply the strategic use of artificial intelligence in healthcare			
	• Use HEC digital library	C3		
Sternoclavicular and acromioclavicular joints	• Classify joints and discuss the attachment of capsule and ligaments and discuss the different movement on these joints along with muscles involved in these movements.	C2	Skill lab SGD	MCQ SAQ VIVA OSPE
	• Describe neurovascular supply.	C2		
	• Understand the curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		
Surface Anatomy & Radiology	• Discuss the surface anatomy of axioappendicular region.	C2	Skill lab SGD	MCQ VIVA OSPE
	• Interpret the normal radiologic appearance of bones in axioappendicular region.	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Practice principles of bioethics	C3		
	• Understand the curative and preventive health care measures	C3		
	• Read a relevant research article	C3		
	• Use HEC digital library	C3		

Topics Of SDL	Learning Objectives	Learning Resources
Clavicle	• Determine the side • Demonstrate anatomical position, general features, attachments and articulations (medial and lateral). • Describe Intramembranous development. • Describe ossification in detail and Fracture of Clavicle • Able to read a relevant research article	❖ Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Clavicle (Chapter 3, Page143,153,154). ❖ https://www.youtube.com/watch?v=Ykfzt-olaYs
Scapular Anastomosis and Its Clinical Significance	• Determine the side • Demonstrate anatomical position, general features, attachments and articulations (medial and lateral). • Describe scapular anastomosis and its clinical significance • Able to read a relevant research article	❖ Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Scapula (Chapter 3, Page143-145,154,171,172). ❖ https://www.youtube.com/watch?v=zFawNgaSL6E
Anterior axioappendicular muscles	• Describe Superficial fascia with cutaneous nerve and vessels of anterior axioappendicular region. • Understand the bio-physiological aspects of anterior axioappendicular region. • Able to read a relevant research article and use digital library	❖ Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Anterior axioappendicular muscles (Chapter 3, Page 168,169). https://teachmeanatomy.info/
Posterior axioappendicular muscles	• Tabulate Muscles of the pectoral region (origin, insertion, nerve supply, action and applied). • Identify and describe the pectoral and clavipectoral fascia. • Able to read a relevant research article and use digital library	❖ Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Posterior axioappendicular muscles (Chapter 3, Page 170,171). https://teachmeanatomy.info/
Axilla	• Define axilla • Describe its boundaries, • Enumerate the Contents of axilla, (axillary artery with its branches, axillary vein and tributaries, axillary lymphatics, lymph nodes and brachial plexus).	❖ Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Axilla (Chapter 3, Page 183-190,197,198). ❖ https://teachmeanatomy.info/ ❖ https://www.youtube.com/watch?v=uSMugI_NNJc
Brachial plexus	• Describe the formation of brachial plexus its roots and trunks. • Describe the origin and root values of different nerves arising • Able to read a research article on brachial plexus • Able to use digital library	❖ Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Brachial plexus (Chapter 3, Page 191-196). ❖ https://www.youtube.com/watch?v=1qgqrXlpr1Y

Brachial plexus injuries	• Describe the different neurological deficits arising as a result of damaged to roots, trunks and branches of brachial plexus at different levels. • Able to read a research article on brachial plexus	❖ Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Brachial plexus injuries (Chapter 3, Page 199-200). ❖ https://teachmeanatomy.info/ ❖ https://www.youtube.com/watch?v=c9giLkwgYA0
Breast	• Describe the extent of breast • Describe the relations of breast • Describe structure of gland. • Discuss related clinical	❖ Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Breast (Chapter 4, Page 315-318,323-326). ❖ https://www.youtube.com/watch?v=OW0qQnT5GoA

Practicals

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

Physiology				
Theory				
Topic	**Learning Objectives** **At the End of Lecture Students Should Be Able To:**	**Learning Domain**	**Teaching Strategy**	**Assessment Tools**
Introduction to Physiology & Physiology Department	• Introduce faculty members	C1	LGIS SGD	SAQ MCQ VIVA
	• Define physiology	C2		
	• Classify different branches of physiology	C2		
	• Explain the importance of physiology in medical and clinical sciences	C1		
Cell physiology & Homeostasis	• Understand functional organization of human body from cell to systems	C2	LGIS SGD	M SAQ MCQ VIVA
	• Differentiate between prokaryotes and eukaryotes.	C2		
	• Discuss salient features of cell theory	C2		
	• Define homeostasis	C1		
	• Describe homeostatic mechanisms of the major functional systems.	C1		
Concept of Body Fluid and Internal Environment	• Describe distribution of total body water	C1	LGIS SGD	SAQ MCQ VIVA
	• Enlist the proportion of intra cellular and extra cellular fluids.	C1		
	• Differentiate between ECF & ICF	C2		
	• Recall Physical characteristics of normal ECF constituents	C1		
	• Understand the concept of internal environment (which student can differentiate for unicellular and multi cellular organisms.)	C2		
Homeostatic Control System I	• Describe the characteristic of control system of the body.	C1	LGIS SGD	SAQ MCQ VIVA
	• Enlist four control mechanisms of body	C1		
	• Understand the mechanism of positive feedback, negative feedback, feed forward control and adaptive control with examples.	C2		

Homeostatic Control System II	• Recall control mechanisms	C1	LGIS SGD	SAQ MCQ VIVA
	• Give examples	C1		
	• Compare and contrast feed forward and adaptive mechanisms	C2		
	• Define gain of control system	C1		
	• Comprehend gain of the control system	C2		
	• Calculate gain of the feedback system and understand the significance of sign in the formula	C3		
Cellular organelles and cell functions	• Describe cytoskeleton & cell locomotion	C1	LGIS Group presentations	SAQ MCQ VIVA
	• Discuss functions of cilia and amoeboid movement	C2		
	• Describe the mechanism of ATP generation	C1		
	• Enlist three major processes of ATP consumption in the body	C1		
	• Understand cell ingestion and other independent roles of cell	C2		
Cell Membrane and Cell Organelles, I & II	• Enlist functions of ER, golgi apparatus, lysosome & perxosome, mitochondria	C1	LGIS SGD Group presentations	SAQ MCQ VIVA
	• Compare and contrast RER & SER, lysosomes & peroxisomes	C2		
	• Understand Docking mechanism	C2		
	• Discuss physiological importance of mitochondria & ATP	C2		
	• Describe the structure of cell membrane: fluid mosaic model	C1		
	• Enlist functions of cell membrane	C1		
	• Enlist membrane bound and non-membrane bound organelles	C1		
	• Differentiate between cytoplasm and cytosol	C2		
	• Enlist various types of ion channels	C1		

Cell membrane Ion channels, Transport across the cell membrane: Diffusion	• Enumerate modes of transport mechanism across the cell membrane	C1	LGIS SGD	SAQ MCQ VIVA
	• Define and discuss factors affecting diffusion	C1		
Transport across cell membrane: Osmosis	• Recall transport mechanism across the cell membrane with special emphasis on osmosis and osmotic pressure	C1	LGIS SGD	SAQ MCQ VIVA
	• Recall factors affecting osmosis	C1		
	• Comprehend the concept of moles and osmoles	C2		
	• Recall osmolarity of body fluids	C1		
	• Discuss tonicity	C2		
	• Comprehend concept of isotonic, hypertonic and hypotonic	C2		
Transport across cell membrane: Active transport I & II	• Define active transport	C1	LGIS SGD	SAQ MCQ VIVA
	• Classify active transport	C2		
	• Comprehend various types of active transport with examples with special emphasis on Na-K pump	C2		
Structure of nucleus and ribosomes, Cell Division	• Describe structure of nucleus and ribosome	C1	LGIS PBL	SAQ MCQs VIVA
	• Discuss vaults	C2		
	• Understand basic concepts about DNA and	C2		
	• RNA	C1		
	• Recall various types of RNA and their functions	C1		
	• Enlist and Draw steps of mitosis and meiosis	C2		
	• Comprehend role of different parts of chain of DNA as genes like TATA box			
Genetics Transcription & Translation	• Define & Explain Genetics, Transcription & Translation		LGIS PBL	SAQ MCQs VIVA
	• Describe Genetic control of protein synthesis			
	• Differentiate between apoptosis & Necrosis			

Cellular control mechanism, Cell cycle, Programmed cell death	• Describe different cellular control mechanisms regarding gene regulation	C1	LGIS PBL	SAQ MCQs VIVA
	• Explain Cell differentiation, apoptosis and cellular changes in cancer	C2		
Intracellular communication and cell junctions	• Describe the structure of various intracellular connections	C1	LGIS SGD	SAQ MCQ VIVA
	• Give the physiological importance of cell junctions	C1		
Signal Transduction	• Describe the various 2nd messenger systems	C1	LGIS	SAQ MCQ VIVA
	• Discuss physiological significance	C2		

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

Topics Of SDL	Learning Objectives	Learning Resources
Concept of body fluids & internal environment.	• Introduction • Concept of extracellular and intracellular fluid • Homeostasis • Examples of control system	❖ Ganong's Review of Medical Physiology.25TH Edition, General principles and Energy productionin Medical Physiology (chapter 01, Page 03) ❖ Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Introduction to physiology, controlsystems and homeostasis, chapter no. 1, page no. 40.49 ❖ Physiology by Linda S. Costanzo 6th Edition. Cellular physiology, chapter 01. Page 1 ❖ Textbook of Medical Physiology by Guyton & Hall.14th Edition. Introduction to Physiology.(Section 01, Chapter1, page 03).
Cell membrane & classification ofcell organelles	• Structure of cell membrane • Cell cytoskeleton • Cytoplasm and various organelles • Golgi Apparatus and its function • Lysosomes and peroxisomes • Secretory vesicles	❖ Ganong's Review of Medical Physiology.25TH Editions, Overview of Cellular Physiology inMedical Physiology (chapter 02, Page33) ❖ Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Compartmentation, chapter 3, page95 ❖ Physiological Basis of Medical Practice by Best & Taylor's.13thEdition. The cell (chapter 01,section 1 Page 03, 18) ❖ Textbook of Medical Physiology by Guyton & Hall.14th Edition. Introduction to Physiology.(Section 1, chapter 03, page 31)
Intracellular communication and celljunction	• Receptors and its types • Cellular signaling and various mechanisms • Signal transduction • Hormone receptors and their activation • Second messenger mechanisms	❖ Ganong's Review of Medical Physiology.25TH Edition., Overview of Cellular Physiology inMedical Physiology (chapter 02, Page 33-44) ❖ Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Compartmentation, chapter 3, page109 ❖ Physiology by Linda S. Costanzo 6th Edition. Gastrointestinal Physiology ❖ Physiological Basis of Medical Practice by Best & Taylor's.13th EditionThe cell (chapter 01, Page14) ❖ Textbook of Medical Physiology by Guyton & Hall.14thEdition. Introduction to Endocrinology.(Section 14, Page 920)
Receptors and signal transduction	• Receptors and its types • Cellular signaling and various mechanisms • Signal transduction	❖ Ganong's Review of Medical Physiology.25TH Editions, Overview of Cellular Physiology inMedical Physiology (Chapter 02, Page 41) ❖ Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Communication, chapter 6, page204 ❖ Physiological Basis of Medical Practice by Best &

	• Hormone receptors and their activation • Second messenger mechanisms	Taylor's.13th Edition. Section 7, principles ofhormone action and endocrine control (Chapter 50, Page817) ❖ Textbook of Medical Physiology by Guyton & Hall.14th Edition. Introduction to Physiology.(Section 1, Chapter 02, page 13)
Homeostasis Control System- I (Negative Feedback System, Conceptof Error and Gain)	• Control systems of body • Negative and positive feedback mechanism and their examples • Apoptosis and necrosis	❖ Ganong's Review of Medical Physiology.25THEdition, Overview of Cellular Physiology inMedical Physiology (Chapter 02, Page 62) ❖ Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Introduction to physiology, chapterno. 1, page no. 45 ❖ Textbook of Medical Physiology by Guyton & Hall.14th Edition. Introduction to Physiology.(Section 1, Chapter 1, page 04,07) (Chapter 03, Page 45)
Genetics, Transcriptionand Translation	• Building blocks of DNA • Genetic code • Process of transcription and translation • Types of RNA • Cell division	❖ Ganong's Review of Medical Physiology.25THEdition, General principles and Energy productionin Medical Physiology (Chapter 01, Page 63) ❖ Textbook of Medical Physiology by Guyton & Hall.14thEdition. ❖ (Section 01, Chapter03, Page31)
Structure of Nucleus, Ribosomes and Cell Division	• Structure of Nucleus • Ribosomes • Mitosis & Overview of cancer	❖ Ganong's Review of Medical Physiology.25THEdition, Overview of Cellular Physiology inMedical Physiology (Chapter 02, Page42) ❖ Human Physiology by Dee Unglaub Silver thorn. 8THEdition. Compartmentation, chapter 3, page100 ❖ Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. the cell (Chapter 01,Page7,) ❖ Textbook of Medical Physiology by Guyton & Hall.14thEdition. (Section 01, Chapter02, Page 19)
Transport across cell membrane andits various types (osmosis, diffusion, primary and secondary active transport	• Types of transport across cell membrane • Diffusion and osmosis • Concept of gating of channels • Primary active transport • Secondary active transport	❖ Ganong's Review of Medical Physiology.25THEdition, Overview of Cellular Physiology inMedical Physiology (Chapter 02, Page 45) ❖ Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Membrane dynamics chapter 5,page 160 ❖ Physiology by Linda S. Costanzo 6th Edition. Cellular physiology, chapter 1, page 5 ❖ Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Properties and functionsof cell membrane, chapter 2, page 18 ❖ Textbook of Medical Physiology by Guyton & Hall.14th Edition. Membrane Physiology. (Section02, Chapter04, Page51)

Practicals				
Topic	**Learning Objectives**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Introduction to Microscope	• Identification of different parts especially focusing lenses and their uses	C1	Skill Lab	OSPE
	• Focusing technique of different blood slides e.g Neubauer's chamber TLC & DLC slides	P		
Introduction to Wintrobe & Westergen tube	• Identify the wintrobe and westergen tubes	C1	Skill Lab	OSPE
	• Should know the differences between two tubes and uses in different methods	P		
Apparatus identification (Introduction to Neubauer's chamber, Red Blood Cell (RBC) pipettes& White Blood Cell (WBC) pipette	• Complete study of Neubauer's slide, calculation of volumes of corner squares and central squares	P	Skill Lab	OSPE
	• Important differentiating points between WBC & RBC's pipettes	C1		
	• How to dilute the two pipettes	P		
	• Should know the composition of diluting fluids	C1		
Apparatus identification (Introduction to centrifuge machine)	• Be aware with the electrical connections of centrifuge machine and to control different speeds	P, A	Skill Lab	OSPE

Biochemistry				
Theory				
Topic	**Learning Objectives** **At the End Of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Cell organelles				
Cell and cell organelles	• Explain composition of normal cell • Describe methods to separate different organelles of cell • Describe structure, functions and marker enzymes of ER & Golgi apparatus • Describe structure, functions and marker enzymes of lysosome, peroxisome & ribosome • Describe structure, functions and marker enzymes of mitochondria and Nucleus • Illustrate the clinical conditions and congenital defects of cell organelles	C2 C2 C2 C2 C2 C3	LGIS	MCQs, SAQs & Viva
Cell membrane and transport across cell membrane				
Cell membrane	• Explain composition of cell membrane • Understand fluid mosaic model • Describe functions performed by each component	C2 C2 C2	LGIS	MCQs, SAQs & Viva
Functions of cell membranes	• Discuss functions & importance of cell membrane	C2	LGIS	MCQs, SAQs & Viva
Transport across cell membrane	• Explain transport of various substances by active and passive transport, diffusion, phagocytosis, endocytosis and exocytosis • Correlate the clinical disorders with defective transport across cell membrane	C2 C3	LGIS	MCQs, SAQs & Viva
Physicochemical properties of cell				
	• Define osmosis and osmotic pressure. • Discuss biochemical application of osmotic and oncotic pressure and methods to measure them.	C1 C2	LGIS	MCQs, SAQs & Viva

Osmosis, osmotic pressure and oncotic pressure	• Correlate oncotic pressure with clinical scenarios	C3		
Phenomenon of viscosity, surface tension, emulsification and adsorption	• Define phenomenon of viscosity, surface tension, emulsification and adsorption • Explain Biochemical applications and methods to measure them	C1 C2	LGIS	MCQs, SAQs & Viva
Donnan equilibrium, adsorption and ion exchange resins	• Define Donnan equilibrium, adsorption and ion exchange resins. • Describe their effects on tissue fluids and biochemical importance	C1 C2	LGIS	MCQs, SAQs & Viva
Water and pH	• Define pH, Pka, body buffer • Discuss water distribution in the body • Understand dehydration and overhydration	C1 C2 C3	LGIS	MCQs, SAQs & Viva
Enzymes				
Enzymes Introduction	• Define Enzymes. • Explain general functions of enzymes. • Differentiate between coenzyme and cofactors	C1 C2 C2	LGIS	MCQs, SAQs & Viva
Mechanism of enzyme action	• Describe different mechanisms of enzyme action.	C2	LGIS	MCQs, SAQs & Viva
Classification of enzymes	• Discuss different classes of Enzymes	C2	LGIS	MCQs, SAQs & Viva
Properties of Enzymes	• Elaborate the Properties of Enzymes such as specificity for substrate and stereo specificity.	C2	LGIS	MCQs, SAQs & Viva
Factors affecting Enzyme action	• Discuss different factors which increase or decrease the activity of enzymes	C2	LGIS	MCQs, SAQs & Viva

Enzyme inhibitors	• Describe enzyme inhibitors and how the activity of the regulatory enzymes can be modulated for benefit of body	C2	LGIS	MCQs, SAQs & Viva
Enzyme Regulation	• Explain enzyme regulation	C2	LGIS	MCQs, SAQs & Viva
Diagnostic role of Enzymes	• Interpret the role of measuring activity of different enzymes in the diagnosis and prognosis of different diseases • Interpret the role of Enzyme as medicine and their effects on body.	C3 C3	LGIS	MCQs, SAQs & Viva
Genetics & Cancer				
Nucleic acids chemistry	• Explain structure and biological importance of DNA, types of DNA • Differentiate between DNA &RNA • Explain structure, types and functions of RNA	C2 C2 C2	LGIS	MCQs, SAQs & Viva
Replication	• Describe mechanism of replication of prokaryotes & Eukaryotes	C2	LGIS	MCQs, SAQs & Viva
Transcription	• Describe mechanism of Transcription of prokaryotes & Eukaryotes	C2	LGIS	MCQs, SAQs & Viva
Translation	• Discuss genetic code • Describe mechanism of Translation in prokaryotes & Eukaryotes • Illustrate mechanism of action of antibiotics at different stages of translation	C2 C2 C3	LGIS	MCQs, SAQs & Viva
DNA damage & Repair	• Describe mechanism of DNA damage & Repair • Apply knowledge of DNA repair mechanisms in related clinical cases	C2 C3	LGIS	MCQs, SAQs & Viva

Mutations	• Describe different types of mutations with examples	C2	LGIS	MCQs, SAQs & Viva
PCR and Recombinant DNA technology	• Define PCR • Explain mechanism and indications of PCR • Discuss Recombinant DNA technology	C1 C2 C2	LGIS	MCQs, SAQs & Viva
Cancer	• Explain biochemical basis of cancer	C2	LGIS	MCQs, SAQs & Viva

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

Topics Of SDL	Learning Objectives	Learning Resources
Cell and cell organelles	• Explain composition of normal cell • Describe methods to separate different organelles of cell • Describe structure, functions and marker enzymes of ER & Golgi apparatus • Describe structure, functions and marker enzymes of lysosome, peroxisome & ribosome • Describe structure, functions and marker enzymes of mitochondria and Nucleus	❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9th edition (chapter 1, page 3)

	• Illustrate the clinical conditions and congenital defects of cell organelles	
Cell membrane Transport across cell membrane	• Explain composition of cell membrane • Understand fluid mosaic model • Describe functions performed by each component • Explain transport of various substances by active and passive transport, diffusion, phagocytosis, endocytosis and exocytosis • Correlate the clinical disorders with defective transport across cell membrane	❖ Harper's illustrated biochemistry 32nd edition (chapter 40 page - 460) ○ ❖ Harper's illustrated biochemistry 32nd edition (Chapter 40 page 467)
Physichemical Aspects Osmosis, osmotic pressure and oncotic pressure	• Define osmosis and osmotic pressure. • Discuss biochemical application of osmotic and oncotic pressure and methods to measure them. • Correlate oncotic pressure with clinical scenarios	❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9th edition (Chapter 02 page 46)
Phenomenon of viscosity, surface tension.	• Define phenomenon of viscosity, surface tension. • Explain Biochemical applications and methods to measure them.	❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9th edition (Chapter 02 page 52, 55)
Nucleic Acid Chemistry	• Define Donnan equilibrium, adsorption and ion exchange resins. • Describe their effects on tissue fluids and biochemical importance	○ ❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9th edition (Chapter 02 page 50)
Cancer	• • Explain biochemical basis of cancer	❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9th edition (Chapter 6 page 168)
Diagnostics Role of Enzyme	• Interpret the role of Enzyme in diagnosis and their effects on body.	❖ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9th edition (Chapter 06 page 169) ❖ Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 05 page 69)
Transcription	• Describe mechanism of Transcription of prokaryotes & Eukaryotes	❖ Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 30 page 459)

Practicals				
Topic	**Learning Objectives** **At The End Of Practical Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Introduction to Laboratory precautions and glassware	• Understand the use of laboratory glassware • State precautions while working in the laboratory	P	Skill Lab	OSPE
Introduction of Laboratory equipment's	• Describe parts and working of different laboratory equipments	P	Skill Lab	OSPE
Physic chemical principals: emulsification and surface tension	• Demonstrate mechanism of surface tension and emulsification	P	Skill Lab	OSPE
Physic chemical principals: tonicity and adsorption	• Demonstrate effects of solutions of different tonicity on red cells (isotonic, hypotonic and hypertonic) • Illustrate process of adsorption.	P	Skill Lab	OSPE

Orientation Sessions of Medical Education and Management Courses			
Program of Welcome Ceremony			
Sr. No.	**Activity**	**Name**	**Time**
1.	Seating of Students in Auditorium		8.00AM To 8:30AM
2.	Welcome words and announcement of the Ceremony	Dr. Sidra Hamid	9:00AM
3.	Tilawat-e-Quran Pak	Dr. Fahad Anwar	9:05AM
4.	Haddiya-e-Naat	Mr. Waqar	9:10AM
5.	Invitation to distinguished guests on Stage		9:15AM
6.	Vice Chancellor welcome address	Prof. Dr. Muhammad Umar	9:30AM
7.	Welcome address by Principal RMC	Prof. Dr. Jahangir Sarwar Khan	9:45AM
8.	White Coat Ceremony (05 High achievers among boys) (5 High achievers among girls)	Prof. Dr Muhammad Umar	10:00AM
9.	Oath Taking	Prof. Dr. Muhammad Umar	10:15AM
10.	Welcome Note by Director DME	Prof. Dr Rai Muhammad Asghar	10:30AM
11.	Introduction to IT services RMU by Director IT	Mr. Hafiz Shahid Rasool	10:45AM
12.	Introduction to Hostel & Transportation	Prof. Dr. Naeem Zia	11:00AM
Concluding remarks by Dr. Sidra Hamid			

Medical Education			
Theory			
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Teaching Strategy**	**Assessment Tool**
Orientation of Integrated Modular system, Intoduction to study guides and RMU Policies	• Understand the concept of integration • Understand the orientation of integrated modular curriculum of RMU • How to use Study Guides • Introduction to different policies of RMU	LGIS	MCQs
Introduction to Assessment Model of RMU	• Discuss the concept of Continous internal assessment • To comprehend the rules of eligibility of professional examination	LGIS	MCQs
RMU Goes digital	• Introduction to LMS, CMS and MS Teams. • Inrtorduction to RMU website • How to use HEC digital library • How to use up to date website	LGIS	MCQs
Vision & Mission	• Discuss the vision and mission of RMU • Discuss the implications of under standing vision and mission of and organization	LGIS	MCQs
Leadership	• Define clinical leadership • Differentiate between management and leadership • Types of leadership style	LGIS	MCQs
Professionalism	• Define medical professionalism • Describe attributes of healer and professional • Discuss the social contract of medical profession • List values, skills and behavior for professionalism	LGIS	MCQs
Lecture on feedback	• Receive and provide effective feedback • Describe types of feedback	LGIS	MCQs

	• Discuss principles of feedback • Discuss essential elements of feedback		
Islam and Medical Science	• Discuss role of Islam and importance of Islam in Medical Science	LGIS	MCQs

Basic and Clinical Sciences (Vertical Integration)

Anatomy, Physiology, & Biochemistry			
Clinical Themes			
Subject	**Topic**	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**
Anatomy	• Fracture of clavicle	Apply basic knowledge of subject to study clinical case.	C3
	• Winging of scapula due to long thoracic nerve injury	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• Down's syndrome	Apply basic knowledge of subject to study clinical case.	C3
	• Smoker's cough	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• Enzymes	Apply basic knowledge of subject to study clinical case.	C3
	• Genetics/PCR	Apply basic knowledge of subject to study clinical case.	C3

Pathology				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tools**
Introduction to Pathology	• Define the following terms: • Etiology • Pathogenesis • Morphology	C1	LGIS SGD	MCQ

Cellular Responses to Injury	• Discuss cellular responses to injury for: • Reversible injury • Adaptation • Irreversible injury • Cell death	C2	LGIS SGD	MCQ
	• Describe, the morphologic changes in cell injury culminating in necrosis and apoptosis	C2		
Intracellular Accumulations	• Describe types of intracellular accumulations with clinical examples: • Lipids/ fat • Protein • Glycogen • Pigments	C2	LGIS SGD	MCQ
	• Explain mechanism of intracellular accumulations.	C2		
	• Enlist causes of fatty change	C1		
	• Describe the pathogenesis of fatty liver	C1		
Pigments	• Classify pigments	C2	LGIS SGD	MCQ
	• Explain the mechanism of pigment production and deposition in various clinical settings	C2		
	• Describe the morphological features (gross/ microscopic) with deposition of following pigments: Lipofuscin, Melani, Hemosiderin, Bilirubin, Anthracosis	C1		
Free Radicals/ Reactive Oxygen Species (Ros). Oxidative Stress	1. Define ROS/free radicals	C1	LGIS SGD	MCQ
	2. Enlist oxygen derived free radicals	C1		
	3. Describe mechanism of generation of free radicals	C2		
	4. Describe mechanism of removal of free radicals(antioxidants)	C2		
	5. Describe the pathologic effects of free radicals	C2		
Irreversible Injury. Necrosis	• Define necrosis	C1	LGIS	MCQ
	• Enlist patterns/types with clinical examples	C1		

	• Describe morphological changes (gross and microscopic) in necrosis	C2	SGD	
Apoptosis (Irreversible Injury)	• Define apoptosis	C1	LGIS SGD	MCQ
	• Enlist clinical examples of apoptosis in • physiologic conditions	C1		
	• Enlist clinical examples of apoptosis in pathologic conditions	C1		
	• Describe mechanism of apoptosis	C2		
	• Tabulate differences between necrosis and apoptosis	C1		
Genetic Disorders	• Classify human genetic disorders	C1	LGIS SGD PBL	MCQ
	• Define mutation	C1		
	Define the following inheritance pattern: • Autosomal dominant • Autosomal recessive • X-linked	C1		
	• Describe diseases associated with consanguineous marriages	C2		

Pharmacology				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Introduction to Pharmacology	• Define pharmacology	C1	LGIS	MCQ
	• Discuss main branches of Pharmacology	C2		
	• Define drug according to WHO	C1		
	• Describe drug nomenclature	C1		
	• Cite important drug references	C1		
	• Describe the sources of drug	C2		
	• Enlist different routes of drug administration	C1		

Routes of drug administration	• Discuss the merits and demerits of each route of drug administration	C2	LGIS	MCQ
	• Identify the factors the influence the choice of the route of drug administration	C2		
Absorption of drugs	• Define drug absorption	C1	LGIS	MCQ
	• Identify different sites of drug absorption	C1		
	• Recall transport processes utilized by the drug for absorption across different sites	C1		
	•			
Factors affecting absorption of drugs	• Enlist drug and body related factors affecting drug absorption	C1	LGIS	MCQ
	• Briefly discuss different factors affecting drug absorption	C2		
Distribution of drugs	• Define distribution of drug	C1	LGIS	MCQ
	• Identify different body compartments	C1		
	• Explain distribution of drug through various body compartments	C2		
	• Enlist factors affecting distribution of drugs	C1		

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

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

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

Obstetrics & Gynecology				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Introduction to Fertilization, Implantation, embryogenesis, congenital abnormalities	• Understand the process of conception and implantation.	C2	LGIS	MCQs
	• Know the importance of embryogenesis	C2		
	• Identify major structural abnormalities	C1		
	• Understand the factors involved in fetal structural abnormalities	C2	LGIS	MCQs

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

Spirally Integrated Courses / General Education Cluster (GEC) Courses

The Holy Quran Translation Lecture				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Introduction to Quran Translation	• Understand and apply ethical considerations in Quranic translation.	C2	LGIS	SAQ
Islam and medical sciences	• Co-relate Islamic concepts given in various verses of The Holy Quran with Medical Sciences	C2	LGIS	SAQ

Biomedical Ethics & Professionalism				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Introduction to History of Medical Ethics	• To appraise the historical perspective of Hippocratic oath • Understanding the beginnings of contemporary bioethics to address ethical dilemmas	C2 C2	LGIS	MCQs

Behavioral Sciences				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Introduction to Behavioral Sciences	• To describe Holistic and Traditional Allopathic medicine.	C1	LGIS	MCQs
Management of stress	• Define the types of stress, its causes and management of stress	C1		

Family Medicine				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Introduction to Family Medicine & its application in health care system	• Describe presenting complaints of patients with body aches	C3	LGIS-1	MCQs
	• Discus complications of body aches			
	• Describe initial treatment of patients with body aches			
	• Know when to refer patient to consultant/ Hospital			

Artificial Intelligence (Innovation)				
Theory				
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	• Discuss fractures of upper limb with their clinical significance. • Discuss role of artificial intelligence in interpretation of radiographs	C2	LGIS	MCQS

Life Style and Prevention				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Healthy Lifestyle: A Foundation for Medical Professionals	• Understand the components of a healthy lifestyle. • Recognize the challenges of maintaining a healthy lifestyle as medical students.	C2	LGIS	MCQS
	• Develop strategies to incorporate healthy habits into their routines.			

Integrated Undergraduate Research Curriculum (IUGRC)				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Theoretical Lecture Based Teachings				
Introduction to Community Medicine	Define Community Medicine, public health, preventive medicine	C1		
	Differentiate Community medicine and preventive medicine	C2		
	Elaborate evolution of preventive medicine/public health	C2		
	Discuss role of public health in prevention of diseases	C2		
	Discuss importance of public health	C2		
Introduction to Health Research process and researcher (Research-I)	• Define Health Research & Concept of Health research methods.	C1	LGIS-1	MCQs
	• Understand background and value of research in health & human development	C2		
	• Elaborate Fundamental types and fields of health research covering;	C2		
	- Basic & Applied Research - Quantitative & Qualitative Research - Collaborative & Multidisciplinary research - Health Research triangle	C2		
	• Conceptualize the drivers of research Including;	C2		
	- Curiosity - Health needs - Opportunity Profit • Describe meanings of HR & HRM			
	• Appreciate role of HR in healthcare practices and human development	C2		

	• Differentiate among various types and fields of HR	C2		
	• Explain different drivers of HR	C2		
Characteristics of research and health research methods (Research-II)	• Explain meanings of various characteristics of health research process so as to	C2	LGIS-2	MCQs
	• Differentiate research activity from non-research activity.	C2		
	• Elaborate ingredients of researcher	C2		
	• Appreciate the importance of commands in certain pre-requisite subjects & skills before undertaking a research study.	C2		
	• Define Health Research	C1		
	• Discuss the criteria for selection of a research topic	C2		
	• Elaborate the types of variable	C2		
	• Differentiate between qualitative and quantitative data	C2		
Basics of Ethics in Health Research (Research-III)	• Appreciate value of ethics in conduct of Health Research.	C2	LGIS-3	MCQs
	• Explain basic ethical principles of health research.	C2		
	• Interpret the application of data collection ethics	C2		
	• Explain ethics of research methods	C2		
Basics of Ethics in Health Research (Research-IV)	• Narrate responsibility for ethics in HR.	C2		
	• Explain Nuremburg code and importance of ethics in current research trends.	C2		
	• Elaborate General ethical principles including explanation of 04 basic principles of Beneficence, non-maleficence, respect and justice	C2		
Five steps of EBM	• Discuss Five steps of EBM	C2	LGIS-3	MCQs

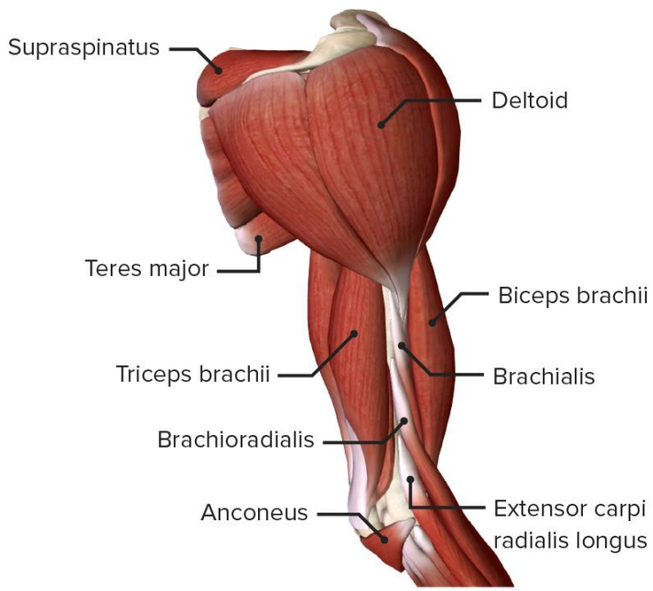
Entrepreneurship		
Theory		
Topics	**Brief Note**	**Learning Outcomes**
Ideate Initial Idea	How it would create value	Understand the concept of ideation in the entrepreneurial context. Learn techniques for generating creative and innovative business ideas. Develop skills to evaluate and refine initial ideas for feasibility and viability.

Digital Literacy Module			
Theory			
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Teaching Strategy**	**Assessment Tool**
RMU Goes digital	• Introduction to LMS, CMS and MS Teams. • Introduction to RMU website • How to use HEC digital library • How to use up to date website	LGIS	MCQs

Block-I

Module No. 2 – Musculoskeletal-I

Duration 5 Weeks



MSK-I Module Team

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

Module Committee		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar
2.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf
3.	Director DME	Prof. Dr. Ifra Saeed
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar
5.	Chairperson Biochemistry	Dr. Aneela Jamil
6.	Focal Person Anatomy First Year MBBS	Asso. Prof. Dr. Mohtashim Hina
7.	Focal Person Physiology	Dr. Sidra Hamid
8.	Focal Person Biochemistry	Dr. Aneela Jamil
9.	Focal Person Pharmacology	Dr. Zunera Hakim
10.	Focal Person Pathology	Dr. Asiya Niazi
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom
13.	Focal Person Quran Translation Lectures	Dr. Uzma Zafar
14.	Focal Person Family Medicine	Dr. Sadia Khan

Module Task Force Team		
1.	Coordinator	Dr. Maria Tasleem (Assistant Professor of Anatomy)
2.	DME Focal Person	Dr. Farzana Fatima
3.	Co-coordinator	Dr. Gaiti Ara (Senior Demonstrator of Anatomy)
4.	Co-Coordinator	Dr. Fahd Anwar (Demonstrator of Physiology)
5.	Co-coordinator	Dr. Romessa Naeem (Demonstrator of Biochemistry)

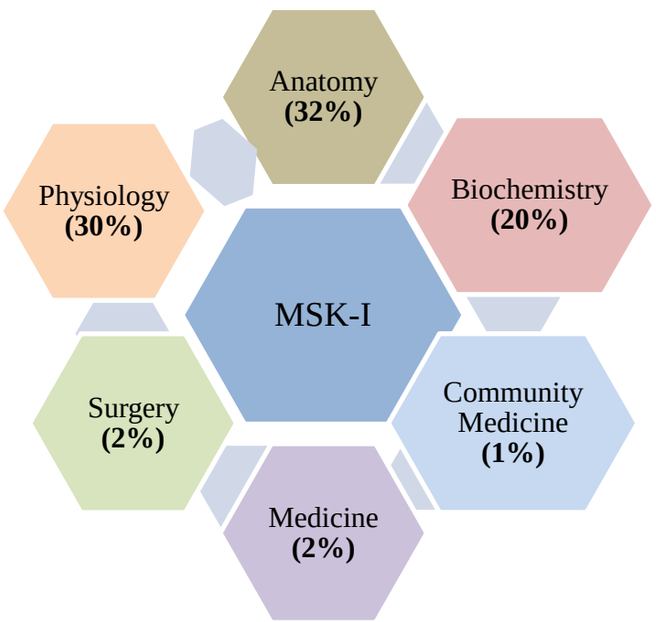
DME Implementation Team		
1.	Director DME	Prof. Dr. Ifra Saeed
2.	Assistant Director DME	Dr. Farzana Fatima
3.	Implementation Incharge 1st & 2nd Year MBBS	Prof. Dr. Ifra Saeed Dr. Farzana Fatima
4.	Editor	Muhammad Arslan Aslam

Themes					
Block	**Module**	**General Anatomy**	**Embryology**	**Histology**	**Gross Anatomy**
I	• Anatomy	Skeletal System • Bones • Joints	General Embryology Second Week of Human Development till Placenta & Fetal Membranes	General Histology • Connective Tissue • Cartilage • Bone	Shoulder joint till Hand
	• Biochemistry	• Minerals, Vitamins (A, D, E, ascorbic acid, thiamin and niacin), Introduction & Classification of Amino Acids			
	• Physiology	• NMJ, Introduction Concept of Motor Unit. Neuromuscular Transmission, Synthesis & Fate of Acetylcholine • Drugs Acting On NMJ, Myasthenia Gravis, Lambart Eaton Syndrome • Structure of Neurons. Classification of Neurons & Nerve Fibers • Nernst Potential, RMP • Recording & Propagation of Action Potential & Factors Effecting Nerve Conduction & Hyperpolarized State • Stimulus & Response & Types of Stimuli, Stages of Action Potential			
	Spiral Courses				
	• The Holy Quran Translation	• Imaniat			
	• Seerat Mubarak	• The Significance of Seerah Studies			
	• Bioethics & Professionalism	• Islamic concept of Bioethics			
	• Research Club Activity	• Comprehend their role in under “theme and scheme”			
	• Family Medicine	• Approach to a patient with Body aches			
	• Artificial Intelligence/Radiology	• Interpretation of upper limb Radiograph & use of AI			
	• Vertical components	• The Holy Quran Translation Component			
	Vertical Integration				
	Clinically content relevant to musculoskeletal-I module • Shoulder Dislocation (Surgery) • Tennis elbow, Fracture of olecranon, Radius and Ulna (Surgery) • Osteoporosis (Medicine) • Osteomalacia, Rickets & Polyarthritis (Medicine) • Accidents (Community Medicine)				
Early Clinical Exposure (ECE)					
		• How to Read Bone X- ray.			

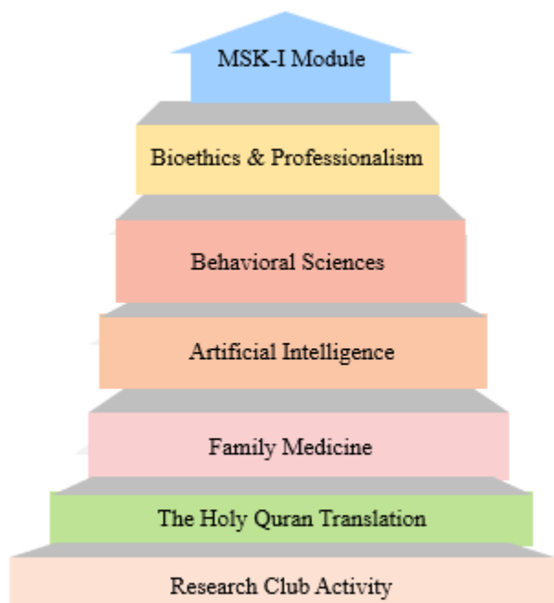
	• Clinical Rotations	• How to find Bone age • Fractures of distal Bones • Placental abnormalities • Uterine abnormalities • Pregnancy and effects of congenital uterine abnormalities • X-ray in pediatric age group • Pathologies like Rickets, congenital dislocation of hip joint and other abnormalities
Clinical Relevance		
• Accidents • Osteoporosis • Understanding congenital skeletal abnormalities (e.g., clubfoot, spina bifida) • Role of biomechanics in orthopedic injuries (e.g., sports injuries) • Clinical application of bone physiology in osteoporosis and rickets • Basics of fracture management and prevention strategies		

Implementation of Terms of Reference (TORS)
• Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are predefined as per the guidelines of PMDC and to be strictly followed. • The hours mentioned within each module are the mandatory minimum required. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. However, the level of cognition can be kept at a higher level. • The Table of Specifications provided will be used for the three papers of the first professional examination. • The same table of specifications should be used for the respective block exams for internal assessment. • The criteria defined for continuous internal assessment is to be followed for each module and block respectively

Integration of Disciplines in Musculoskeletal-I Module



Spiral / General Education Cluster Courses (13%)



Module No. 2 – MSK-I

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

Module Outcomes

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

Knowledge

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

Skills

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

Attitude

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

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

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Syllabus of Musculoskeletal-I (Module No. 2)

Anatomy				
Theory				
Topic	**Learning Objectives** **At the end of session students should be able to**	**C/P/A**	**Teaching Strategy**	**Assessment Tool**
Embryology				
Formation of Bilaminar Embryonic Disc (2nd week of Human Development)	• Describe formation of Amniotic Cavity, embryonic disc and Umbilical vesicle	C2	LGIS	SAQs MCQs VIVA VOCE
	• Discuss development of chorionic sac	C2		
	• Outline the process of implantation	C1		
	• Describe changes in Gravid Endometrium	C2		
	• Understand the Bio-physiological aspects of gravid endometrium	C2		
	• Corelate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Gastrulation Establishment of Body Axis and Fate Map (3rd week)	• Discuss process of gastrulation with special reference to primitive streak	C2	LGIS	SAQs MCQs VIVA VOCE
	• Describe the fate of primitive streak	C2		
	• Discuss establishment of body axis	C2		
	• Draw fate map and discuss its importance in future development	C2		
	• Understand the Biophysiological aspects of gastrulation	C2		
	• Describe congenital abnormalities associated with gastrulation	C3		
	• Corelate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
		C3		

	• Apply strategic use of AI in health care • Read a relevant Research article	C3		
Notochord Formation (3rd week)	• Define notochord	C1	LGIS	SAQs MCQs VIVA VOCE
	• Delineate different stages of notochord formation	C1		
	• Discuss the importance of notochord in development of central nervous system	C2		
	• Describe role of notochord in development of axial Skeleton	C1		
	• Describe the fate of notochord	C2		
	• Correlate with clinical conditions of notochord formation	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Neurulation (3rd week)	• Define neurulation	C1	LGIS	SAQs MCQs VIVA VOCE
	• Describe formation of neural plate and neural tube	C2		
	• Discuss neural crest formation	C2		
	• Enlist derivatives of neural crest cells	C1		
	• Understand the bio-physiological aspects of Neurulation	C2		
	• Discuss neural tube defects	C3		
	• Discuss different types of spina bifida	C3		
	• Discuss the importance of folic acid in the prevention of spina bifida	C2		
	• Corelate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
	• Enumerate three germ layers and their derivatives	C1		

Development and Differentiation of Somites	• Describe different divisions of mesoderm	C2	LGIS	SAQs MCQs VIVA VOCE
	• Describe development of somites and their differentiation	C2		
	• Explain different stages of somite development	C2		
	• Understand the Biophysiological aspects of Somite differentiation	C2		
	• Correlate clinical aspects of somite differentiation	C3		
	• Focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	•Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Early Development of Cardiovascular System & highlights of 4th-8th week	• Describe early development of cardiovascular system and chorionic villi	C2	LGIS	SAQs MCQs VIVA
	• Discuss development of intraembryonic coelom	C2		
	• Define angiogenesis and vasculogenesis.	C1		
	• Correlate clinical aspects of angiogenesis	C3		
	• Summarize the main developmental events and changes in external form of the embryo during the 4th to 8th weeks	C2		
	• Corelate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Folding of Embryo	• Enlist different phases of embryonic development	C1	LGIS	SAQs MCQs VIVA VOCE
	• Describe folding of the embryo in median plane	C2		
	• Describe folding of the embryo in horizontal plane	C2		
	• Discuss results of folding	C2		
	• Discuss Omphalocele and Gastroschisis	C3		
	• Corelate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
	• Describe different criteria for fetal age estimation	C2		SAQs
	• Discuss the trimesters of pregnancy with their importance	C2		
	• Describe highlights of fetal period	C2		

Fetal period	• Differentiate between embryonic and fetal period	C2	LGIS	MCQs VIVA VOCE
	• Tabulate growth in length and weight during fetal period	C2		
	• Enumerate and discuss factors influencing fetal growth	C2		
	• Define the term perinatology	C1		
	• Enlist and briefly describe procedures for assessing fetal well-being	C3		
	• Correlate clinical aspects of fetal period	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Placenta	• Discuss Implantation and establishment of the embryo within the uterus	C2	LGIS	SAQs MCQs VIVA VOCE
	• Describe the differentiation of the uterine lining into decidua	C2		
	• Describe the development of a placenta	C2		
	• Describe fetal – maternal circulation	C2		
	• Discuss the bio-physiological aspects of placenta	C2		
	• Corelate the clinical conditions associated with placenta	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Fetal Membranes and Multiple Pregnancies	• Enlist membranes developing during pregnancy	C1	LGIS	SAQs MCQs VIVA VOCE
	• Discuss origin, composition, location, function and fate of yolk sac	C2		
	• Explain origin, composition, location, function and fate of Amnion	C2		
	• Describe formation of umbilical cord and its structure	C2		
	• Define Allantois along with its importance and function	C1		
	• Discuss different types of twins	C2		
	• Correlate clinical aspects of fetal membranes	C3		
	• Correlate with the clinical conditions of twin pregnancy	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Histology				

Connective tissue I Cells of connective tissue Embryonic connective tissue / mucoid Connective Tissue	• Define connective tissue	C1	LGIS	SAQs MCQs VIVA VOCE
	• Classify connective tissue	C2		
	• Enlist and explain types of cells in CT	C2		
	• Enumerate sites and describe the function of each type of cell of connective tissue	C2		
	• Understand the Biophysiological aspects of connective tissue	C2		
	• Draw and label histological structure of mucoid CT.	C2		
	• Describe fibers in mucoid CT	C2		
	• Correlate clinical conditions of CT	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research articles	C3		
Connective tissue II Loose aerolar connective tissue & its types Reticular CT	• Enumerate examples and location of reticular, connective tissue	C1	LGIS	SAQs MCQs VIVA VOCE
	• Illustrate histological structure of loose and reticular connective tissue	C2		
	• Correlate clinical aspects of loose and reticular CT	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Connective tissue III Adipose CT Dense regular and irregular connective	• Enumerate examples and location of adipose and dense CT.	C1	LGIS	SAQs MCQs VIVA VOCE
	• Draw, describe and label histological structure of all types of connective tissue.	C2		
	• Differentiate between dense regular and irregular connective tissue microscopically	C2		
	• Correlate clinical aspects of loose and reticular CT	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
	• Classify cartilage	C2	LGIS	SAQs
	• Enlist sites of hyaline, fibro and elastic cartilage	C1		
	• Appreciate microscopic structure of Hyaline, Elastic and Fibrocartilage	C2		
	• Differentiate between three cartilages	C2		

Cartilage	• Describe the structure of perichondrium	C2		MCQs VIVA VOCE
	• Describe the arrangement of layers in articular cartilage	C2		
	• Understand the Biophysiological aspects of cartilage	C2		
	• Correlate with clinical conditions	C3		
	• focus on provision of curative and preventive health care measures			
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Bone-I (Cells & Types)	• Describe structure and functions of bone cells	C2	LGIS	SAQs MCQs VIVA VOCE
	• Discuss periosteum and endosteum	C2		
	• Discuss types of bones	C2		
	• Describe the histological features of spongy and compact bone	C2		
	• Describe structure of osteon.	C2		
	• Understand the Biophysiological aspects of bone	C2		
	• Correlate clinical aspects of bone	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Bone-II (Ossification)	• Describe osteogenesis	C2	LGIS	SAQs MCQs VIVA VOCE
	• Discuss bone growth, remodeling and repair	C2		
	• Describe histological changes in bones in osteoporosis, rickets, osteomalacia, osteopetrosis and bone tumors	C3		
	• Correlate with the clinical conditions.	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		

General Anatomy				
Bone-I (General Features)	• Describe the functions of bone and skeleton	C2	LGIS	SAQs
	• Identify general features of bone	C2		
	• Differentiate between maceration and decalcification of bones	C2		

	• Correlate with clinical conditions of bone	C3		MCQs VIVA VOCE
	• focus on provision of curative and preventive health care	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Bone-II Classification & Blood supply)	• Classify bones based on different criteria	C2	LGIS	SAQs MCQs VIVA VOCE
	• Describe the growing end hypothesis	C2		
	• Describe blood supply of bones	C2		
	• Appreciate role of bones in estimation of sex, age and stature.	C2		
	• Correlate with the clinical conditions.	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Joints-I (Types)	• Define joints	C1	LGIS	SAQs MCQs VIVA VOCE
	• Classify fibrous joints with examples	C2		
	• Classify cartilaginous joints with examples	C2		
	• Classify synovial joints with examples	C2		
	• Understand the Bio-physiological aspects of joints	C2		
	• Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		
Joints-II (Movements)	• Describe structure of synovial joint	C2	LGIS	SAQs MCQs VIVA VOCE
	• Classify synovial joints	C2		
	• Explain movements around synovial joints	C2		
	• Enlist Degenerative joint diseases	C3		
	• Describe the involvement of anatomical structure of the articular cartilage in Degenerative joint disease	C3		
	• Correlate with the clinical conditions.	C3		

	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		

Topic	Learning Objectives At the end of Session students should be able to	C/P/A	Teaching Strategy	Assessment Tool
Shoulder Joint	• Classify the joint (according to type, shape and movement)	C2	SGD, Skill Lab	MCQs SEQs VIVA VOCE OSPE
	• Discuss the attachments of capsule and ligament	C2		
	• Enlist the intra-articular structure (tendon of biceps brachii)	C1		
	• Describe attachment of glenoidal labrum with its significance in relation to synovial membrane	C2		
	• Discuss the neurovascular supply	C2		
	• Discuss factors indispensable for stability of joint	C2		
	• Discuss the movements at shoulder joint	C2		
	• Enlist related bursae.	C1		
	• Explain the related clinicals (shoulder dislocation, rotator cuff injuries, Glenoid Labrum tears, Frozen shoulder)	C3		
	• Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
Flexor compartment & Neurovascular organization of the arm	• Tabulate muscles of flexor compartment with their origin, insertion, nerve supply and actions	C2	SGD, Skill Lab	MCQs SEQs VIVA VOCE OSPE
	• Describe Neurovascular organization of arm.	C2		
	• Map the outline of Brachial artery and Musculo cutaneous nerve in a simulated patient or model	P		
	• Correlate with the clinical conditions (biceps tendinitis, dislocation of tendon of biceps brachii)	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		

Extensor compartment of the arm	• Tabulate Muscles of extensor compartment with origin insertion, nerve supply and actions	C2	SGD, Skill Lab	MCQs SEQs VIVA VOCE OSPE
	• Describe the neurovascular organization	C2		
	• Discuss consequences of injury to radial nerve (wrist drop), venipuncture in cubital fossa)	C3		
	• Map the outline of Radial nerve and ulnar nerve on a simulated patient or model	P		
	• Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Ulna	• Determine the side	C1	SGD, Skill Lab	MCQs SEQs VIVA VOCE OSPE
	• Demonstrate anatomical position	P		
	• Discuss general features, attachments and articulations	C2		
	• Describe ossification	C2		
	• Elaborate interosseous membrane and its importance	C2		
	• Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
Radius	• Determine the side	C1	SGD, Skill Lab	MCQs SEQs VIVA VOCE OSPE
	• Demonstrate its anatomical position	P		
	• Discuss general features, attachments and articulations	C2		
	• Describe its ossification	C2		
	• Describe the interosseous membrane and its importance	C2		
	• Correlate the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
	• Tabulate muscles of flexor compartment with their origin, insertion, nerve supply and actions	C2		

Flexor compartment of the forearm	• Correlate with clinical conditions associated with flexor compartment	C3	SGD, Skill Lab	MCQs SEQs VIVA VOCE OSPE
	• Map the outline of Median Nerve , Radial Artery and Ulnar Artery of forearm in a simulated patient or Model	P		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
Extensor compartment of the forearm	• Tabulate muscles of extensor compartment with origin, insertion, nerve supply and actions	C2	SGD, Skill Lab	MCQs SEQs VIVA VOCE OSPE
	• Correlate with clinical conditions associated with extensor compartment of forearm (Tennis elbow)	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
Neurovascular organization of forearm	• Describe nerves and vessels of forearm (formation, commencement, course, branches and relations)	C2	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Correlate with associated clinical conditions (Median nerve injury, pronator syndrome, cubital tunnel syndrome)	C3		
	• Map the outline of Radial Nerve and Ulnar Nerve on a simulated patient or model	P		
	• Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Elbow joint	• Describe the type of joint with its articular surfaces	C2	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Discuss the capsule, synovial membrane and ligaments of the joints	C2		
	• Enumerate the related bursae,	C1		
	• Describe axis and plane of movements	C2		
	• Enumerate muscles producing movements at elbow joint.	C1		
	• Correlate with the associated clinical conditions (Elbow joint dislocation and student's elbow)	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care			

	• Read a relevant research article	C3		
Proximal and distal radioulnar joints	• Describe type of radioulnar joints, articular surfaces, capsular attachments, synovial membrane and ligaments.	C2	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Describe movements of supination and pronation with special reference to axes	C2		
	• Enumerate the muscles producing these movements	C1		
	• Correlate clinical aspects of joint	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
Hand	• Understand the arrangement of carpal bones	C1	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Identify the salient features of carpel bone.	C2		
	• Discuss the special blood supply of scaphoid bone.	C3		
	• Describe the mid carpal joint.	C2		
	• Discuss the 1st carpometacarpal joint including the type of the joint capsule synovial membrane and ligaments with axis of the movement and the muscles producing the movements	C2		
	• Correlate with the clinical conditions.	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care			
	• Read relevant research article	C3		
Wrist joint	• Describe the type of joint with its articular surfaces	C2	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Discuss the capsule, synovial membrane and ligaments of the joint	C2		
	• Enumerate the related bursae	C1		
	• Describe axis and plane of movements	C2		
	• Enumerate muscles producing movements at joint	C1		
	• Discuss wrist fractures & Dislocations	C3		
	• Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article			
Anastomosis around wrist joint	• Discuss the blood vessels involved in the formation of anastomosis around the wrist joint	C2		
	• Explain the importance of anastomosis.	C2		

	• Correlate with the clinical conditions	C3	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• focus on provision of curative and preventive health care measures Able to focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article			
Dorsum of Hand, Flexor retinaculum Extensor retinaculum	• Describe the muscles of dorsum of hand	C2	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Discuss the Dorsal digital expansion	C2		
	• Describe the attachment of flexor retinaculum with structures related to it.	C2		
	• Map the outline of flexor and extensor retinacula on a simulated patient or a model.	P		
	• Describe the Guyon's canal.	C2		
	• Describe the formation of the carpel tunnel and its applied anatomy.	C3		
	• Describe the attachment of extensor retinaculum and its various compartments with structures passing through it.	C2		
	• Discuss the De Quervain's disease.	C3		
	• Correlate with the clinical conditions.	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care			
	• Read a relevant research article	C3		
Palm of hand-I Muscles & Neurovascular organization	• Tabulate the muscles forming the thenar and hypothenar eminence.	C2	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Discuss Lumbricals, Palmar and dorsal interossei with their attachments and actions.	C2		
	• Discuss the formation of superficial and deep arterial arches	C2		
	• Map the outline of superficial and deep arterial arches on a simulated patient or model.	P		
	• Correlate with the clinical conditions.	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
	• Discuss the formation and attachments of palmar aponeurosis.	C2		MCQs
	• Describe the formation of palmar spaces and its divisions	C2		
	• Describe the thenar and mid palmar spaces.	C2		
	• Define pulp spaces	C1		

Palm of hand-II Fascial spaces of hand Grip	• Relate anatomy of pulp space with its common clinical conditions	C3	SGD, SKILL LAB	SEQs VIVA VOCE OSPE
	• Describe dorsal subcutaneous spaces	C2		
	• Demonstrate surgical incisions.	C3		
	• Describe different types of grips	C2		
	• Correlate with the clinical conditions.	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
Cross sectional Anatomy of upper limb	• Identify the structures present at different levels of cross section; mid humeral shaft, end of humeral shaft, elbow joint, superior radioulnar joint, mid forearm, wrist joint, proximal shafts of metacarpals.	C2	SGD, SKILL LAB	MCQs SEQs VIVA VOCE OSPE
	• Correlate with the clinical conditions	C3		
	• Read a relevant research article	C3		
	• Apply strategic use of AI in health care	C3		

Topic	Learning Objectives At the end of Session students should be able to	Learning Resources
Shoulder Joint	• Classify the joint (according to type, shape and movement)	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page 266- 271,284-285). https://teachmeanatomy.info/upper-limb/joints/shoulder
	• Discuss the attachments of capsule and ligament	
	• Enlistt heintra-articular structure (tendon of biceps brachii)	
	• Describe attachment of glenoidal labrum with its significance in relation to synovial membrane	
	• Discuss the neurovascular supply	
	• Discuss factors indispensable for stability of joint	
	• Discuss the movement sat shoulder joint	
	• Enlist related bursae.	
	• Explain the related clinicals (shoulder dislocation, rotator cuff injuries, Glenoid Labrum tears, Frozen shoulder)	
Flexor compartment & Neurovascular organization of the arm	• Tabulate muscles of flexor compartment with the irorigin, insertion, nerve supply and actions	• Clinical Oriented Anatomy by Keith L. Moore.8THEdition. (Chapter 3, Page201-211,211-214). https://teachmeanatomy.info/upper-limb/muscles/anterior-forearm/
	• Describe Neurovascular organization of arm,	
	• Explain the related clinicals (biceps tendinitis, dislocation of tendon of biceps brachii)	

Extensor compartment of the arm	• Tabulate Muscles of extends or compartment with origin insertion, nerve supply and actions • Describe the neurovascular organization • Discuss consequences of injury to radial nerve (wrist drop), venipuncture in cubital fossa) • Read relevant research article • Use Digital Library	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page201-211,211-214). https://teachmeanatomy.info/upper-limb/muscles/upper-arm/
Ulna	• Determine the side • Demonstrate anatomical position • Discuss general features, attachment sand articulations • Describe ossification • Elaborate interosseous membrane and its importance • Correlate the clinical aspects	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page147). https://teachmeanatomy.info/upper-limb/bones/ulna/
Radius	• Determine the side • Demonstrate it anatomical position • Discuss general features, attachments and articulations • Describe its ossification • Describe the interosseous membrane and its importance • Correlate the clinical aspects	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page148). https://teachmeanatomy.info/upper-limb/bones/radius/
Flexor compartment of the forearm	• Tabulate muscles of flexor compartment with their origin, insertion, nerves Supply and actions • Describe clinical conditions associated with flexor compartment	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page215-234,236,240) https://teachmeanatomy.info/upper-limb/muscles/anterior-forearm/
Extensor compartment of the forearm	• Tabulate muscles of extensor compartment with origin, insertion, nerve supply and actions • Describe clinical condition associated with extensor compartment of forearm (Tennis elbow)	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page215-234,236,240). https://teachmeanatomy.info/upper-limb/muscles/posterior-forearm/

Neurovascular organization of forearm	• Describe nerves and vessels of forearm (formation, commencement, course, branches and relations) • Describe associated clinical conditions (Median nerve injury, pronator syndrome, cubital tunnel syndrome) • Read relevant research article • Use Digital Library	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page215-234,236,240). https://teachmeanatomy.info/upper-limb/muscles/posterior-forearm/
Elbow joint	• Describe the type of joint with its articular surfaces • Discuss the capsule, synovial membrane and ligaments of the joints • Enumerate the related bursae, • Describe axis and plane of movements • Enumerate muscles producing movements at elbow joint. • Describe the associated clinical conditions (Elbow joint dislocation and student's elbow)	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition (Chapter 3, Page271-274). https://www.kenhub.com/en/library/anatomy/elbow-joint
Proximal and distal radioulnar joints	• Describe type of radioulnar joints, articular surfaces, capsular attachments, synovial membrane and ligaments. • Describe movements of supination and pronation with special reference to axes • Enumerate the muscles producing these movements • Correlate clinical aspects of joint	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page274-277). https://www.kenhub.com/en/library/anatomy/proximal-radioulnar-joint https://www.kenhub.com/en/library/anatomy/distal-radioulnar-joint
Hand	• Understand the arrangement of carpal bones • Identify the salient features of carpel bone. • Discuss the special blood supply of scaphoid bone. • Describe the midcarpal joint. • Discuss the1st carpometacarpal joint including the type of the joint capsules ynovial Membrane and ligaments with axis of the movement and the muscles producing the movements • Read relevant research article • Use Digital Library	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Chapter 3, Page148-151,278-283). https://teachmeanatomy.info/upper-limb/muscles/hand/
Wrist joint	• Describe the type of joint with its articular surfaces • Discuss the capsule, synovial membrane and ligaments of the joint • Enumerate the related bursae • Describe axis and plane of movements	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page278).

	• Enumerate muscles producing movements at joint • Discuss wrist fractures & Dislocations	https://www.kenhub.com/en/library/anatomy/the-wrist-joint
Anastomosis around wrist joint	• Discuss the blood vessels involved in the formation of anastomosis around the wrist joint • Explain the importance of anastomosis.	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page278). https://www.kenhub.com/en/library/anatomy/arterial-anastomoses-of-the-upper-extremity
Dorsum of Hand, Flexor retinaculum Extensor retinaculum	• Describe the muscles of dorsum of hand • Discuss the Dorsal digital expansion • Describe the attachment of flexor retinaculum with structures related to it. • Describe the Guyon's canal. • Describe the formation of the carpel tunnel and its applied anatomy. • Describe the attachment of extensor retinaculum and its various compartments with structures passing through it. • Discuss the De Quervain's disease.	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page159,224-226). https://teachmeanatomy.info/upper-limb/muscles/hand/
Palm of hand-I Muscles & Neurovascular organization	• Tabulate the muscles forming the thenar and hypothenar eminence. • Discuss Lumbricals, Palmar and dorsal interossei with their attachments and actions. • Discuss the formation of superficial and deep arterial arches • Discuss the clinicals associated with palm	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Pag243-256). https://teachmeanatomy.info/upper-limb/muscles/hand/
Palm of hand-II Fascial spaces of hand Grip	• Discuss the formation and attachments of palmar aponeurosis. • Describe the formation of palmar spaces and its divisions • Describe the thenar and mid palmar spaces. • Define pulp spaces • Relate anatomy of pulp space with its common clinical conditions • Describe dorsal subcutaneous spaces. • Demonstrate surgical incisions. • Describe different types of grips • Read relevant research article • Use Digital Library	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page241-243,258-262). https://boneandspine.com/spaces-of-hand/

Practicals				
Topic	**At The End Of The Practical The Students Should Be Able To**	**C/P/A**	**Teaching Strategy**	**Assessment Tools**
Connective Tissue-I • Embryonic connective tissue / mucoid Connective Tissue • Loose areolar connective tissue • Reticular Connective Tissue • Adipose Connective Tissue	• Identify mucoid connective tissue under microscope	P	Skill Lab	OSPE MCQs
	• Illustrate histological structure of mucoid connective tissue	C2		
	• Write two points of identification	C1		
	• Identify reticular and adipose connective tissue under microscope	C2		
	• Illustrate histological structure of reticular and adipose connective tissue	C2		
	• Write two points of identification	C1		
	• Focus the slide	P		
Connective Tissue-II • Dense regular connective tissue • Dense irregular connective tissue	• Identify dense regular and irregular connective tissue under microscope	P	Skill Lab	OSPE MCQs
	• Illustrate histological structure of dense regular and irregular connective tissue	C2		
	• Write two points of identification	C1		
	• Differentiate between dense regular and irregular connective tissue microscopically	C2		
	• Focus the slide	P		
Cartilage • Hyaline cartilage • Elastic cartilage • Fibrocartilage	• Identify all three types of cartilages under microscope	P	Skill Lab	OSPE MCQs
	• Illustrate microscopic structure of all three cartilages	C2		
	• Discuss the structure of perichondrium	C1		
	• Write wo points of identification	C1		
	• Enlist sites of hyaline, fibro and elastic cartilage	C1		
	• Focus the slide	P		
Bone	• Identify compact and spongy bone under microscope	P		
	• Illustrate microscopic structure of compact bone and spongy bone	C2		

• Compact Bone • Spongy Bone	• Write two points of identification • Focus the slide	C1 P	Skill Lab	OSPE MCQs

Physiology				
Theory				
Topic	**Learning Objectives** **At the end of session students should be able to**	**C/P/A**	**Teaching Strategy**	**Assessment Tool**
Structure of Neuron	• Describe different parts of neuron	C1	LGIS SDL	SAQs MCQs VIVA VOCE
Classification of Neurons and nerve fibers, NGF	• Describe the classification of neurons and nerve fibers	C1	LGIS SDL	SAQs MCQs VIVA VOCE
	• Describe NGF; given their roles	C1		
Stimulus and Response & Types of Stimuli	• Define stimulus	C1	LGIS	SAQs MCQs VIVA VOCE
	• Describe various types of stimuli and response	C1		
Concept of degeneration and regeneration	• Explain degeneration and regeneration of nerve fibers	C2	LGIS	SAQs MCQs VIVA VOCE
Properties of nerve fibers	• Discuss the properties of nerve fibers	C2	LGIS	SAQs MCQs VIVA VOCE
Graded Potential, Comparison with action potential	• Define graded Potential with examples	C1	LGIS	SAQs MCQs VIVA VOCE
	• Compare between graded potential and action potential	C2		

Nernst Potential RMP	• Understand the concept of Nernst potential and equilibrium potential for different ions	C2	LGIS SDL	SAQs MCQs VIVA VOCE
	• Define resting membrane potential of nerves.	C1		
	• Explain the factors which determine the level of RMP	C2		
	• Differences between electrical and chemical synapse	C2		
RMP: & Measurement & effect of Electrolytes,	• Describe the terms polarized and hyperpolarized	C1	LGIS	SAQs MCQs VIVA VOCE
	• Describe the role of various ions for these states	C1		
Stages of Action Potential I&II	• Define and draw action potential	C1	LGIS	SAQs MCQs VIVA VOCE
	• Describe different phases of action potential	C1		
Recording of Action Potential Propagation of Action Potential & Factors effecting nerve conduction Polarization and hyperpolarization state	• Briefly describe the method of recording resting membrane potential and action potential	C1	LGIS	SAQs MCQs VIVA VOCE
	• Describe the mechanism of propagation of action potential	C1		
	• Describe various factor that effect nerve conduction	C1		
Refractory Period, Different types of Action Potentials	• Define refractory period and discuss its types	C1	LGIS SDL	SAQs MCQs VIVA VOCE
	• Describe various types of action potential	C1		
Synapse and synaptic transmission	• Describe synapse and its types	C1	LGIS	SAQs MCQs VIVA VOCE
EPSP, IPSP, Properties of chemical synapse	• Discuss in detail various properties of chemical synapse	C2	LGIS	SAQs MCQs VIVA VOCE

Properties of Chemical synaptic	• Discuss in detail various properties of chemical synapse	C2	LGIS	SAQs MCQs VIVA VOCE
NMJ , Synthesis and release of Ach Excitation-Contraction coupling	• Describe the physiologic anatomy of neuromuscular junction.	C1	LGIS SDL	SAQs MCQs VIVA VOCE
	• Recall Synthesis and release of Ach	C1		
	• Describe the mechanism of transmission of impulses from nerve endings to skeletal muscle fibers	C1		
	• Describe briefly the biochemistry of acetyl choline	C1		
Drugs acting on NMJ, Excitation-Contraction coupling	• Enlist drugs that enhance and block transmission at neuromuscular junction	C1	LGIS SDL	SAQs MCQs VIVA VOCE
	• Describe mechanism of excitation contraction coupling	C1		
Myasthenia Gravis, Lambert Eaton Syndrome	• Describe the salient features of myasthenia gravis and Lambert Eaton syndrome	C1	LGIS	SAQs MCQs VIVA VOCE

Topic	**Learning Objectives** **At the end of Session students should be able to**	**C/P/A**	**Teaching Strategy**	**Assessment Tool**
Discussion regarding previous module	• Discuss difficulties regarding questions, MCQs of Foundation Module	C2	SGD	MCQs SAQs Viva Voce OSPE
RMP, measurement & effects, of electrolyte on RMP	• Define resting membrane potential of nerves.	C1	SGD	MCQs SAQs Viva Voce OSPE
	• Explain the factors which determine the level of RMP	C2		
Drugs acting on NMJ excitation contraction coupling	• Drugs acting on NMJ	C1	SGD	MCQs SEQs SAQs
	• Excitation contraction coupling	C1		

				Viva Voce OSPE
Synapse and synaptic transmission & EBSP,IPSP properties of chemical synapse	• Describe synapse and its types	C1	SGD	MCQs SAQs Viva Voce OSPE
	• Differences between electrical and chemical synapse	C2		
Nernst potential	• Concept of Nernst potential	C1	SGD	MCQs SAQs Viva Voce OSPE
	• Equilibrium potential for different ions	C2		
Neuro muscular function (NMJ)	• Transmission Across NMJ	C1	SGD	MCQs SAQs Viva Voce OSPE
	• Diseases of NMJ	C2		
Nerve growth factor (NGF)	• Describe NGF	C1	SGD	MCQs SAQs Viva Voce OSPE
	• Give their role	C1		
	• Explain De-generation and Re-Generation of nerve fibers	C2		

Topics	Learning Objective	References
Structure of neurons Classification of neurons & nerve fibers	• Structure of neurons • Myelinate Dand unmyelinated nerve fibers. • Neuroglia • Difference between neurons and glial cells	• Ganong's Review of Medical Physiology.25TH Edition physiology Excitable Tissue; Nerve (Chapter 04, Page 85-90) • Textbook of Medical Physiology by Guyton & Hall. 14thEdition. Introduction to Physiology. (Unit2, Chapter 05 Membrane Physiology Page74) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 01. Physiology of Body Fluids. (Chapter 03, Page 37)
Nernst potential, RMP	• Basic physics of membrane potential, Nernst equation, • Goldman Equation • Origin of RMP indifferent cell types.	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Chapter no. 05 membrane dynamics Page no.188) • Textbook of Medical Physiology by Guyton & Hall.14th Edition Membrane Potential and action potential. (Unit 2,Chapter 05 Page 63) • Ganong's Review of Medical Physiology. 25TH Edition, Excitable Tissue; Nerve (Chapter 04, Page 90) • Physiological Basis of Medical Practice by Best & Taylor's.13th

		Edition. Section 01. Properties and function of cell membrane. (Chapter 02, Page 31,41-43)
Properties of nerve fibers	• Rhythmicity of Excitable tissues, • Characteristics of signal transmission, • Types of refract toy period • Concept of excitation	• Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Membrane Potential and action potential (Unit2, Chapter 05, Page 73-76) • Ganong's Review of Medical Physiology.25TH Edition, Over view of cell physiology in medical physiology. Excite able Tissue; Nerve (Chapter04, Page 94) • Physiological Basis of Medical Practice by Best &Taylor's.13th Edition.Section01. Property and function of cell membrane. (Chapter03,Page41,55)
Measurement of RMP & effect of electrolytes on RMP	• Measurement of RMP • Effect of electrolyte son RMP • Role of Na/K pump	• Textbook of Medical Physiology by Guyton & Hall. 14th Edition. Membrane Potential and action potential (Unit2, Chapter 05, Page 65,67-70) • Human Physiology by Dee Unglaub Silver thorn. 8THEdition.Chapter no.05 Membrane dynamics Page no.188-194) • Physiology by Linda S. Costanzo 6th Edition. Cellular Physiology (Chapter01.Page18)
Concept of degeneration & regeneration	• Introduction • Axonal Degeneration • Wallerian Degeneration	• Ganong's Review of Medical Physiology.25TH Edition, overview of cell physiology in medical physiology (chapter 6, page 133) • A & P Anatomy and physiology Tortora, Chapter 12 Nervous tissue And Homeostasis Page 447 • Ganong's Review of Medical Physiology.25TH Edition, overview of cell physiology in medical physiology (Chapter 4, page 97)
Stimulus & response & types of stimuli, Stages of action potential	• Neuron action potential, • Stages of Propagation of AP • Conduction Rates • ALL-OR-NONE Principle	• Textbook of Medical Physiology by Guyton & Hall.14th Edition.Introduction to Physiology. (Unit 2, Chapter 05 Membrane Potential and action potential Page 71) • Ganong's Review of Medical Physiology.25TH Edition, Excitable Tissue; Nerve (Chapter 04,Page 93) • Physiology by Linda S. Costanzo 6thEdition. cellular Physiology (Chapter 01. Page 25) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 01. Properties and function of cell membrane. (Chapter 03,Page 45,47-51)
A, Refractory period, types of action potential. Graded	• Threshold Potential • Action potential • Types of Action Potential	• A. • Ganong's Review of Medical Physiology.25TH Edition, General principles and Energy production in Medical Physiology (chapter 04, Page 90, 93)

potential comparison with action potential B. Recording & propagation of action potential & factors effecting nerve conduction & hyperpolarized state	• Propagation of Action Potential • Hyperpolarization • Factors effecting Action potential	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Introduction to Physiology. (Chapter 5, page 67). • Ganong's Review of Medical Physiology.25TH Edition, General principles and Energy production in Medical Physiology (chapter 8, page 273) • B. • Ganong's Review of Medical Physiology.25TH Editions, Overview of Cellular Physiology in Medical Physiology (chapter 08, Page 276, 278, 281) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Introduction to Physiology. (Section 1, chapter 04. , page 71,72.73,74) • Ganong's Review of Medical Physiology.25TH Editions, Overview of Cellular Physiology in Medical Physiology (chapter 04, page 93)

Practical				
Topic	**At the end of practical students should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Estimation of hemoglobin Practical I	• Apparatus identification • Detail procedure • Precautions • Aseptic measures taken during blood sampling	P, A	Skill lab	OSPE
Estimation of hematocrit Practical I	• Hct definition • How to measure • Precautions	P,A	Skill lab	OSPE
ESR Practical I	• Procedure • Precautions • Clinical importance of ESR, normal values	P,A	Skill lab	OSPE
Preparation of DLC	• Preparation of slide – practice • How to make blood film • How to stain it after preparation • Help of teaching aid identification of cells	P,A	Skill lab	OSPE

Biochemistry				
Theory				
Topic	**Learning Objectives** **At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Minerals & Vitamins				
Minerals classification and Introduction. Calcium Phosphate	• Classify Minerals • State Daiy Requirements of Calcium in different conditions	C1 C2	LGIS	MCQs, SAQs & Viva
	• Discuss Types & Sources of Calcium phosphate	C2		
Biochemical Role of Calcium & Phosphate	• Discuss causes of Hypercalcemia & Hypocalcemia • Describe effects of Hypercalcemia & Hypocalcemia • State Daily Requirements of Phosphate • Discuss Biochemical functions of Phosphate	C2 C2	LGIS	MCQs, SAQs & Viva
Fluoride, Magnesium, Sulphur	• Elaborate Biochemical functions of Fluoride, Sulphur & Magnesium • Describe Deficiency Effects	C2 C1	LGIS	MCQs, SAQs & Viva
Iodine, Copper, Zinc, Selenium, Manganese	• Recall sources & daily requirements • Discuss their biochemical functions • Describe Deficiency Effects	C1 C2	LGIS	MCQs, SAQs & Viva
Vitamins & Their Classification	• Classify Vitamins & Water-Soluble Vitamins • Enlist Sources of Vitamin A & E • Describe Biochemical functions of Vitamin A & E • Describe Deficiency Effects of Vitamin A & E	C2		MCQs,

Vitamin A and E	• Explain Toxic Effects of Vitamin A	C1	LGIS	SAQs & Viva
Vitamin D	• Enlist Sources of Vit.D • Explain Steps of activation of Vit.D in the body • Describe Biochemical functions of Vit.D • Explain Deficiency effects of Vit.D • Explain Toxic effects of Vit.D	C1 C2	LGIS	MCQs, SAQs & Viva
Vitamin C	• Enlist Sources of Vit.C • Describe Biochemical functions of Vit.C • Explain Deficiency effects of Vit.C • Explain Toxic effects of Vit.C	C1 C2	LGIS	MCQs, SAQs & Viva
Niacin & Thiamine	• Enlist Sources • Describe Biochemical functions • Explain Deficiency effects	C1 C2	LGIS	MCQs, SAQs & Viva
Classification & Structure of Amino Acids	• Classification & Structure of Amino Acids & Isomerism of Amino Acids	C2	LGIS	MCQs, SAQs & Viva

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

Topics	Learning Objective	References
Minerals & Vitamins		
Minerals Introduction Classification Calcium and phosphate	• State Daily Requirements of Calcium in different conditions • State Daily Requirement of Phosphate in different condition • Classify Minerals Discuss Types • Sources of Calcium • Sources of Phosphate	• Textbook of Lippincott 8th Edition Chapter # 29 page#466-467 • Textbook of Harper 32nd Edition Chapter # 44 page# 540 • https://www.ncbi.nlm.nih.gov/books/NBK218735 • https://youtu.be/34FTvJZCrt4
Biochemical Role of Calcium & Phosphate	• Discuss causes of Hypercalcemia • Discuss causes of Hypocalcemia • Describe effects of Hypercalcemia & Hypocalcemia • State Daily Requirements of Phosphate Discuss Biochemical functions of Phosphate	• Textbook of Lippincott 8th Edition Chapter # 29 page #466-467 • https://www.ncbi.nlm.nih.gov/books/NBK279023/ • https://youtu.be/qAeWKCXDniw
Fluoride, Magnesium, Sulphur	• Elaborate Biochemical functions of Fluoride, Sulphur & Magnesium • Enlist Sources of Fluoride, Sulphur. • Magnesium Describe Deficiency Effects	• Textbook of Lippincott 8th Edition Chapter # 29 page #468 • https://www.ncbi.nlm.nih.gov/ • https://youtu.be/PTOJNdtuXro

Iodine, Copper, Zinc, Selenium, Manganese	• Recall sources & daily requirements • Discuss their biochemical functions Describe Deficiency Effects	• Textbook of Lippincott 8th Edition Chapter # 29 page #449-454 • https://youtu.be/1i9fSQSvYI0 • https://pubmed.ncbi.nlm.nih.gov/
Definition of Vitamins &Classification of Vitamins Vitamin A and E	• Classify Fat- & Water-Soluble Vitamins • Enlist Sources of Vitamin A & E • Describe Biochemical functions of Vitamin A & E • Describe Deficiency Effects of Vitamin A & E • Explain Toxic Effects of Vitamin A	• Textbook of Lippincott 8th Edition Chapter # 28 page #423,432-436,441,444 • Textbook of Harper 32nd Edition Chapter # 44 page# 528-529 • https://byjus.com/chemistry • https://youtu.be/7ZFr9xiAt94
Biochemical Role of Vitamin D	• Enlist Sources of Vit.D • Explain Steps of activation of Vit.D in the body • Describe Biochemical functions of Vit.D • Explain Deficiency effects of Vit.D • Explain Toxic effects of Vit.D	• Textbook of Lippincott 8th Edition Chapter # 28 page # 437-440 • Textbook of Harper 32nd Edition Chapter # 44 page# 530-532 • https://byjus.com/chemistry • https://youtu.be/6xhE5e16X0c
Deficiency Manifestation of Vitamin A and D	• Explain Deficiency effects of vitamin A and D	• Textbook of Lippincott 8th Edition Chapter # 28 Page #435,439 • Textbook of Harper 32nd Edition Chapter # 44 page# 530-532 • https://www.ncbi.nlm.nih.gov/ • shttps://youtu.be/ZCINiQX-mxU
Deficiency manifestation of Thiamine	• Explain Deficiency effects	• Textbook of Lippincott 8th Edition Chapter # 28 Page #429,430 • Textbook of Harper 32nd Edition Chapter # 44 page# 534 • https://www.ncbi.nlm.nih.gov/ • https://youtu.be/WAkXS8lgoA0
Niacin and Thiamine Classification & Structure of Amino Acids	• Classification & Structure of Amino Acids & Isomerism of Amino Acids • Enlist Sources Niacin and Thiamine • Describe Biochemical functions Niacin and Thiamine • Explain deficiency effects of Niacin and Thiamine	• Textbook of Lippincott 8th Edition Chapter # 28and 1 Page #1-5 &429-431 • Textbook of Harper 32nd Edition Chapter # 44 page# 534-535 • https://microbenotes.com/ • https://youtu.be/9pwBUTIcxHk

Practical				
Topic	**At the End of Practical Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Color test for detection of amino acids	• Biuret test • Ninhydrin Test	P	Skill Lab	OSPE
Color test for detection of amino acids	• Xanthoprotic Test • Million- Nasse's Test	P	Skill Lab	OSPE
Color test for detection of amino acids	• Arginine by Sakaguchi's Test • Tryptophan by Aldehyde Test	P	Skill Lab	OSPE
Quantitative Analysis	• Serum calcium • Serum Ascorbic Acid	P	Skill Lab	OSPE

Basic and Clinical Sciences (Vertical Integration)

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

Community Medicine				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Accidents	At the end of session students will be able to 1. Categorize different types of accidents	C2	LGIS	MCQs
	2. Describe risk factors involved in accidents	C2		
	3. Participate in activities/programs for prevention and control of accidents	C2		
	4. Describe steps involved in prevention of different types of accidents.	C2		

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

Osteomalacia /rickets	• Enlist causes of rickets	C1	LGIS	MCQs
	• Discuss changes in bones in osteomalacia	C2		
	• Describe clinical features of osteomalacia & rickets	C2		
	• Enlist investigations for of osteomalacia & rickets	C1		
	• Discuss management of osteomalacia & rickets	C2		

Surgery				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Shoulder dislocation	• Discuss the possible sites of shoulder dislocation	C2	LGIS	MCQs
	• Discuss the consequences of dislocation	C2		
	• Management concepts	C2		
Tennis elbow, fracture of olecranon, radius and ulna	• Describe: • Tennis elbow	C2	LGIS	MCQs
	• Discuss fractures of radius and ulna	C2		
	• Describe the common sites of fracture	C2		
	• Management concepts	C2		

Spirally Integrated Courses / General Education Cluster (GEC) Courses

The Holy Quran Translation Lecture				
Theory				
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

Seerat Mubarak				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
The Significance of Seerah Studies	• Discuss the meaning of Seerat un Nabi • Explain the importance of knowing the Seerah of Prophet	C2	LGIS	SAQ

Family Medicine				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Approach to a Patient with body aches	• Describe presenting complains of patients with body aches	C3	LGIS	MCQs
	• Discus complications of body aches			
	• Describe initial treatment of patients with body aches			

	• Know when to refer patient to consultant/ Hospital			

Integrated Undergraduate Research Curriculum (IUGRC)				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Practical based teachings				
Practical Session -I (Club Activity)	• Comprehend their role in under “theme and scheme” of IUGRC-1st Year Practical component	C3	LGIS	MCQS
	• Understand the techniques used to access, retrieve, and review and source of Scientific literature on the given topics (on selected topics for “updated evidence in Health” (UEIH) for poster development.			
	• Make search string and perform literature search using Boolean operators			
	• Access scientific databases and carry out an effective literature review using a number of sources or databases (PubMed)			
	• Access HEC Digital library / PERN network use			
	• Understand EBM Cycle & its 5 steps			
	• How to configure & present a scientific poster / element of a scientific poster			
	• How to write References of the information cited			
	• Learn overall posters’ work reporting guidelines			

Biomedical Ethics & Professionalism				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Islamic concepts of Bioethics	• Conceptualize the Islamic teachings of medical ethics • Outline the main points in oath of Muslim doctor • Correlate the 4 principles of medical ethics with principles of Islamic medical ethics	C2 C2	LGIS	MCQs

Radiology/Artificial Intelligence (Innovation)				
Theory				
Topic	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Fractures of upper limb	• Discuss fractures of upper limb with their clinical significance. • Discuss role of artificial intelligence in interpretation of radiographs	C2	LGIS	MCQS

SECTION-VIII

Block-II

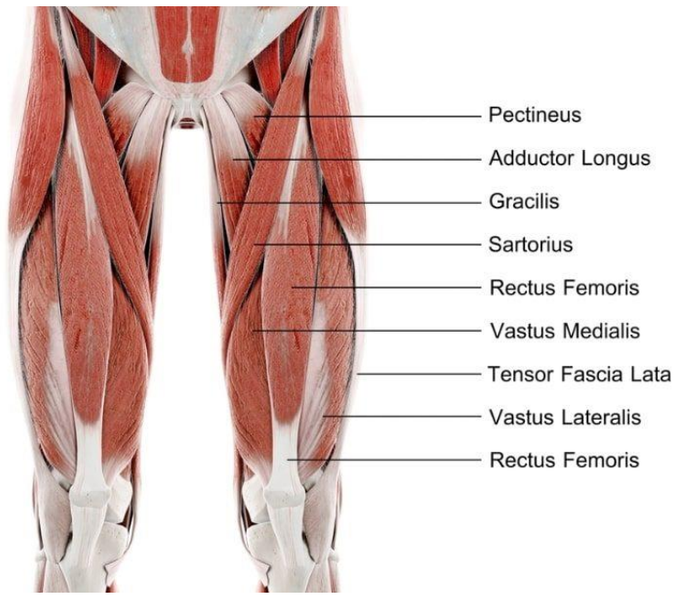
Course Contents

- **Module III- Musculoskeletal Module II**
- **Module IV- Blood & Immunity Module**

Block-II

Module No. 3 – Musculoskeletal-II

Duration 5 Weeks



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		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar
2.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf
3.	Director DME	Prof. Dr. Ifra Saeed
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar
5.	Chairperson Biochemistry	Dr. Aneela Jamil
6.	Focal Person Anatomy First Year MBBS	Asso. Prof. Dr. Mohtashim Hina
7.	Focal Person Physiology	Dr. Sidra Hamid
8.	Focal Person Biochemistry	Dr. Aneela Jamil
9.	Focal Person Pharmacology	Dr. Zunera Hakim
10.	Focal Person Pathology	Dr. Asiya Niazi
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom
13.	Focal Person Quran Translation Lectures	Dr. Uzma Zafar
14.	Focal Person Family Medicine	Dr. Sadia Khan

Module Task Force Team		
1.	Coordinator	Dr. Fahd Anwar (Demostrator of Physiology)
2.	DME Focal Person	Dr. Farzana Fatima
3.	Co-coordinator	Dr. Sajjad Hussain (Senior Demonstrator of Anatomy)
4.	Co-Coordinator	Dr. Almas (Senior Demonstrator Biochemistry
5.	Co-coordinator	Dr. Fareed Ullah Khan (Senior Demonstrator Physiology) & Clinical Co- Coordinatior

DME Implementation Team		
1.	Director DME	Prof. Dr. Ifra Saeed
2.	Assistant Director DME	Dr. Farzana Fatima
3.	Implementation Incharge 1st & 2nd Year MBBS	Prof. Dr. Ifra Saeed Dr. Farzana Fatima
4.	Editor	Muhammad Arslan Aslam

Themes					
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**

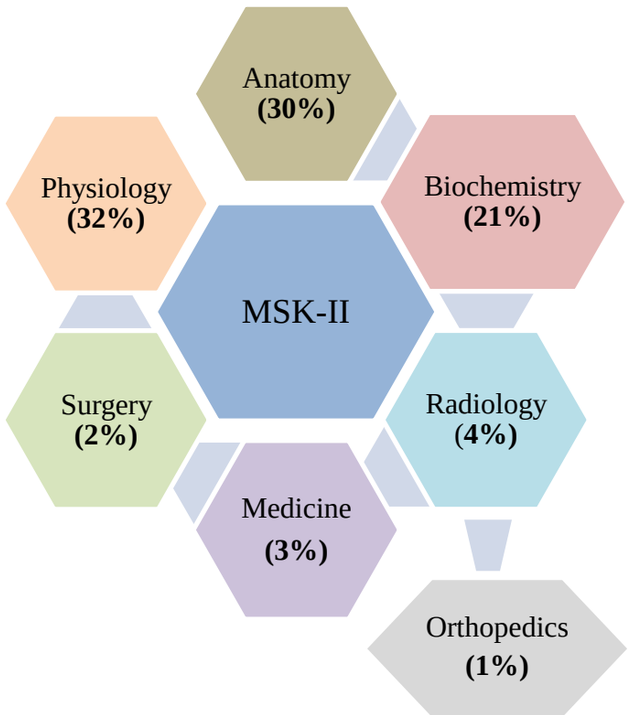
Clinical Relevance

- Fractures of Lower Limb
- Muscular Dystrophies
- Muscle Strains and their Management (e.g., hamstring injury)
- Pathophysiology of Myasthenia Gravis
- Carpal Tunnel Syndrome: Diagnosis and Treatment
- Sciatica: Causes, Diagnosis, and Management
- Polymyositis and Dermatomyositis: Clinical Features and Diagnosis
- Rotator Cuff Injuries: Mechanisms and Management
- Compartment Syndrome: Pathophysiology and Emergency Management
- Rheumatoid Arthritis: Pathology and Joint Deformities
- Tendon Injuries (e.g., Achilles tendon rupture)
- Role of Physical Therapy in Post-Injury Rehabilitation

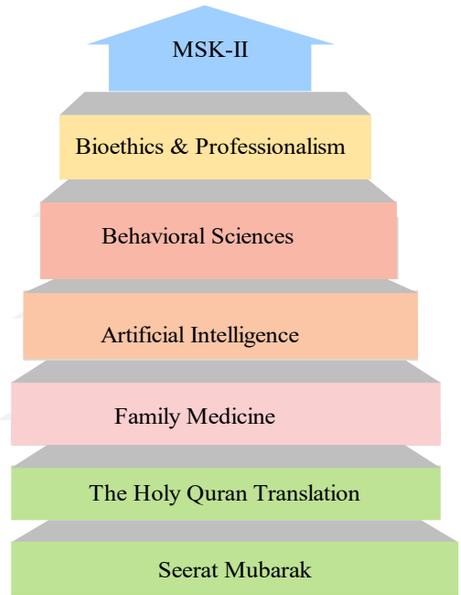
Implementation of Terms of Reference (TORS)

- Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are predefined as per the guidelines of PMDC and to be strictly followed.
- The hours mentioned within each module are the mandatory minimum required.
- The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. However, the level of cognition can be kept at a higher level.
- The Table of Specifications provided will be used for the three papers of the first professional examination.
- The same table of specifications should be used for the respective block exams for internal assessment.
- The criteria defined for continuous internal assessment is to be followed for each module and block respectively

Integration of Disciplines in Musculoskeletal-II Module



Spiral / General Education Cluster Courses (7%)



Module No. 3 – MSK-II

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.
    - **Artifical 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

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Syllabus of Musculoskeletal-II (Module No. 3)

Anatomy				
Theory				
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	C1 C2 C2 C2 C3 C3 C3	LGIS	MCQ SAQ VIVA

	• Apply strategic use of AI in health care • Read relevant research article	C3 C3		
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 • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C2 C2 C1 C2 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA
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	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	C1 C2 C2	LGIS	MCQ SAQ VIVA

	• 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 C3 C3 C3		
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 • Read relevant research article	C2 C2 C2 C3 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA
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	• Enlist different stages of limb development • Discuss early and late stage of limb development	C1 C2		MCQ

(Development of limbs)	• 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	C3 C3 C3 C3 C3 C3	LGIS	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	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	C1 C2 C2 C1 C2 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA

	• Apply strategic use of AI in health care • Read relevant research article	C3 C3		

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 C3	Skill Lab	MCQ SEQ VIVA OSPE

	• Read relevant research article	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 • 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 C1 P C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE

	• Read relevant research article	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 trochancteric 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 • Practice the principles of Bioethics • Apply strategic use of AI in health care • Read relevant research article	C2 C1 C2 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
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	C1 C2 C1 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE

	• Read relevant research article	C3 C3		
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 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. • 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 C1 C2 C2 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
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	C1 P P C2 C2 C2 C1 C2 C3	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 C3		
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 C3	Skill Lab	MCQ SEQ VIVA OSPE
Popliteal Fossa	• Identify surface landmarks • Enlist contents • 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	C1 C1 C2 P C3 C3 C3 C3 C3	Skill Lab	MCQ 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.	C1 C2 P C1 P	Skill Lab	MCQ SEQ VIVA OSPE

	• 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	C2 C2 C3 C3 C3 C3 C3		
Anterior Compartment of Leg (Muscles and Neurovascular Organization)	• Demonstrate surface landmarks • Discuss superficial fascia & deep fascia, their contents including retinecula • 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 • Read relevant research article	P C2 C2 C1 C3 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
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

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 anteriorlateral 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 • Use digital library	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
Medial Compartment Of	• Describe the muscles of medial compartment of thigh • Discuss origin, insertion and nerve supply of medial compartment of thigh	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 548-551). https://www.youtube.com/watch?v=AeuLBN5ouwo

Thigh	• Describe the course relations and branches of obturator nerve. • Correlate the clinical aspects • Read relevant research article • Use digital library	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 trochancteric 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. • Discuss synovial membrane and its folding. • Enlist ligaments and their attachments • Discuss movements possible at hip joint and muscles producing them	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510-626,629-632,660-661). https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/referenceworkentry/10.1007/978-3-030-43240-9_2

	• Describe blood supply and nerve supply. • Correlate the clinical aspects • Read relevant research article • Use digital library	
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

Practicals				
Practical	**At The End Of This Skill Lab, Student Should Be Able To Illustrate:**	**LearningDomain**	**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					
Theory					
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 physiologicanatomy of skeletal muscle Draw and label thesarcomere	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.Contractionof Skeletal muscle. Section 02. (Chapter 06, Page 79)	1. https://youtu.be/8iklTDlra5Q 2. https://www.sciencedirect.com/science/article/abs/pii/0197018687901070 3. https://teachmephysiology.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 andits importance in musclecontraction	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 Practice by Best & Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 68) • Textbook of Medical	1. https://www.sciencedirect.com/science/article/abs/pii/0197018687901070 2. https://youtu.be/8iklTDlra5Q .https://link.springer.com/article/10.1007/s12551-013-0135-x

				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	1. https://youtu.be/RTnKBt2sDf0 2. https://youtu.be/NvV2xTrShvg

				Medical Physiology by Guyton & Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 82,88)	
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)	1. https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=85&ContentID=P00792 2. https://www.sciencedirect.com/topics/engineering/length-tension-curve

				• Textbook of Medical Physiology by Guyton & Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 91)	
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	1. https://www.sciencedirect.com/topics/engineering/length-tension-curve - 2. https://youtu.be/3ntulKD4kvY

				of Skeletal muscle.Section 02. (Chapter 06, Page 85,87)	
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)	1. https://youtu.be/v5Nm_LaAQVo - 2. 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)	1. https://youtu.be/28CYhgjrBLA - - 2. 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)	1. https://www.kenhub.com/en/library/anatomy/smooth-musculature - 2. 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	MCQ SAQ VIVA	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 14. Page 131) • Human	1. https://youtu.be/L2Gf9cj7jBw 2. https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential

		C1 C2		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)	
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 Medica 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	1. https://www.kenhub.com/en/library/anatomy/smooth-musculature - 2. https://youtu.be/qEVRoKuoj4U

				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)	1. https://pubmed.ncbi.nlm.nih.gov/1661829/ 2. 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)	1. https://training.seer.cancer.gov/anatomy/muscular/types.html - - 2. 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	3. https://youtu.be/TnFoJ7Hhi-M 4. https://teachmeanatomy.info/thorax/organs/heart/conducting-system/

				Edition. (Chapter 08,page 155,162) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.Section 02. (Chapter 10, Page 127,133)	

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		

Topics Of SDL	Learning Objective	References	Learning Resources
SDL (On Campus): Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle	Discuss the sliding filament model of muscle contraction Describe the structure sarcotubular systemand its importance in muscle contraction	• 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 byBest & 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 ofSkeletal muscle.Section 02. (Chapter 06,Page 81) (Chapter 07, Page 93,97)	• https://www.sciencedirect.com/science/article/abs/pii/0197018687901070 • 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	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	• https://www.sciencedirect.com/topics/engineering/length-tension-curve • https://youtu.be/3ntulKD4kvY

contraction, heat production in muscle		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)	
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,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	• 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)	• https://www.kenhub.com/en/library/anatomy/smooth-musculature • https://youtu.be/qEVRoKuoj4U

		• Textbook of Medical Physiology by Guyton & Hall.14th Edition.Excitation and Contraction of Smooth muscle.Section 02. (Chapter 08, Page 101)	
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	• 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	• Ganong's Review of Medica 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/16618229/ • 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 propogation	• 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/

Practicals

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 • Comprehend	C1			
	• Calculation on hemocytometer	C3			
	• Recall Normal values	C1			
Determinati on of TLC	• 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 • Recall Normal values	C2 C1			
	• Apparatus identification • Principle	P C1	Skill Lab	OSPE	

Determination of PlateletCount	• Procedure	C1			Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• 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 Corelations of blood transfusion	C1 C1 C1 C2 C3	Skill Lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail

Biochemistry				
Theory				
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 • Enlist Factor regulating and helping in strengthening of collagen • Interpret defects of collagen synthesis and elastin	C2 C2 C2 C1 C3	LGIS	MCQs, SAQs & Viva
Techniques for separation of proteins	• Describe Techniques for separation of proteins	C2	LGIS	MCQs, SAQs & Viva

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

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

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

Basic and Clinical Sciences (Vertical Integration)

Anatomy, Physiology & Biochemistry			
Clinical Themes			
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

Radiology				
Theory				
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				
Theory				
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	1st	Radiology	**10:20 AM – 11:20 AM**	X rays of Hip Bone	
2.	Tuesday 25-06-2024	5th	Orthopedics	**10:30 AM – 11:20 AM**	Fractures of Lower Limb	

Spirally Integrated Courses / General Education Cluster (GEC) Courses

Content

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

The Holy Quran Translation Lecture				
Theory				
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				
Theory				
Importance of Hadees and Sunnah	• Discuss the meaning of Hadith and Sunnah • Describe the importance of Hadees and Sunnah	C2	LGIS	SAQ

Family Medicine				
Theory				
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)				
Theory				
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					
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 1st Prof. MBBS exam.	PMDC Code of Ethics: http://www.pmdc.org.pk/LinkClick.aspx?fileticket=v5WmQYMvhz4%3D&tabid=102&mid=554
History of	Discussion on Health Research ethics focusing; •Historical perspective of Tuskegee studies,	At the end of the session students should be able to;	LGIS 1hr contact session	1 MCQs of level C1 to C3 will cover this session teachings in	Guidelines and Teachers Handbook for

	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 of 04 basic principles of Beneficence, non-maleficence, respect and justice. - Interpretation research ethics for; - Informed consent and confidentiality in research HR	• Explain the meaning of the term "'ethics'".**C1** • Describe the historical perspective of global development of medical ethics. **C1** • 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**	in 2-4 parallel classes, Conducted by Senior faculty.	relevant block examination in pool of total 04 MCQs. Result / marks obtained will contribute towards Internal assessment (IA) in 1st Prof. MBBS exam.	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/nurcode.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	Discussion will cover basic elements of Laboratory Ethics focusing; • Importance of medical professionalism for	At the end of the session students should be able to ;	Case based discussion in 2 hr contact session in	Assignment based assessment under	- Real life scenarios in form of Case

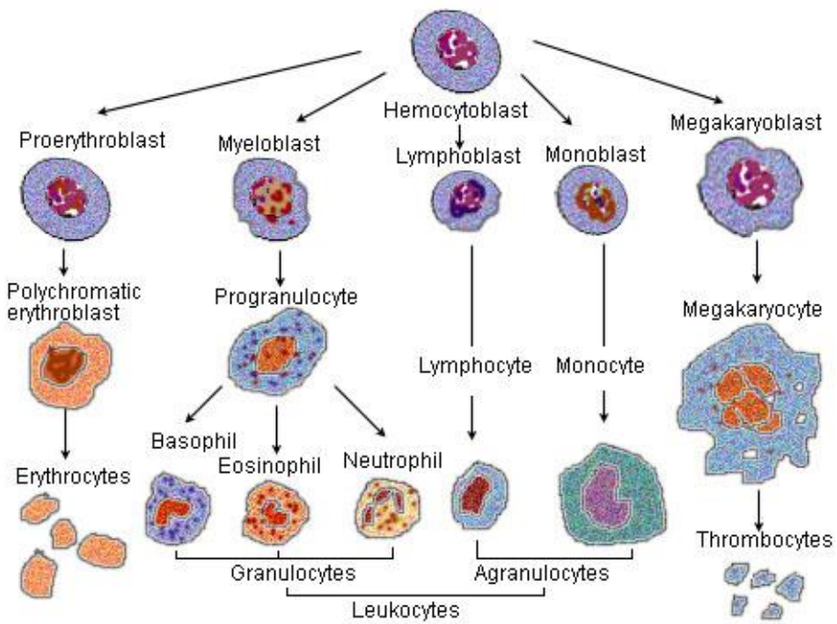
	the medical student; including respect and gratitude towards colleagues • Code of conduct: Collaboration, partnership, Teamwork , Maintaining dress code, religion obligations of medical doctor , focus on physicians' character, virtues and duties • Delineate the ethical consideration while performing procedures on real patients or simulated patients in Laboratory setting	• 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**	4-6 parallel classes conducted by faculty of respective departments Role plays Reflective writing	aggregate Marks (Internal Assessment) Assignment to be uploaded on LMS	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				
Theory				
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	1st	Seerat Mubarak	**09:00 AM – 10:00 AM**	Importance of Hadees and Sunnah	Molana Abdul Waahid (0341-5444667)
2.	Friday 31-05-2024	1st	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	2nd	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	3rd	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	4th	Behavioral Sciences	**11:20 AM – 12:10 PM**	Communication Skills	Dr. Arsalan Manzoor
6.	Friday 21-06-2024	4th	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	4th	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	4th	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	5th	Artificial Intelligence	**10:30 AM – 11:20 AM**	Introduction to Artificial Intelligence	Prof. Dr. Riaz Ahmed
10.	Tuesday 25-06-2024	5th	Behavioral Sciences	**09:00 AM – 10:10 AM**	Rights and responsibilities of patients and doctors	
11.	Tuesday 26-06-2024	5th	Biomedical Ethics	**11:20 AM – 12:10 PM**	History of Medical Ethics	Dr. Arsalan Even Dr. Maria Odd

Block-II
Module No. 4 - Blood & Immunity

Duration 5 Weeks



Blood and Immunity Module Team

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

Module Committee		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar
2.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf
3.	Director DME	Prof. Dr. Ifra Saeed
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar
5.	Chairperson Biochemistry	Dr. Aneela Jamil
6.	Focal Person Anatomy First Year MBBS	Asso. Prof. Dr. Mohtashim Hina
7.	Focal Person Physiology	Dr. Sidra Hamid
8.	Focal Person Biochemistry	Dr. Aneela Jamil
9.	Focal Person Pharmacology	Dr. Zunera Hakim
10.	Focal Person Pathology	Dr. Asiya Niazi
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom
13.	Focal Person Quran Translation Lectures	Dr. Uzma Zafar
14.	Focal Person Family Medicine	Dr. Sadia Khan

Module Task Force Team		
1.	Coordinator	Dr. Rahat (APWMO of Biochemistry)
2.	DME Focal Person	Dr. Farzana Fatima
3.	Co-coordinator	Dr. Ali Raza (Senior Demonstrator of Anatomy)
4.	Co-Coordinator	Dr. Uzma Zafar (APWMO of Biochemistry)
5.	Co-coordinator	Dr. Kamil Tahir (Senior Demonstrator Physiology)

DME Implementation Team		
1.	Director DME	Prof. Dr. Ifra Saeed
2.	Assistant Director DME	Dr. Farzana Fatima
3.	Implementation Incharge 1st & 2nd Year MBBS	Prof. Dr. Ifra Saeed Dr. Farzana Fatima Dr. Saira Aijaz
4.	Editor	Muhammad Arslan Aslam

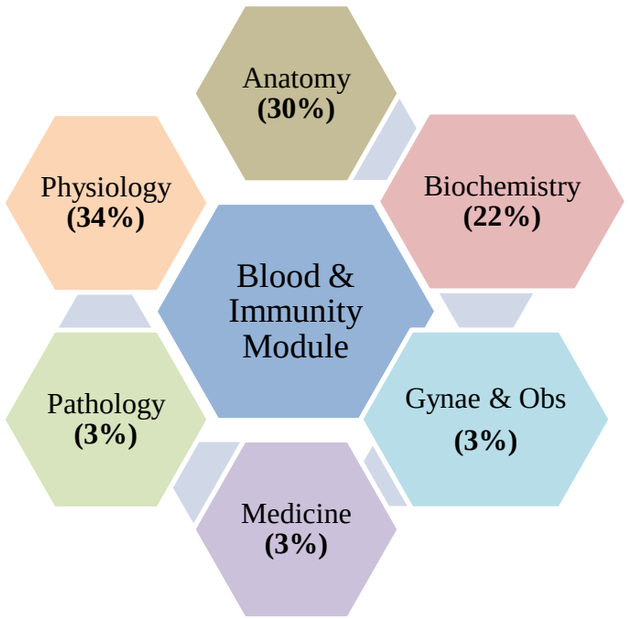
Themes						
Block	**Subjects**	**Embryology**	**Histology**	**Gross Anatomy**	**CBL**	**SDL**
II	• Anatomy	• Development of pharyngeal arches • Development of spleen • Development of thymus	• Spleen • Thymus • Lymph nodes • Tonsils	Lower Limb • Posterior compartment of leg to foot	• Ankle sprain • Flat foot	• Posterior compartment of leg and flexor retinaculum • Neurovascular organization of posterior compartment of leg • Foot joints • Ankle joints • Sole of foot • Spleen • Gait cycle
	• Physiology	• Plasma Proteins • Stages of erythropoiesis & factors affecting erythropoiesis • Hemoglobin & Hemoglobinopathies, Iron Metabolism • Red cell fragility, ESR & Red cell indices, Anemia & polycythemia • Fate of RBCs & Jaundice • Types of immunity, Physiology of innate immunity tolerance & auto immunity • Physiology of acquired immunity B-Cells • Physiology of acquired immunity T-Cells. Allergy and Hypersensitivity reactions, Auto-immune diseases and AIDS • Composition of blood & Hemopoiesis • WBCs classification & formation. Neutrophils, Eosinophils & Basophils and their properties • Platelet formation & function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR • Blood coagulation • Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia) • Thromboembolic condition (DVT, Pulmonary Embolism, DIC) Anticoagulant therapy (Heparin, warfarin, Prevention of blood clotting outside the body) • Physiological mechanism of temperature regulation • Role of Hypothalamus in temperature regulation • Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold) • ABO & Rh Blood grouping system • Rh Blood grouping system and Erythroblastosis fetalis • Blood transfusion hazards • Tissue and organ transplantations				
	• Biochemistry	• Heme synthesis				

		• Porphyria • Breakdown of hemoglobin • Jaundice • Blood • Structure of hemoglobin and myoglobin • Types of Hemoglobin • Oxygen dissociation curve. • Abnormalities in Hemoglobin. • Hemoglobinopathies • Plasma proteins • Acute phase proteins & Albumin • Haptoglobin and transferring. • Ferritin and hemosiderin • Ceruloplasmin. • Antiproteases and amyloidosis • Immunoglobulins • AIDs • Folic acid. • Vitamin B12 • Iron
	Spiral Courses	
	• Bioethics & Professionalism	• Activity I • Activity II • Activity III
	• Family Medicine	• Aproach to a Patient Aneamia
	• The Holy Quran Translation	• Muaamlaat • Muaasharat
	Vertical components	
	• Pathology	• Mediators of Inflammation • (Medicine)
	• Medicine	• Anemia • Jaundice
	• Gynae & Obs	• Rh Incompatibility And Its Significance -Immune
	Early Clinical Exposure (ECE)	
	• Medicine	• Immunodeficiency cases • Hepatosplenomegaly

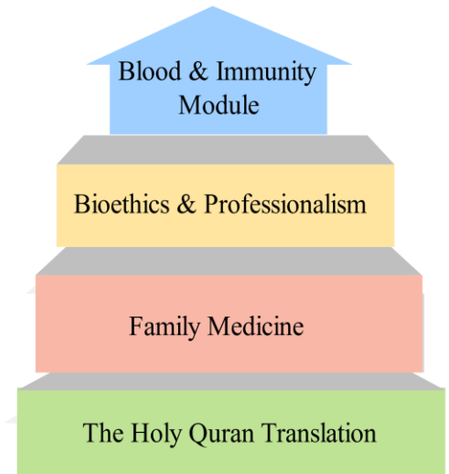
		Lymphadenopathy
	• Pediatrics	• Neonatal Jaundice • ABO/ Rh Incompatibility • Lymphadenopathy/ Hepatosplenomegaly
	• Pathology Laboratory	Identification of Slides of Spherocytosis • Microcytosis • Leukocytosis • Lymph node • Bone Marrow
Clinical Relevance		
• Anemia • Thalassemia • Pathophysiology of Iron Deficiency Anemia • Sickle Cell Anemia: Clinical Manifestations and Diagnosis • Hemophilia: Presentation and Emergency Management • Disseminated Intravascular Coagulation (DIC): Pathology and Clinical Importance • Mechanisms of Autoimmune Diseases (e.g., Systemic Lupus Erythematosus) • Clinical Features of Acute Leukemia • Blood Transfusion Reactions and Their Management • Diagnosis and Management of Thrombocytopenia • Hypersensitivity Reactions (e.g., anaphylaxis) Immunodeficiency Disorders (e.g., HIV/AIDS and SCID)		

Implementation of Terms of Reference (TORS)
• Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are predefined as per the guidelines of PMDC and to be strictly followed. • The hours mentioned within each module are the mandatory minimum required. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. However, the level of cognition can be kept at a higher level. • The Table of Specifications provided will be used for the three papers of the first professional examination. • The same table of specifications should be used for the respective block exams for internal assessment. • The criteria defined for continuous internal assessment is to be followed for each module and block respectively

Integration of Disciplines in Blood & Immunity Module



Spiral / General Education Cluster Courses (5%)



Module No. 4 - Blood and Immunity

Rationale

Blood is a specialized connective tissue that delivers necessary substances such as nutrients and oxygen to the cells and transports metabolic waste products away from those same cells.. Blood accounts for 8% of the human body weight. The average adult has a blood volume of roughly 5 liters, composed of plasma and several kinds of cells (occasionally called corpuscles); these formed elements of the blood are erythrocytes (red blood cells, RBCs), leukocytes (white blood cells), and thrombocytes (platelets). By volume, the red blood cells constitute about 45% of whole blood, the plasma about 54.3%, and white cells about 0.7%.
White blood cells are part of the body's immune system; they destroy and remove old or aberrant cells and cellular debris, as well as attack infectious agents (pathogens) and foreign substances.
The rationale behind is to introduce the students the basic constituents, functions and transport of various substances through blood.

Module Outcomes

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

Knowledge

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

Skills

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

Attitude

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

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

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Syllabus of Blood & Immunity (Module No. 4)

Anatomy				
Theory				
Topic	**At the End of The Session Students Should Be Able To:**	**Learning Domain**	**Teaching Strategy**	**Assessment Tools**
(Histology) Lymph node	• Classify lymphoid tissue	C2	LGIS	MCQ SAQ VIVA
	• Define diffuse lymphoid tissue, nodular lymphoid tissue and lymphoid organs	C1		
	• Discuss the histological features of lymph node	C2		
	• Enlist functions of lymph node	C1		
	• Understand the supporting elements of lymph node	C2		
	• Describe filtration through lymph node	C2		
	• Discuss importance of high endothelial venules in lymph node	C2		
	• Discuss the clinical correlation of lymph node	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
(Histology)	• Describe the location and functions of thymus	C1	LGIS	MCQ SAQ
	• Enumerate different types of reticuloepithelial cells	C1		
	• Describe microscopic structure of thymus	C2		
	• Compare the histological structure of thymus and other lymphoid organs	C2		
	• Discuss blood thymus barrier	C2		

Thymus & Tonsil	• Describe general histological structure of tonsils	C2		VIVA
	• Differentiate palatine, lingual, and pharyngeal tonsils histologically	C2		
	• Discuss the clinical correlation of thymus	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Read a research article	C3		
(Histology) Spleen	• Describe the location and functions of spleen	C2	LGIS	MCQ SAQ VIVA
	• Describe microscopic structure of spleen	C2		
	• Differentiate between red and white pulp of spleen	C2		
	• Discuss blood circulation through spleen	C2		
	• Discuss the clinical correlation of spleen	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Read a research article	C3		
(Embryology) Development of Pharyngeal arches & pouches	• Define pharyngeal arches and pouches	C1	LGIS	MCQ SAQ VIVA
	• Discuss the components of pharyngeal arches and pouches	C2		
	• Describe the development and fate of each pharyngeal arch and pouches	C2		
	• Discuss the clinical correlation of pharyngeal arches and pouches	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Read a research article	C3		

Topic	At the End Of The Session Students Should Be Able To:	Learning Domains	Teaching Strategy	Assessment Tools
Posterior Compartment of Leg (muscles) and flexor retinaculum	• Illustrate cutaneous innervation	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe superficial fascia & deep fascia.	C2		
	• Discuss superficial and deep muscle groups in posterior compartment	C2		
	• Tabulate origin, insertion, nerve supply and action of all muscles of posterior compartment of leg	C2		
	• Discuss ruptured calcaneal tendon, calcaneal bursitis and accessory soleus muscle	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Posterior Compartment of Leg (Neurovascular organization)	• Describe origin, course relations, branches and tributaries of neurovascular bundle	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss superficial veins i.e long and short saphenous veins	C2		
	• Palpate the posterior tibial pulse	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Bones of Foot	• Enumerate the bones of foot	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Identify different bones of foot	C1		
	• Discuss bony features and muscle attachment	C2		
	• Discuss fracture of metatarsals and os trigonum, avascular necrosis of head of talus	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
	• Tabulate muscle on the dorsal aspect of foot	C2		

Dorsum of foot	• Describe blood supply and nerve supply	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss cutaneous innervation of dorsum of foot	C2		
	• Palpate the dorsalis pedis artery on dorsum of foot	C3		
	• Discuss other clinicals related to the dorsum of the foot	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Ankle Joint	• Describe the articular surfaces of ankle joint	C2	Skill Lab	MCQ SAQ VIVA OSPE
	• Describe the attachment of capsule	C2		
	• Enumerate the ligaments	C1		
	• Discuss the movements possible at ankle joint and muscles producing them	C2		
	• Discuss ankle sprain	C3		
	• Discuss different types of ankle injuries	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Joints of Foot	• Classify the joints of foot	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss the articular surfaces, joint capsules, ligaments, movements and muscles producing movements	C2		
	• Discuss major ligaments in detail	C2		
	• Discuss tibial nerve entrapment	C3		
	• Discuss club foot, claw foot and other clinical conditions	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
	• Identify Surface landmarks	C1		

Sole of foot (Muscles)	• Describe cutaneous innervation of sole of foot	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe Plantar aponeurosis its attachments	C2		
	• Discuss flexor retinaculum	C2		
	• Discuss muscles in different layers of foot with origin, insertion, nerve supply and actions	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Sole of foot (Neurovascular Organization)	• Enlist nerves and arteries present in sole of foot	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss route and relations of neurovascular bundle in sole of foot	C2		
	• Describe the formation of vascular arches of foot along with clinicals	C2, C3		
	• Discuss plantar fasciitis	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Arches of Foot and Gait Cycle	• Classify the arches of foot	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe different components of arches of foot	C2		
	• Discuss stability factors of arches of foot	C2		
	• Discuss pes planus (flat foot), club foot and other clinicals	C3		
	• Discuss gait cycle and its stages	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Thymus, Tonsils	• Describe location of thymus and tonsils	C2	SGD, Skill Lab	MCQ SAQ VIVA
	• Discuss anatomical features of thymus and tonsils	C2		
	• Describe blood supply, venous drainage and lymphatic drainage of thymus and tonsils	C2		

	• Enumerate functions of thymus and tonsils	C1		OSPE
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Spleen	• Discuss the location of spleen	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Enumerate anatomical relations of spleen	C1		
	• Discuss blood supply, venous drainage and lymphatic drainage of spleen	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Radiology, Surface Anatomy & Cross Sectional Anatomy	• Identify different structures on radiographs	C3	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Demonstrate the surface anatomy of various structures present in posterior compartment of leg and foot	P		
	• Demonstrate the surface anatomy of spleen, thymus and tonsils	P		
	• Discuss the Cross-Sectional anatomy at the level of leg & foot	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		

Topics	Learning objectives	Learning Resources
Posterior compartment of leg and flexor retinaculum	• Illustrate cutaneous innervation • Describe superficial fascia & deep fascia. • Discuss superficial and deep muscle groups in posterior compartment • Tabulate origin, insertion, nerve supply and action of all muscles of posterior compartment of leg • Discuss ruputured calcaneal tendon, calcaneal bursitis and accessory soleus muscle • Correlate the clinical aspects • Read relevant research article • Use digital library	• Clinically Oriented Anatomy 9th Edition, **pg no.755** • https://www.youtube.com/watch?v=Bj4c7wGdIwc&pp=ygUTY29tcGFydG1lbnRzIG9mIGxlZw%3D%3D • https://www.sciencedirect.com/science/article/abs/pii/S1440244004800343 •
Neurovascular organization of posterior compartment of leg	• Describe origin, course relations, branches and tributaries of neurovascular bundle • Discuss superficial veins i.e long and short saphenous veins • Palpate the posterior tibial pulse • Discuss clinical correlation related to venous return in leg • Correlate the clinical aspects • Read relevant research article • Use digital library	• Clinically Oriented Anatomy 9th Edition, **pg no. 755** • https://www.youtube.com/watch?v=Bj4c7wGdIwc&pp=ygUTY29tcGFydG1lbnRzIG9mIGxlZw%3D%3D • https://www.mdpi.com/2077-0383/11/21/6448
Foot Joints	• Classify the joints of foot • Discuss the articular surfaces, joint capsules, ligaments, movements and muscles producing movements • Discuss major ligaments in detail • Discuss tibial nerve entrapment • Discuss club foot, claw foot and other clinical conditions • Correlate the clinical aspects • Read relevant research article • Use digital library	• Clinically Oriented Anatomy 9th Edition, **pg no. 808** • https://www.youtube.com/watch?v=Ex9KzkAYN-8&pp=ygUKZm9vdCBqb2ludA%3D%3D • https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3180294/
Ankle joint	• Describe the attachment of capsule • Enumerate the ligaments • Discuss the movements possible at ankle joint and muscles producing them • Discuss ankle sprain • Discuss different types of ankle injuries • Correlate the clinical aspects • Read relevant research article	• Clinically Oriented Anatomy 9th Edition, **pg no. 806** • https://www.youtube.com/watch?v=Ex9KzkAYN-8&pp=ygUKZm9vdCBqb2ludA%3D%3D

	• Use digital library	• https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3414868/
Sole of foot	• Identify Surface landmarks • Describe cutaneous innervation of sole of foot • Describe Plantar aponeurosis its attachments • Discuss flexor retinaculum • Discuss muscles in different layers of foot with origin, insertion, nerve supply and actions • Correlate the clinical aspects • Read relevant research article • Use digital library	• Clinically Oriented Anatomy 9th Edition, **pg no. 768-781** • https://www.youtube.com/watch?v=JorGDBbPzI&pp=ygUcc29sZSBvZiBmb290IGFuYXRvbXkgbGVjdHVyZQ%3D%3D • https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311689/
Spleen	• Discuss the location of spleen • Enumerate anatomical relations of spleen • Discuss blood supply, venous drainage and lymphatic drainage of spleen • Discuss clinical correlations of spleen with special reference to splenectomy • Correlate the clinical aspects • Read relevant research article • Use digital library	• Clinically Oriented Anatomy 9th Edition, **pg no. 487** • https://www.youtube.com/watch?v=3K5I6MMDA8M&pp=ygUOc3BsZWVuIGFuYXRvbXk%3D • https://www.sciencedirect.com/science/article/pii/S0046817782802232
Gait cycle	• Define the gait cycle • Discuss the stages of gait cycle • Correlate the clinical aspects • Read relevant research article • Use digital library	• Clinically Oriented Anatomy 9th Edition, **pg no. 701, 768-781** • https://www.youtube.com/watch?v=1u6d1CX7o9c&pp=ygUXZ2FpdCBjeWNsZSBiaW9tZWNoYW5pY3M%3D • https://www.sciencedirect.com/topics/engineering/gait-cycle

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

Physiology						
Theory						
Topics	**At the end of lecture students should be able to:**	**Learning Domains**	**Teaching Strategy**	**Assessment Tools**		
Composition of blood & Hemopoiesis	1.Describe composition and general functions of blood 2.Explain the role of bone marrow in hemopoiesis and erythropoiesis 3.Draw steps of hemopoiesis 4. Define committed and uncommitted cells	1.C2 2. C2 3. C3 4. C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, Cardiovascular Physiology (Chapter 31, Page 553) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 547,548) • Physiological Basis of Medical Practice by Best & Taylor's.13thEdition. Section 03, Blood (Chapter 19, Page347) (Chapter 20, Page 356) • Textbook of Medical Physiology by Guyton & Hall.14thEdition. Red blood cells, Anemia and Polycythemia. Section 06. (Chapter 33, Page 439)	https://accessmedicine.mhmedical.com/content.aspx?bookid=3047&sectionid=255121548 2.https://youtu.be/cm8IK24RRvA

Plasma Proteins	1.Enumerate plasma proteins, their properties, sites of production and their functions. 2.Explain effects of deficiency of plasma proteins 3.Discuss conditions associated with decreased production and increased excretion of plasma proteins	C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, Cardiovascular Physiology (Chapter 31, Page 563) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 547) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood (Chapter 19, Page	https://www.ncbi.nlm.nih.gov/books/NBK531504/ 2.https://accessmedicine.mhmedical.com/content.aspx?bookid=1366&sectionid=73247095348,353)
WBCs classification & formation. Neutrophils, Eosinophils &Basophils and their properties	1. Enumerate and explain various types of leukocytes and steps of leucopoiesis. 2. Explain the characteristics and functions. 3. Conditions in which these cells are increased and decreased. 4. Leukemias and their effects on the body	C1/C2 C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Resistance of the body to Infection. Section 06. (Chapter 34, Page 449,456,457)	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9777002/ 2.https://youtu.be/TelOcCkZX7c

Stages of erythropoiesis & factors affecting erythropoiesis	1. Elaborate Morphological features of RBCs. 2. Describe the stages of production of RBCs. 3. Recall Life span of RBCs 4. Enumerate and explain factors which affect erythropoiesis. 5. Enlist sites of production of erythropoietin 6. Describe recombinant erythropoietin. 7. Explain mechanism of release and action of erythropoietin	C2 C1 C1 C2 C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, Cardiovascular Physiology (Chapter 31, Page 553) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 547,548) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood (Chapter 19, Page347) (Chapter 20, Page 356) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Red blood cells, Anemia and Polycythemia. Section 06. (Chapter 33, Page 439)	https://accessmedicine.mhmedical.com/content.aspx?bookid=3047&sectionid=255121548 2.https://youtu.be/cm8IK24RRvA

Monocytes -macrophage system & lymphocytes	1. Explain the characteristics and functionsof monocytes. 2. Explain monocyte-macrophage system; importance	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section01, Immunity, Infection and Inflammation (Chapter 03, Page 67) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood (Chapter 21, Page371) (Chapter 22, Page 387) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 450-452)	https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system 2.https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4
Hemoglobin & Hemoglobinopathies, Iron Metabolism	1. Discuss details about iron metabolism in body including iron absorption and storage. 2. Understand the structure, synthesis and functions of hemoglobin and its types. 3. Enlist different types of hemoglobinopathies	C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 555) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 553) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 23, Page	https://www.sciencedirect.com/topics/medicine-and-dentistry/red-blood-cell-indices 2.https://youtu.be/QUHqYVK-Nhg 3. https://youtu.be/mOrRJBqm744

					407,409) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 446,447)	
Process of inflammation and Lines of defense during inflammation	1. Describe the role of neutrophils and monocytes in inflammation. 2. Elaborate Lines of defense	1.C1, C2 2. C1, C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section01, Immunity, Infection and Inflammation (Chapter 03, Page 81) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood) (Chapter 22, Page 384) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 454)	https://youtu.be/WFm9j1rNkQs .https://en.wikipedia.org/wiki/Inflammation .https://www.verywellhealth.com/signs-of-inflammation-4580526
Red cell fragility, ESR & Red cell indices, Anemia & polycythemia	1. Define RBC fragility; importance; conditions in which fragility is changed. 2. Discuss various blood indices, give their	C1 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 555) • Human Physiology by	https://www.sciencedirect.com/topics/medicine-and-dentistry/red-blood-cell-indices 2.https://youtu.be/QUHqYVK-Nhg

	formulae,co-related with different types of anemias. 3. Enumerate various types of anemias and polycythemias. 4. DIiscuss details about various types of anemias and polycythemia and their effect on circulatory system.			MCQ (LMS based Assessment, MST based Assessment) OSPE	Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 553) • Physiological Basis of Medical Practice by Best & Taylor's.13thEdition. (Chapter 23, Page 407,409) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 446,447)	3. https://youtu.be/mOrRJBqm744
Platelet formation & function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)	1. Explain thrombocytopoiesis. 2. Describe functions of platelets 3. Define hemostasis. 4. Explain steps of hemostasis	C2 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 564) (Chapter 03, Page 79) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 558) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 24, Page 413) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter	https://my.clevelandclinic.org/health/symptoms/21999-hemostasis https://www.sciencedirect.com/topics/neuroscience/hemostasis

					37, Page 477,487)	
Fate of RBCs & Jaundice	1. Give life span of RBCs and explain their destruction. 2. Describe various types, compare and differentiate between various types of jaundice	C1, C2 C1, C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 555) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 553) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 23, Page 407,409) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 446,447)	https://www.sciencedirect.com/topics/medicine-and-dentistry/red-blood-cell-indices 2.https://youtu.be/QUHqYVK-Nhg 3. https://youtu.be/mOrRJBqm744
Blood coagulation	1. Explain hemostasis, mechanism of blood coagulation, fibrinolysis and anticoagulants	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment)	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 559) • Physiological Basis of Medical Practice by Best &	https://youtu.be/gExUCrpAKyQ https://medlineplus.gov/lab-tests/coagulation-factor-tests/

				OSPE	Taylor's.13th Edition. (Chapter 24, Page 417) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 37, Page 479)	
Types of immunity, Physiology of innate immunity tolerance & auto immunity	1. Define immunity and its types. 2. Compare and contrast innate and acquired immunity. 3. Difference between passive and active immunity	C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section01, Immunity, Infection and Inflammation (Chapter 03, Page 67) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood (Chapter 21, Page371) (Chapter 22, Page 387) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 450-452)	https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system 2.https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4
Concept of intravascular anticoagulants and bleeding disorders (Vit K	1. Explain Intravascular coagulation.	1.C2 2.C2 3. C1		MCQ SEQ VIVA VOCE	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 559)	https://youtu.be/gExUCrpAKyQ

deficiency, hemophilia and thrombocytopenia)	2. Discuss Bleeding disorders. 3. Enlist Types of hemophilia		LGIS	MCQ (LMS based Assessment, MST based Assessment) OSPE	• Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 24, Page 417) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 37, Page 479)	https://medlineplus.gov/lab-tests/coagulation-factor-tests/
Physiology of acquired immunity B-Cells	1. Enumerate various types of lymphocytes 2. Discuss their important characteristics and 3. Explain the mechanism of preprocessing	C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section01, Immunity, Infection and Inflammation (Chapter 03, Page 67) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood (Chapter 21, Page371) (Chapter 22, Page 387) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 450-452)	https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system 2.https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4

Thromboembolic condition (DVT, Pulmonary Embolism, DIC) Anticoagulant therapy (Heparin, warfarin, Prevention of blood clotting outside the body)	• Discuss different Thromboembolic Conditions • Explain Pulmonary Embolism and clinical correlation • Enlist different Anticoagulant therapy	C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 559) • Physiological Basis of Medical Practice by Best & Taylor's.13thEdition. (Chapter 24, Page 417) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 37, Page 479)	https://youtu.be/gExUCrpAKyQ https://medlineplus.gov/lab-tests/coagulation-factor-tests/
Physiology of acquired immunity T-Cells. Allergy and Hypersensitivity reactions, Auto-immune diseases and AIDS	1. Define clone and explain the roles of T and B lymphocyte clones in immunity 2. Discuss the mechanisms involved in Immune Tolerance 3. Compare Type I and Type IV hypersensitivity reactions 4. Describe the process of immunization 5. Understand role of T-lymphocytes in transplants 6. Identify different types	C1, C2 C2 C2 C1 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25THEdition. Section01, Immunity, Infection and Inflammation (Chapter 03, Page 67) • Physiological Basis of Medical Practice by Best & Taylor's.13thEdition. Section 03, Blood (Chapter 21, Page371) (Chapter 22, Page 387) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06.	https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system 2.https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4

	of tissue grafts				(Chapter 34, Page 450-452)	
Physiological mechanism of temperature regulation	1. Explain Concept of temperature 2. Discuss Physiological mechanism of temperature regulation	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 73, Page 889-936)	**https://shop.elsevier.com/books/guyton-and-hall-textbook-of-medical-physiology/hall/978-0-323-59712-8**
ABO & Rh Blood grouping system	1. Enlist Blood group and its types 2. Explain Rh Blood Grouping System	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 558) (Chapter 36, Page 473) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 25, Page 432) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 36, Page 471)	https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/abo-blood-group-system https://youtu.be/wfqnNuYIY78
Role of Hypothalamus in temperature regulation	1. Discuss Role of Hypothalamus in temperature regulation 2. Explain Temperature Regulating centers	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 73, Page 889-936)	**https://shop.elsevier.com/books/guyton-and-hall-textbook-of-medical-physiology/hall/978-0-323-59712-8**

Rh Blood grouping system and Erythroblastosis fetalis	1. Discuss Rh Blood Grouping System 2. Explain Erythroblastosis fetalis 3. Discuss Clinical correlation	C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 558) (Chapter 36, Page 473) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 25, Page 432) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 36, Page 471)	https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/abo-blood-group-system https://youtu.be/wfqnNuYIY78
Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold)	1. Discuss Disorders of temperature regulation 2. Explain Concept of Fever 3. Clinical correlation Of Heat Stroke	1.C2 2.C2 3.C3	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 73, Page 889-936)	**https://shop.elsevier.com/books/guyton-and-hall-textbook-of-medical-physiology/hall/978-0-323-59712-8**
Blood transfusion hazards. Tissue and organ transplantations	1. Discuss Blood transfusion hazards. 2. Explain Effect of blood transfusion on various organs 3. Explain Tissue and organ transplantations	C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 558) (Chapter 36, Page 473) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 25, Page 432)	https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/abo-blood-group-system https://youtu.be/wfqnNuYIY78

					• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 36, Page 471)	

Topics	At the end of discussion students should be able to:	Learning Domains	Teaching Strategy	Assessment Tools
Functions & composition of blood, Hemopoiesis and Bone marrow	1.Describe composition and general functions of blood 2.Explain the role of bone marrow in hemopoiesis and erythropoiesis 3.Draw steps of hemopoiesis 4. Define committed and uncommitted cells 5.Correlate basic knowledge with clinical application	1.C2 2. C2 3. C3 4. C1 5.C3	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Hemoglobin & Hemoglobinopathies, Iron Metabolism	1. Discuss details about iron metabolism in body including iron absorption and storage 2. Understand the structure, synthesis and functions of hemoglobin and its types 3. Enlist different types of hemoglobinopathies 4. Correlate basic knowledge with clinical application	C2 C2 C1 C3	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Platelet formation & function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)	1. Explain thrombocytopenia 2. Describe functions of platelets 3. Define hemostasis 4. Explain steps of hemostasis 5. Correlate basic knowledge with clinical application	C2 C2 C1 C2 C3	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
	1. Explain Concept of temperature 2. Discuss Physiological mechanism of temperature regulation 3. Correlate basic knowledge with clinical application	C2 C2 C3	SGD	MCQ SEQ VIVA VOCE

Physiological mechanism of temperature regulation				MCQ (LMS based Assessment, MST based Assessment) OSPE
Stages of Erythropoiesis Factors Affecting Erythropoiesis (First week)	1. Elaborate Morphological features of RBCs 2. Describe the stages of production of RBCs 3. Recall Life span of RBCs 4. Enumerate and explain factors which affect erythropoiesis 5. Enlist sites of production of erythropoietin 6. Describe recombinant erythropoietin 7. Explain mechanism of release and action of erythropoietin	C2 C1 C1 C2 C1 C2 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Physiology of WBC (third week)	1. Enumerate and explain various types of leukocytes and steps of leucopoiesis 2. Explain the characteristics and functions 3. Conditions in which these cells are increased and decreased 4. Leukemias and their effects on the body	C1/C2 C2 C2 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Physiology of platelets (Fourth week)	1. Explain thrombocytopenia 2. Describe functions of platelets 3. Define hemostasis 4. Explain steps of hemostasis	C2 C2 C1 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Blood transfusion hazards. Tissue and organ transplantations (Fifth week)	1. Discuss Blood transfusion hazards. 2. Explain Effect of blood transfusion on various organs 3. Explain Tissue and organ transplantations	C2 C2 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Disorders of temperature regulation	1. Discuss Disorders of temperature regulation 2. Explain Concept of Fever 3. Clinical correlation Of Heat Stroke	1.C2 2.C2 3.C3		MCQ SEQ VIVA VOCE

(Fever, Heat stroke, Exposure of body to extreme cold) (Fifth week)			SGD	MCQ (LMS based Assessment, MST based Assessment) OSPE

Topics Of SDL	Learning Objectives	Learning Resources
ON CAMPUS Platelet formation & function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)	1. Explain thrombocytopenia 2. Describe functions of platelets 3. Define hemostasis • Explain steps of hemostasis	• Ganong's Review of Medical Physiology.25TH Edition. Section 05, (Chapter 31, Page 564) (Chapter 03, Page 79) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 558) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 24, Page 413) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 37, Page 477,487) • https://my.clevelandclinic.org/health/symptoms/21999-hemostasis • https://www.sciencedirect.com/topics/neuroscience/hemostasis
Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)	1. Explain Intravascular coagulation 2. Discuss Bleeding disorders • Enlist Types of hemophilia	• Ganong's Review of Medical Physiology.25TH Edition. Section 05, (Chapter 31, Page 566) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 24, page 427) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 37, Page 484) • https://youtu.be/unp3vGsxlIA • https://www.hematology.org/education/patients/bleeding-disorders
(OFF CAMPUS): Composition of blood	1.Describe composition and general functions of blood 2.Explain the role of bone marrow in hemopoiesis and erythropoiesis 3.Draw steps of hemopoiesis • 4. Define committed and uncommitted cells	• Ganong's Review of Medical Physiology.25TH Edition. Section 05, Cardiovascular Physiology (Chapter 31, Page 553) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 547,548) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood (Chapter 19, Page 347) (Chapter 20, Page 356) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Red blood cells, Anemia and Polycythemia. Section 06. (Chapter 33, Page 439) 1. https://accessmedicine.mhmedical.com/content.aspx?bookid=3047&sectionid=255121548 • 2.https://youtu.be/cm8IK24RRvA

Function of Plasma Proteins	1.Enumerate plasma proteins, their properties, sites of productions and their functions 2.Explain effects of deficiency of plasma proteins • 3.Discuss conditions associated with decreased production and increased excretion of plasma proteins	• Ganong's Review of Medical Physiology.25TH Edition. Section 05, Cardiovascular Physiology (Chapter 31, Page 563) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 547) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood (Chapter 19, Page 348,353) 1. https://www.ncbi.nlm.nih.gov/books/NBK531504/ 2.https://accessmedicine.mhmedical.com/content.aspx?bookid=1366&sectionid=73247095
WBCs classification & formation. Neutrophils, Eosinophils & Basophils and their properties	Enumerate and explain various types of leukocytes and steps of leucopoiesis Explain the characteristics and functions Conditions in which these cells are increased and decreased • Leukemias and their effects on the body	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Resistance of the body to Infection. Section 06. (Chapter 34, Page 449,456,457) 1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9777002/ 2.https://youtu.be/TelOcCkZX7c
Monocytes - macrophage system & lymphocytes	Explain the characteristics and functions of monocytes. • Explain monocyte-macrophage system; importance	• Ganong's Review of Medical Physiology.25TH Edition. Section 01, Immunity, Infection and Inflammation (Chapter 03, Page 67) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood (Chapter 21, Page 371) (Chapter 22, Page 387) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 450-452) 1. https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system 2.https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4
Process of inflammation and Lines of defense during inflammation	1. Describe the role of neutrophils and monocytes in inflammation • Elaborate Lines of defense	• Ganong's Review of Medical Physiology.25TH Edition. Section 01, Immunity, Infection and Inflammation (Chapter 03, Page 81) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 03, Blood) (Chapter 22, Page 384) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34,

		Page 454) 1. https://youtu.be/WFm9j1rNkQs 2. .https://en.wikipedia.org/wiki/Inflammation 3. .https://www.verywellhealth.com/signs-of-inflammation-4580526
Red cell fragility, ESR & Red cell indices, Anemia & polycythemia	1. Define RBC fragility; importance; conditions in which fragility is changed. 2. Discuss various blood indices, give their formulae, co-relate with different types of anemias. 3. Enumerate various types of anemias and polycythemias. • Discuss details about various types of anemias and polycythemia and their effect on circulatory system.	1. Ganong's Review of Medical Physiology.25TH Edition. Section 05, (Chapter 31, Page 555) 2. Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 553) 3. Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 23, Page 407,409) 4. Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 446,447) 1. https://www.sciencedirect.com/topics/medicine-and-dentistry/red-blood-cell-indices 2.https://youtu.be/QUHqYVK-Nhg 3. https://youtu.be/mOrRJBqm744
Blood coagulation	• Explain hemostasis, mechanism of blood coagulation, fibrinolysis and anticoagulants	1. Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 559) 2. Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 24, Page 417) 3. Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 37, Page 479) 1. https://youtu.be/gExUCrpAKyQ 2. https://medlineplus.gov/lab-tests/coagulation-factor-tests/
ABO & Rh Blood grouping system	• Blood group and its types Rh Blood Grouping System	• Ganong's Review of Medical Physiology.25TH Edition. Section 05, (Chapter 31, Page 558) (Chapter 36, Page 473) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 25, Page 432) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 36, Page 471) • https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/abo-blood-group-system • https://youtu.be/wfqnNuYIY78

Practicals				
Topic	**Learning Objectives**	**Learning Domains**	**Learning Strategy**	**Assessment Tools**
Determination of Rh blood group	• Principle • Procedure • Methods • Types of blood groups • Clinical Correlations of blood transfusion	C1/C3 A3 P3	Practical/skill lab	Viva Voce OSPE Video Assisted Assessment
Determination of Clotting time (CT)	• Procedure • Clinical importance • Recall Normal values	C1/C3 A3 P3	Practical/skill lab	Viva Voce OSPE Video Assisted Assessment
Determination of Bleeding time (BT)	• Procedure • Clinical importance • Recall Normal values	C1/C3 A3 P3	Practical/skill lab	Viva Voce OSPE Video Assisted Assessment
Recording of Body Temperature	• Principle • Procedure • Methods • Clinical Correlations	C1/C3 A3 P3	Practical/skill lab	Viva Voce OSPE Video Assisted Assessment
Reference: Saqib Practical Copy First Year				

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

	• Recall normal level of Bilirubin	C1	LGIS	MCQs SAQs
	• Enlist types of Jaundice.	C1		
	• Describe Biochemical tests to distinguish various types of jaundice.	C2	LGIS	
	• . Describe Physiological Jaundice	C2		

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

	• Recall Recommended Dietary allowance.	C1		
Vitamin B12	• Recall Sources of Vitamin B12	C1	LGIS	MCQs SAQs
	• Describe biochemical role of vitamin B12	C2		
	• Discuss Deficiency effects of B12	C2		

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

Topics Of SDL	Learning Objectives	Learning resources
Structure of hemoglobin and myoglobin	• Describe Structure of hemoglobin • Describe structure of myoglobin. • Discuss Biochemical roles of hemoglobin and myoglobin.	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 03, page 25-28) • https://doi.org/10.1016/j.bcmd.2017.10.006 • https://www.youtube.com/watch?v=Qv-KExGKAYw • Use digital library • https://chemed.chem.purdue.edu/genchem/topicreview/bp/1biochem/blood3.html
Types of Hemoglobin	• Enlist various types of Hemoglobin. • Describe Importance of heme and globin components • Interpret importance of HbA1c in diagnosis of Diabetes	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 03, page 33-34) • https://pubmed.ncbi.nlm.nih.gov/34200315/ • https://www.youtube.com/@DrAishwaryaKelkar • Use digital library • https://www.ucsfhealth.org/medical-tests/hemoglobin-electrophoresis#:~:text=Many%20different%20types%20of%20hemoglobin,have%20small%20amounts%20of%20HbF
	• Discuss Importance of oxygen dissociation curve. • Enlist various factors affecting the curve. •	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 03, page 28-32) • https://pubmed.ncbi.nlm.nih.gov/2650756/

Oxygen dissociation curve.		• https://youtu.be/BYGPkRFvzOc • Use digital library • https://www.osmosis.org/learn/Oxygen-hemoglobin_dissociation_curve
Hemoglobinopathies	• Discuss hemoglobinopathies. • Enlist Types of thalassemia. • Discuss Familial counseling. • Elaborate Preventive measures.	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 03, page 35-39) • https://pubmed.ncbi.nlm.nih.gov/30193516/ • https://youtu.be/34u1sOLrgV0 • Use digital library • https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3163784/
Heme synthesis	• Describe enzymatic regulation of heme synthesis	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 21, page 277-279) • https://www.sciencedirect.com/science/article/pii/S0891584999002233 • Use digital library • https://www.youtube.com/watch?v=f-0n_eOK4JE • https://pubmed.ncbi.nlm.nih.gov/29126700/
Porphyria	• Discuss various types of porphyria	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 21, page 279-281) • https://pubmed.ncbi.nlm.nih.gov/20226990/ • https://www.mayoclinic.org/diseases-conditions/porphyria/symptoms-causes/syc-20356066#:~:text=Porphyria%20(por%2DFEAR%2De,the%20body's%20organs%20and%20tissues. • https://www.aacc.org/science-and-research/clinical-chemistry-trainee-council/trainee-council-in-english/pearls-of-laboratory-medicine/2012/porphyrias
Breakdown of hemoglobin	• Elaborate steps in the breakdown of hemoglobin. • Describe Steps in synthesis of Bilirubin • Recall Normal level of S. Bilirubin.	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 21, page 282-283) • https://www.sciencedirect.com/science/article/pii/S0891584999002233 • Use digital library • https://www.youtube.com/watch?v=f-0n_eOK4JE

		• https://pubmed.ncbi.nlm.nih.gov/29126700/
Jaundice	• Define jaundice. • Recall normal level of Bilirubin. • Enlist types of Jaundice. • Describe Biochemical tests to distinguish various types of jaundice. • Describe Physiological Jaundice	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 21, page 284-285) • https://pubmed.ncbi.nlm.nih.gov/14765767/ • https://www.youtube.com/watch?v=gIACp5js4MU • https://my.clevelandclinic.org/health/diseases/15367-adult-jaundice
Plasma proteins	• Describe plasma proteins. • Discuss Biochemical role of various plasma proteins. • Recall normal levels of plasma proteins • Illustrate Role of A/G ratio.	• Harpers Illustrated biochemistry 30th edition (Chapter 49, page 588-589) • http://ib.bioninja.com.au/options/option-d-human-physiology/d3-functions-of-the-liver/plasma-proteins.html • https://www.nottingham.ac.uk/nmp/sonet/rlos/bioproc/plasma_proteins/page_three.html • https://pubmed.ncbi.nlm.nih.gov/21544836/ • Use digital library
Acute phase proteins & Albumin	• Describe Role of albumin. • Discuss Role of C- reactive protein.	• Harpers Illustrated biochemistry 30th edition (Chapter 49, page 590-592) • https://www.youtube.com/watch?v=xMSEl1ad0z8 • https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3053509/ • https://pubmed.ncbi.nlm.nih.gov/9971870/ • Use digital library
Haptoglobin and transferrin	• Describe Structure of Haptoglobin and transferrin. • Discuss biochemical Role of Haptoglobin and transferrin.	• Harpers Illustrated biochemistry 30th edition (Chapter 49, page 592) • https://pubmed.ncbi.nlm.nih.gov/23016887/ • https://www.youtube.com/watch?v=QR_hcSow4OI • https://pubmed.ncbi.nlm.nih.gov/7027909/ • Use digital library
Ferritin and hemosiderin	• Describe biochemical role of ferritin and hemosiderin. • Describe Hemosiderosis.	• Harpers Illustrated biochemistry 30th edition (Chapter 49, page 592-594) • http://www.vivo.colostate.edu/hbooks/pathphys/topics/ferritin.html • https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4831249/ • https://www.forthwithlife.co.uk/blog/whats-the-difference-between-ferritin-and-iron/ • Use digital library

Ceruloplasmin.	• Describe biochemical role of ceruloplasmin. • Discuss Wilson's disease.	• Harpers Illustrated biochemistry 30th edition (Chapter 49, page 595-597) • https://pubmed.ncbi.nlm.nih.gov/12055353/ • https://www.youtube.com/watch?v=KCh-7Ghj0jY • https://www.mountsinai.org/health-library/tests/ceruloplasmin-blood-test • Use digital library
Antiproteases and amyloidosis	• Describe biochemical role of antiproteases and amyloidosis.	• Harpers Illustrated biochemistry 30th edition (Chapter 49, page 597-598) • https://pubmed.ncbi.nlm.nih.gov/31986086/ • https://pubmed.ncbi.nlm.nih.gov/1719439/ • https://www.youtube.com/watch?v=CQ5q3phGdtQ • Use digital library
Immunoglobulins	• Describe Structure of Immunoglobulin. • Discuss biochemical role of various Immunoglobulin. • Elaborate Class switching.	• Harpers Illustrated biochemistry 30th edition (Chapter 49, page 599-603) • https://pubmed.ncbi.nlm.nih.gov/4188929/ • https://www.youtube.com/watch?v=29mlSMaD-cY • https://medlineplus.gov/lab-tests/immunoglobulins-blood-test/#:~:text=Immunoglobulins%20are%20also%20called%20antibodies,to%20destroy%20only%20those%20germs. • Use digital library
AIDs	• Define AIDs • Describe Immunological defects in AIDs. • Discuss various preventive measures.	• Mushtaq volume II, 7th edition (chapter 11 page – 333-338) • https://pubmed.ncbi.nlm.nih.gov/3277764/ • https://www.who.int/news-room/fact-sheets/detail/hiv-aids#:~:text=Acquired%20immunodeficiency%20syndrome%20(AIDS)%20is,tuberculosis%2C%20infections%20and%20some%20cancers. • https://www.cdc.gov/hiv/basics/whatishiv.html • Use digital library

Folic acid.	• Recall Sources of folic acid. • Discuss deficiency effects of folic acid • Describe biochemical role of folic acid. • Recall Recommended Dietary allowance.	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 28, page 378-379) • https://pubmed.ncbi.nlm.nih.gov/29777755/ • https://www.cdc.gov/ncbddd/folicacid/about.html • https://www.cdc.gov/ncbddd/folicacid/about.html#:~:text=When%20the%20baby%20is%20developing,the%20early%20brain%20and%20spine. • Use digital library
Vitamin B12	• Recall Sources of Vitamin B12 • Describe biochemical role of vitamin B12 • Discuss Deficiency effects of B12	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 28, page 379-381) • https://pubmed.ncbi.nlm.nih.gov/25824066/ • https://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional/ • https://www.youtube.com/watch?v=j-2xHmcKkcy • Use digital library
Iron	• Recall Sources of iron. • Describe Transport and absorption of iron. • Discuss hyper and hypo functions of iron.	• Lippincott Illustrated reviews of biochemistry 8th edition (Chapter 29, page 403-404) • https://pubmed.ncbi.nlm.nih.gov/34373750/ • https://www.youtube.com/watch?v=vSkb0kDacjs • https://ods.od.nih.gov/factsheets/Iron-HealthProfessional/ • Use digital library

Practical				
Topic	**At the End of Practical Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Draw of Blood Technique	• How to draw blood	P	Skill Lab	OSPE
Quantitative Estimation of Serum Total Proteins	• Perform estimation of serum Protein • Describe Principal, method, normal blood level and clinical significance of S. Proteins	P	Skill Lab	OSPE
Hemin crystals Technique to draw blood	• Describe Preparation, shape and clinical significance of hemin crystals Illustrate Method and precautions to draw blood.	P	Skill Lab	OSPE
Estimation of S. Bilirubin	• Perform estimation of serum bilirubin • Describe Principal, method, normal blood level and clinical significance of S. Bilirubin	P	Skill Lab	OSPE

Basic and Clinical Sciences (Vertical Integration)

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

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

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

Obstetrics & Gynecology				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Rh incompatibility and its significance	• Know the basic pathophysiology of Rh sensitization	C2	LGIS	MCQs
	• Describe the fetal effects of Rh isoimmunization	C2		
	• Understand signs of fetal anemia	C2		
	• Describe role of Anti-D antibodies in prevention of Rh isoimmunization	C2		

Spirally Integrated Courses / General Education Cluster (GEC) Courses

Content

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

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

Biomedical Ethics				
Theory				
Topics	**At the end of session students should be able to:**	**Learning Domains**	**Teaching Strategy**	**Assessment Tools**
Laboratory Ethics	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. A**1** • 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	A1 A1 A2	Short video demonstration on violation of Ethical principle of autonomy from suit CBEC Video resources	• Assignment based assessment involving real life case scenarios under aggregate Marks (Internal Assessment) • Assignment to be uploaded on LMS

SECTION-IX

Block-III

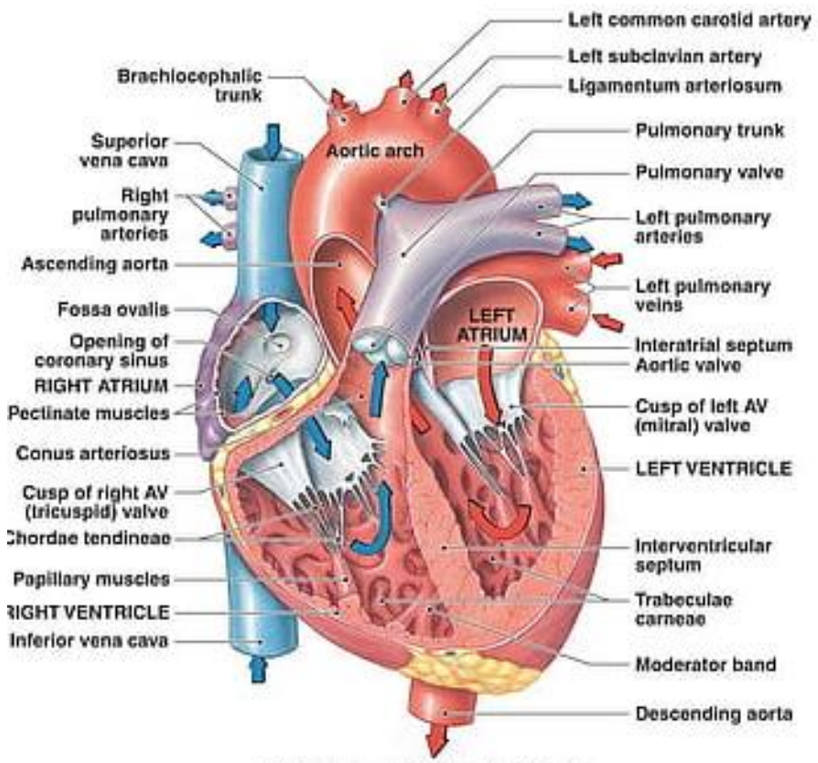
Course Contents

- **Module V- Cardiacvascular System**
- **Module VI- Respiratory System Module**

Block-III

Module No. 5 - Cardiacvascular System

Duration 5 Weeks



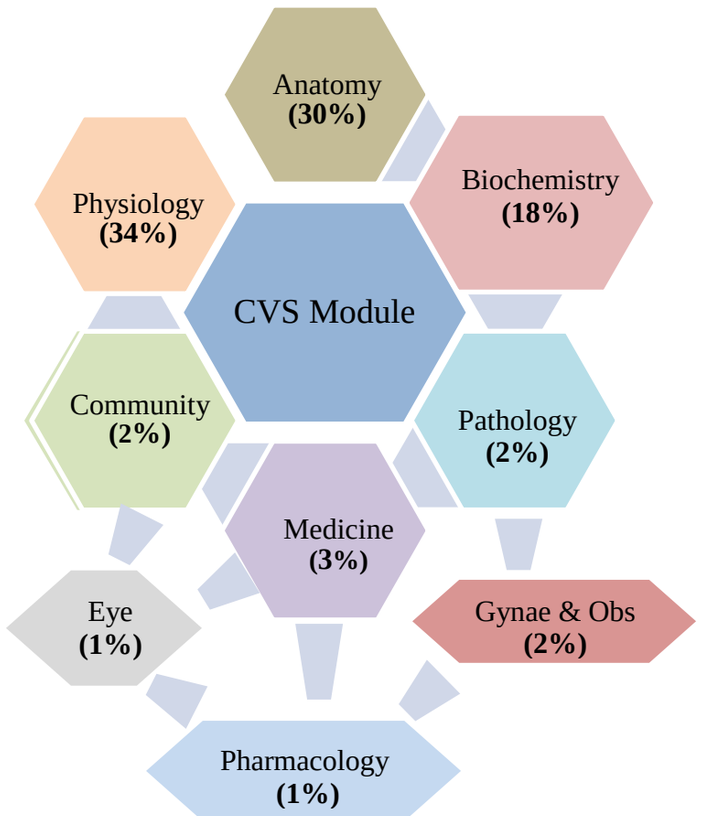
Themes					
Block	**Subjects**	**General Anatomy**	**Embryology**	**Histology**	**Gross Anatomy**
II	• Anatomy	• Heart & Vessels	• Cardiovascular System	• Heart & Vessels	• Mediastinum, Heart, Great Vessels
	• Biochemistry	• Carbohydrate chemistry, Lipid chemistry			
	• Physiology	• The Heart as a Pump and Function of the Heart Valves& regulation of heart pumping, cardiac cycle • Rhythmical Excitation of the Hear &Specialized excitatory & conductive system of the heart & its control (revisit) • Electrocardiogram, its interpretation & its abnormalities • Medical Physics of Pressure, Flow, and Resistance, Vascular Distensibility and Functions of the Arterial and Venous Systems • Microcirculation and the Lymphatic System, Local and Humoral Control of Blood Flow by the Tissues • Nervous Regulation of the Circulation, and Rapid & Long-Term Control of Arterial Pressure, hypertension • Cardiac Output, Venous Return, and Their Regulation • Muscle Blood Flow and Cardiac Output During Exercise; the Coronary & regional circulation • Cardiac Failure, Circulatory Shock • Heart Valves and Heart Sounds; Dynamics of Valvular and Congenital Heart Defects			
	Spiral Courses				
	• The Holy Quran Translation	• Mumamalat-I • Muashrat-II • Ekhlaqiaat-I • Mumamalat -II			
	• Behavioral Sciences, Bioethics & Professionalism	• Breaking the bad news • Stress and its management			
	• Radiology, Artificial Intelligence & Innovation	• Chest radiograph with perspective of cardiovascular system • Radiology with perspective of Artificial Intelligence & Innovation			
	• Family Medicine	• Approach to a patient with chest pain			
	•	•			
	•	•			
	•	•			
	•	•			
	Vertical components				
	• Community Medicine	• Risk factors of coronary vascular disease			
	• Pathology	• Edema			
	• Eye	• Hypertensive retinopathy			
	• Pharmacology	• Clinical Pharmacology of Anti hypertensive drugs			

	• Medicine	• ECG Changes (MI, Electrical Imbalance, Myocardial hypertrophy) • Overview of acute coronary syndrome & management of heart failure & management of shock • Hypertension
	• Gynae & Obs	• Cardiovascular changes in pregnancy • Hypertensive disorders in pregnancy (gestational hypertension, pre-eclampsia)
	Early Clinical Exposure (ECE)	
	• Cardiology	• See cases of Heart Failure and Dyspnea Raised JVP/Oedema • Clinical Examination of Precordium • Normal Heart Sounds • Additional heart sounds See Cases of Coronary Heart Disease
	• Radiology	• X-Ray chest • Cardiomegaly • Radiological signs of heart failure
	• Pediatrics	• See cases of congenital heart diseases • Pediatric case of Heart Failure
Clinical Relevance		
	• Mechanisms and Management of Hypertension • Pathophysiology of Myocardial Infarction (MI) • Clinical Features of Heart Failure and Its Management • Understanding Congenital Heart Defects (e.g., VSD, Tetralogy of Fallot) • Basics of Interpreting an Electrocardiogram (ECG) • Clinical Signs of Shock and Initial Management • Pathophysiology of Valvular Heart Diseases (e.g., mitral stenosis) • Risk Factors and Prevention of Atherosclerosis • Pericarditis: Clinical Presentation and Diagnosis • Cardiac Arrhythmias: Causes and Basic Treatment Principles	

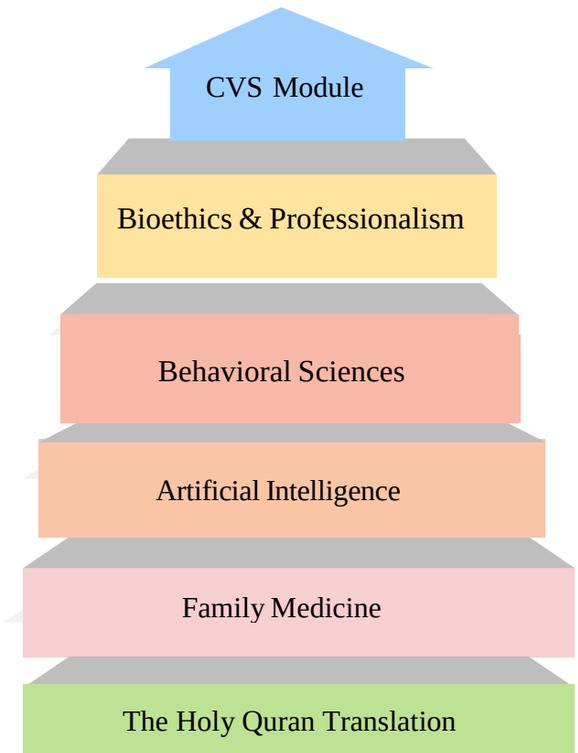
Implementation of Terms of Reference (TORS)

- Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are predefined as per the guidelines of PMDC and to be strictly followed.
- The hours mentioned within each module are the mandatory minimum required.
- The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. However, the level of cognition can be kept at a higher level.
- The Table of Specifications provided will be used for the three papers of the first professional examination.
- The same table of specifications should be used for the respective block exams for internal assessment.
- The criteria defined for continuous internal assessment is to be followed for each module and block respectively

Integration of Disciplines in CVS Module



Spiral / General Education Cluster Courses (7%)



Module No. 5 - CVS

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

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

Module Outcomes

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

Knowledge:

1. Explain the structural & developmental organization of CVS.
2. Explain different waves, segment and intervals of ECG and apply it to the interpretation of ECG.
3. Use technology based medical education including.
   Artificial Intelligence

4. Appreciate concepts & importance of
   Family Medicine
   Bionedical Ethics
   Research

Skill:

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

Attitude:

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

CVS Module Team

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

Module Committee		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar
2.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf
3.	Director DME	Prof. Dr. Ifra Saeed
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar
5.	Chairperson Biochemistry	Dr. Aneela Jamil
6.	Focal Person Anatomy First Year MBBS	Asso. Prof. Dr. Mohtashim Hina
7.	Focal Person Physiology	Dr. Sidra Hamid
8.	Focal Person Biochemistry	Dr. Aneela Jamil
9.	Focal Person Pharmacology	Dr. Zunera Hakim
10.	Focal Person Pathology	Dr. Asiya Niazi
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir
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 Task Force Team		
1.	Coordinator	Dr. Aneela (Senior Demonstrator of Physiology)
2.	DME Focal Person	Dr. Farzana Fatima
3.	Co-coordinator	Dr. Kashif (Senior Demonstrator of Anatomy)
4.	Co-Coordinator	Dr. Romessa Naeem (Demonstrator Biochemistry)
5.	Co-coordinator	Dr. Sheena Tariq (Senior Demonstrator Physiology)

DME Implementation Team		
1.	Director DME	Prof. Dr. Ifra Saeed
2.	Assistant Director DME	Dr. Farzana Fatima
3.	Implementation Incharge 1st & 2nd Year MBBS	Prof. Dr. Ifra Saeed Dr. Farzana Fatima Dr. Saira Aijaz
4.	Editor	Muhammad Arslan Aslam

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Syllabus of Cardiacvascular System (Module No. 5)

Anatomy				
Theory				
Topic	**At the End of The Session Students Should Be Able To:**	**Learning Domain**	**Teaching Strategy**	**Assessment Tools**
General Anatomy of CVS (General Organization	• Describe general organization of cardiovascular system	C2	LGIS	MCQ SAQ VIVA
	• Describe different types of circulations	C2		
	• Discuss general structural patterns of arteries and veins	C2		
	• Classify capillaries	C1		
	• Explain bio - functional importance and location of continuous, fenestrated and sinusoidalcapillaries	C2		
	• Discuss related clinicals	C3		
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• How to read relevant research article	C3		
General Anatomy of CVS (Classification of vessels)	• Classify arteries on the basis of function and size	C1	LGIS	MCQ SAQ VIVA
	• Classify veins on the basis of function and size	C1		
	• Describe differences between arteries and veins	C2		
	• Define anastomosis and discuss different types of arterial and venous anastomosis	C2		
	• Differentiate between anatomic end arteries and functional end arteries giving example	C2		
	• Discuss related clincals	C3		
	• To understand the Biophysiological aspects	C3		

	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• How to read relevant research article	C3		
Histology				
Histology of CVS (Arteries and Veins)	• Describe general histological structure of arteries and veins	C2	LGIS	MCQ SAQ VIVA
	• Tabulate histological differences between arterioles, medium sized arteries, and largearteries	C2		
	• Discuss related clinicals	C3		
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• How to read relevant research article	C3		
Histology of CVS (Capillaries)	• Differentiate between continuous, fenestrated and sinusoidal capillaries	C2	LGIS	MCQ SAQ VIVA
	• Enlist bio functions of endothelium	C2		
	• Discuss related clinicals	C2		
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• How to Read How to read relevant research article	C3		
	• Describe histological details of endocardium, myocardium and epicardium	C3		MCQ
	• Tabulate differences between blood capillaries and lymphatic capillaries	C2		

Histology of CVS (Tunics of Heart & Lymphatic System)	• Discuss biophysiological aspects of Heart & Lymphatic System	C2	LGIS	SAQ VIVA
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• How to Read How to read relevant research article	C3		
Embryological Development				
Development of CVS (Development of Veins)	• Recall the process of vasculogenesis	C2	LGIS	MCQ SAQ VIVA
	• Describe venous drainage of embryo	C2		
	• Enlist derivatives of vitelline veins	C1		
	• Discuss role cardinal veins	C2		
	• Describe Development of inferior vena cava	C2		
	• Discuss related Congenital abnormalities	C3		
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• How to read relevant research article	C3		
Development of CVS (Aortic Arches and derivatives)	• Describe development and transformation of aortic arches	C2	LGIS	MCQ SAQ VIVA
	• Enlist derivatives of 1-6th aortic arches	C1		
	• Discuss formation of intersegmental arteries	C2		
	• Describe sources and formation of coronary arteries	C2		
	• Discuss development of aorta Related Congenital abnormalities	C3		
	• To understand the Biophysiological aspects	C3		

	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• How to read relevant research article	C3		
Development of CVS (Formation, Position and Partitioning of heart tube)	• Discuss establishment of cardiogenin field	C2	LGIS	MCQ SAQ VIVA
	• Describe formation and position of heart tube in developing embryo	C2		
	• Discuss formation of cardiac loop	C2		
	• Describe development of sinus venosus	C2		
	• Explain importance of septum spurium	C2		
	• Describe development of cardiac septa	C2		
	• Discuss different methods of septum formation	C2		
	• Explain septum formation in right atrium	C2		
	• Describe development and differentiation of atria	C2		
	• Discuss related congenital abnormalities	C3		
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• How to read relevant research article	C3		
	• Discuss establishment of cardiogenin field	C2		
Development of CVS	• Discuss formation of septum in atrioventricular canal	C2		
	• Describe formation of atrioventricular valves	C2		
	• Explain septum formation in truncusarteriosis&conuscordis	C2		

(Formation and partitioning of Ventricles)	• Describe septum formation in ventricles Discuss formation of semilunar valves	C2	LGIS	MCQ SAQ VIVA
	• Discuss development of conducting system of heart	C2		
	• Discuss related Congenital abnormalities	C3		
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• How to read relevant research article	C3		
Development of CVS (Fetal circulation)	• Describe fetal circulation in detail	C2	LGIS	MCQ SAQ VIVA
	• Discuss role of foramen ovale, ductus arteriosis and ductus venosis in fetal circulation andtheir fate	C2		
	• Differentiate between fetal and postnatal circulation	C2		
	• Discuss related Congenital abnormalities	C3		
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		

Topic	At the End Of The Session Students Should Be Able To:	Learning Domains	Teaching Strategy	Assessment Tools
Thoracic Wall / Thoracic Vertebra	• Define thorax	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss components and shape of thoracic cavity.	C2		
	• Discuss the applied and the related clinical anatomy	C2		
	• Tabulate origin, insertion, nerve supply and action of all muscles of posterior compartment of leg	C2		
	• Classify Ribs	C1		

	• Correlate the clinical conditions	C3		
	• Describe ribs (side determination, features, attachments, relations, types and ossification.	C2		
	• Practice the principles of Bioethics	C3		
	• Correlate the clinical conditions	C3		
	• To understand the Biophysiological aspects of Thoracic wall	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
Mediastinum	• Discuss the boundaries and division of mediastinum	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Enumerate the contents of anterior mediastinum.	C1		
	• Correlate the clinical conditions	C3		
	• To understand the Biophysiological aspects of Mediastinum	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Map Arch of Aorta, Bracheocephalic artery on SP/Model	P		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
Pericardium	• Describe the gross features of fibrous pericardium with its blood and nerve supply	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe the gross features of serous pericardium with its blood and nerve supply	C2		
	• Describe transverse and oblique pericardial sinus	C2		
	• Describe the Clinical Significance of the Transverse Pericardial Sinus	C3		
	• Define Pericarditis and Pericardial Effusion	C1		
	• Correlate the clinical conditions	C3		
	• To understand the Biophysiological aspects of Pericardium	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Map Pericardium on SP/Model	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Heart (Externalfeatures)	• Demonstrate Position and orientation of heart.	P	SGD, Skill Lab	MCQ SAQ
	• Describe borders and surfaces of the heart.	C2		
	• Demonstrate the external features of the heart	C2		
	• Correlate the clinical conditions	C3		

	• To understand the Biophysiological aspects of Heart(External Feature)	C3		VIVA OSPE
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
	• Use HEC digital library	C3		
Heart (Internalfeatures)	• Differentiate between muscular and smooth part.	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Identify the various openings, important features in inter-atrial septum.	C2		
	• Identify S.A node	C1		
	• Discuss internal features of left atrium, inter atrial septum, mitral valve and pulmonaryveins.	C2		
	• Discuss importance of modulator band.	C2		
	• Identify mitral valve, intervetntricular septum, aortic vestibule, arotic valve.	C3		
	• Correlate the clinical conditions	C3		
	• To understand the Biophysiological aspects of Heart (Internal features)	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Map Cardiac valves on SP/Model	P		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
	• Use HEC digital library	C3		
Heart (Clinical Correlations)	• Coronary Atherosclerosis	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Myocardial Infarction	C1		
	• Angina Pectoris	C1		
	• Coronary Angioplasty	C1		
	• Correlate the clinical conditions	C2		
	• To understand the Biophysiological aspects of Heart (Clinical Correlations)	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Vasculature of heart	• Describe the origin of coronary arteries	C2		

	• Identify course branches and distribution of right coronary arteries and left coronaryartery,	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Discuss the concept of right and left dominance.	C2		
	• Describe the venous drainage of heart.	C2		
	• Correlate the clinical conditions	C3		
	• To understand the Biophysiological aspects of Vasculature of heart	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
Innervation of Heart	• Describe the formation of superficial and deep cardiac plexus.	C2	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Correlate the clinical conditions	C3		
	• To understand the Biophysiological aspects of Innervation of Heart	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Superior mediastinum (Trachea, Esophagus, Ascending Aorta)	• Enumerate the structure of superior mediastinum	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe great vessels in superior mediastinum	C2		
	• Correlate the clinical conditions	C3		
	• To understand the Biophysiological aspects of Superior Mediastinum	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Map Ascending Aorta on SP/Model	P		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Posterior mediastinum (Boundaries and Structures	• Identify structures in posterior mediastinum	C1	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe anatomy of structure in Posterior mediastinum	C2		
	• Identify course, relations and branches of descending aorta.	C2		
	• Correlate the clinical conditions	C2		
	• To understand the Biophysiological aspects of Posteror mediastinum	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Map Descending Thoracic Aorta on SP/Model	P		
	• Practice the principles of Bioethics	C3		

	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Posterior mediastinum (Azygos system)	• Describe formation, course and clinical importance of azygos system of veins	C3	SGD, Skill Lab	MCQ SAQ VIVA OSPE
	• Describe formation and importance of hemiazygos vein	C1		
	• Correlate the clinical conditions	C3		
	• To understand the Biophysiological aspects of Posterior mediastinum	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Cross sectionalAnatomy/ Radiology	• Identify the surfaces present at different levels of cross sections	P	SGD, Skills lab	SAQ VIVAOSPE
	• Manubriosternal Joint/Angle of Louis	P		
	• Upper body of Sternum	P		
	• Section between T 7 , T 8 Thoracic vertebrae	P		
	• Section between T 8 , T 9 Thoracic vertebrae	P		
	• Section between T 9 , T 10 Thoracic vertebrae	P		
	• How to access HEC digital library	C3		
	• Correlate the clinical conditions	C2		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		

Topics	Learning objectives	Learning Resources
Posterior compartment of leg and flexor retinaculum	• Define thorax	• Clinically Oriented Anatomy6th Edition, Pg no.73,77, 78-79, 84,89,93,95,98,446,454 https://youtu.be/PoA-Uq9w-7s https://youtu.be/Ok8-nwVLysM https://www.sciencedirect.com/science/article/pii/S0161475415000639
	• Discuss components and shape of thoracic cavity.	
	• Discuss the applied and the related clinicalanatomy	
	• Classify Ribs	
	• Describe ribs (side determination, features, attachments, relations, types and ossification.	
	• Discuss the applied and the related clinical anatomy	
	• How to access HEC digital library	

	• How to read relevant research article	
Mediastinum	• Define thorax • Discuss components and shape of thoracic cavity. • Discuss the applied and the related clinicalanatomy • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no.107,110,118,127,128,132-133,160-168,171 https://youtu.be/oBR9p_UDTuo https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5111324/
Pericardium	• Describe the gross features of fibrous pericardium with its bloodand nerve supply • Describe the gross features of serous pericardium with its bloodand nerve supply • Describe transverse and oblique pericardial sinus • Describe the Clinical Significance of the Transverse PericardialSinus • Define Pericarditis and Pericardial Effusion • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no.111,128-129,133-134 https://youtu.be/5RMeCgJn730 https://www.sciencedirect.com/science/article/abs/pii/S1054880721000302
Heart I External features	• Demonstrate Position and orientation of heart. • Describe borders and surfaces of the heart. • Demonstrate the external features of the heart • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 https://youtu.be/uhSBFOTwzDQ https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014
Heart II Internal features	• Differentiate between muscular and smooth part. • Identify the various openings, important features in inter-atrialseptum. • Identify S.A node • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 • https://youtu.be/uhSBFOTwzDQ https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014
Heart III Clinical Co-Relation	• Discuss internal features of left atrium, inter atrial septum, mitralvalve and pulmonary veins.	• Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 https://youtu.be/uhSBFOTwzDQ https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014
Heart III Clinical Co-Relation	• Discuss importance of modulator band. • Identify mitral valve, intervetntricular septum, aortic vestibule,arotic valve. • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 https://youtu.be/uhSBFOTwzDQ https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028014

Vasculature of heart	• Describe the origin of coronary arteries • Identify course branches and distribution of right coronary arteriesand left coronary artery, • Discuss the concept of right and left dominance. • Describe the venous drainage of heart. • Discuss the related applied and clinical anatomy • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 https://youtu.be/uhSBFOTwzDQ https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028475
Innervation of heart	• Describe the formation of superficial and deep cardiac plexus. • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 https://youtu.be/uhSBFOTwzDQ https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028932
Superior mediastinum (Trachea, Esophagus, Ascending Aorta)	• Enumerate the structure of superior mediastinum • Describe great vessels in superior mediastinum • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no.127-128,132,160-166,179 https://youtu.be/2POIlBe2xR4 https://www.sciencedirect.com/science/article/abs/pii/S1472029906000336
Posterior mediastinum I	• Identify structures in posterior mediastinum • Describe anatomy of structure in Posterior mediastinum • Identify course, relations and branches of descending aorta. • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Editio n, P no. 128, 168-172, 179 https://youtu.be/2POIlBe2xR4 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9792830/
Surface anatomy / Radiology	• Describe formation, course and clinical importance of azygossystem of veins • Describe formation and importance of hemiazygos vein • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no. 128, 168-172, 179 https://youtu.be/2POIlBe2xR4 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9792830/
	• Demonstrate surface projection and radiological aspects of heart,great vessels, trachea, oesphagus, postion of heart valves • How to access HEC digital library • How to read relevant research article	• Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 • https://youtu.be/wqiK-8nZEqk https://pubs.rsna.org/doi/10.1148/ryct.220047

Practicals				
Topic	**Learning Objectives** **At The End Of Practical Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Elastic Arteries	• identify characteristic histological features of tunica intima, tunica media and tunica adventitia of elastic arteries under microscope	P1	Skill lab	OSPE
	• Illustrate histological structure of elastic artery	C1		
	• Write two points of identification	C1		
	• To read relevant research article	C3		
Muscular Arteries Small Arteries	• identify characteristic histological features of tunica intima, tunica media and tunica adventitia of muscular and small sized arteries arteries under microscope	P1	Skill lab	OSPE
	• Illustrate histological structure of Muscular and small sized artery	C1		
	• Write two points of identification	C1		
	• Differentiate between three types of arteries on histology slides	C1		
	• To read relevant research article	C3		
Large Vein	• Identify characteristic histological features of tunica intima, tunica media and tunica adventitia of large vein under microscope	P1	Skill lab	OSPE
	• Illustrate histological structure of large vein	C1		
	• Write two points of identification	C1		
	• To read relevant research article	C3		
Medium and small sized vein	• Identify characteristic histological features of tunica intima, tunica media and tunica adventitia of medium and small sized vein under microscope	P1	Skill lab	OSPE
	• Illustrate histological structure of medium and small sized vein	C1		
	• Write two points of identification Differentiate between three types of veinson histology slides	C1		

	• To read relevant research article	C3		
Capillaries	• Classify capillaries on the basis of histological structure and function	C1	Skill lab	OSPE
	• Enlist sites of continuous, fenestrated and sinusoidal capillaries	C1		
	• Elaborate characteristic histological features of tunica intima, tunica mediaand tunica adventitia of capillaries	C1		
	• Draw and label histological structure of each type of capillaries	C1		
	• Write two points of identification	C1		
	• To read relevant research article	C3		

Physiology						
Theory						
Topics	**Learning Objectives**	**References**	**Learning Resources**	**Learning Domains**	**Learning Strategy**	**AssessmentTools**
Introduction toCVS	1. Describe scheme of circulation through the heart and body	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Cardiovascular Physiology (Chapter 14, Page 469) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4, Page 117) • Physiological Basis of Medical Practiceby Best & Taylor's.13th Edition.Section 02, (Chapter 05, Page 101)	**1.** https://youtu.be/28CYhgjrBLA **2.** https://training.seer.cancer.gov/anatomy/cardiovascular/#:~:text=The%20cardiovascular%20system%20is%20sometimes,arteries%2C%20veins%2C%20and%20capillaries**.**	1.C1	LGIS	MCQSEQ VIVA VOCEMCQ (LMS based Aseessment, MSTbased Assessment) OSPE

Classification of blood vessels & Biophysical considerations	1.Enumerate Classification of blood vessels. 2.Explain structure and functions of types of blood vessels	• Ganong's Review of Medical Physiology.25TH Edition.Section 05, Cardiovascular Physiology (Chapter 31, Page 567,571) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15, Page 513) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4, Page 119) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 04 (Chapter 15, Page 183)	1. https://youtu.be/ar2_UPiGzmU 2. https://training.seer.cancer.gov/anatomy/cardiovascular/blood/classification.html	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Heart Sounds	Describe four heart sound and differences between 1st and 2nd heart sounds	• Ganong's Review of Medical Physiology.25TH Edition.Section 05, Cardiovascular Physiology (Chapter 30, Page 542) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.Section 04. (Chapter 23, Page 283)	**1.** https://youtu.be/dBwr2GZCmQM **2.** https://www.utmb.edu/pedi_ed/CoreV2/Cardiology/cardiologyV2/cardiologyV23.html	C1/C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Regulation of blood flow	Define and describe Resistance to Blood flow Describe regulation of Blood pressure and Poiseuilles law Describe factors related with Blood viscosity and its role in regulation	• Ganong's Review of Medical Physiology.25TH Edition.Section 05, Cardiovascular Physiology (Chapter 31, Page 575) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 02(Chapter 5, Page 107) (Chapter 6,page 110) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.Section 04. (Chapter 14, Page 173) (Chapter 17, Page 205)	1. https://youtu.be/cocB-M3h9k0 2. https://journals.physiology.org/doi/full/10.1152/advan.00074.2010	C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Capillary circulation, Concept of vasomotion and starling forces	Explain the details of types of starling forces . Expalin role of starling forces in different pathological conditions	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 31, Page 577) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 170) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 02(Chapter 6,Page 119)	1. https://youtu.be/YNROPnYy1tc 2. https://www.osmosis.org/learn/Microcirculation_and_Starling_forces	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

		• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 04. (Chapter 16, Page 193)				
Functions of veins, Venous return and factors affecting venous return	Describe how veins are different from arteries Explain Various factors that affect venous return	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 158) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.Section 4. (Chapter 15, Page 188)	1. https://youtu.be/FKJr5uqPv5s 2. https://www.sciencedirect.com/topics/medicine-and-dentistry/venous-return	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Introduction to ECG & its clinical importance	Enumerate and describe normal components of ECG Draw normal ECG Describe the method of recording ECG Describe the following. Bipolar limb leads.	• Ganong's Review of Medical Physiology.25TH Edition.Section 01,Immunity,Infection and Inflamma tion(Chapter 29, Page 522)	1. https://youtu.be/SEFhbK8ZCgk 2. https://my.clevelandclinic.org/health/diagnostics/16953-electrocardiogram-ekg	C1 C1 C1 C1 C1 C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST

	Describe Einthovians law and Enthovian triangle. Describe Chest leads and Augmented unipolar limb leads Describe how to read normal ECG Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 491) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Chapter 09,Page 170) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 11, Page 135)		C1		based Assessment) OSPE
Cardiac output & its control, measurement of cardiac output, pathologically high and low cardiac output	Explain cardiac output Understand various method to measure cardiac output Explain various factor which help in regulation of heart rate and stroke volume	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 543) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 500-507) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 149,154-158) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.	1. https://youtu.be/WuGMqezV3e o 2. https://teachmephysiology.com /cardiovascular- system/cardiac-output/	C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

		Section 04. (Chapter 20, Page 245)((Chapter 22, Page 280)				
Vectorial analysis & arrhythmias I	Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG Define arrhythmia Describe abnormal sinus rhythms	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 526) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 09,Page 179,180-189) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 12, Page 143)((Chapter 13, Page 157)	1. https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/ 2. https://youtu.be/6LrptveKYus 3. https://www.medicalnewstoday.com/articles/8887#definition	C1 C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Cardiac cycle - I, Events of cardiac cycle and its graphical representation	Describe the cardiac cycle in detail Enumerate and explain its events Explain the events of cardiac cycle	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular	1. https://youtu.be/XbivIaFPoQI 2. https://www.sciencedirect.com/science/article/pii/S0010027721003309 3. https://youtu.be/sLLLOaZ85Lk 4. https://teachmephysiology.com/cardiovascular- system/cardiac-cycle- 2/cardiac-cycle/ 5. https://youtu.be/HNkwXZSSssU	C1 C1, C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

		Physiology (Chapter 4,Page 154) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 9, Page 117)				
Arrhythmias II	Describe abnormal rhythms resulting from the block of heart signals within the intra cardiac conduction pathways Define ectopic beats Explain the following with the help of relevant ECGs. Premature contractions. Paroxysmal tachycardia. Ventricular fibrillation. Atrial fibrillation. Atrial flutter. Cardiac arrest. Describe different degrees of heart block and ECG changes Explain atrial and ventricular flutter and fibrillation	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 527) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 09,Page 180-189) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 13, Page 157)	1. https://youtu.be/6LrptveKYus 2. https://www.medicalnewstoday.com/articles/8887#definition	C1 C1 C2 C2 C2 C2 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Cardiac cycle – II, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping	Draw various events during cardiac cycle Explain regulation of heart pumping	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 9, Page 117-126)	1. https://youtu.be/dmPtaJxgRQU 2. https://youtu.be/VI9zo_CzQ9g 3. https://youtu.be/pli2zs8Kekw 4. https://youtu.be/kMJ-US6Qfqc 5. https://youtu.be/qhtAhbyBSfs 6. https://teachmephysiology.com /cardiovascular- system/cardiac-cycle- 2/cardiac-cycle/	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
ECG changes in myocardial hypertrophies, ischemic heart disease	Discuss ECG changes in different diseases	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 532) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 12,Page 151)	• https://youtu.be/SEFhbK8ZCgk • https://youtu.be/D0V_aQXtRSw • https://www.msdmanuals.com/home/heart-and-blood-vessel-disorders/diagnosis-of-heart-and-blood-vessel-disorders/electrocardiography	1.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Short term regulation of blood pressure	Explain short term regulation of blood pressure Explain central nervous system ischemic response & cushing reaction	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 32, Page 585,590) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15,Page 517,528) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 18,Page 217)	1. https://youtu.be/HUf1LtkPj1k 2. https://www.sciencedirect.com/topics/nursing-and-health-professions/blood-pressure-regulation 3. https://www.cliffsnotes.com/study-guides/anatomy-and-physiology/the-cardiovascular-system/control-of-blood- pressure	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Congestive cardiac failure	Define cardiac failure. Classify cardiac failure Enumerate the causes of cardiac failure and discuss in detail. Discuss and differentiate between compensated heart failure and decompensated heart failure Discuss and	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 30, Page 538) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 22,Page 271)	1. https://www.webmd.com/heart-disease/guide-heart-failure 2. https://youtu.be/EDCaFKgtXks 3. https://www.healthline.com/health/congestive-heart-failure	C1/C2 C1 C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

	differentiate between Low and high output cardiac failure Define Cardiac reserve.					
Long term regulation of blood pressure	Explain the role of kidneys in long term regulation of blood pressure	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 16,page 282) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 19, Page 229)	1. https://youtu.be/5S9xEpAdAgA 2. https://jps.biomedcentral.com/articles/10.1007/s12576-012-0192-0 3. https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Splanchnic circulation, cutaneous circulation	Describe the Physiologic anatomy of cerebral blood flow Describe the blood flow in normal state and local control of blood flow	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 173) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 7,page 146)	1. https://youtu.be/hr6oGuW7mV A 2. https://www.sciencedirect.com/topics/medicine-and-dentistry/splanchnic-blood- flow 3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2999290/	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Skeletal muscle blood flow, Cardiovascular changes during exercise	Discuss the blood flow regulation in skeletal muscle at rest and during exercise.	Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 30, Page 549) Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 178) Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 07,Page 148) Textbook of Medical Physiology by Guyton & Hall.14th Edition.. (Chapter 18, Page 226)(Chapter 21,Page 259)	1. https://www.sciencedirect.com/topics/medicine-and-dentistry/muscle-blood-flow 2. https://youtu.be/H6Fd8sfE2eQ	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Fetal circulation & cardiac abnormalities in fetal circulation	Describe the fetal circulation Discuss the pathophysiology of cardiac abnormalities related to it	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 33, Page 614) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 4(Chapter 23,Page 288)	1. https://youtu.be/rYVGjbzmAtg 2. https://www.sciencedirect.com/science/article/abs/pii/0033062072900151 3. https://myhealth.ucsd.edu/Conditions/Heart/Congenital/90,P01790	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Circulatory Shock	Define shock. Describe the physiologic causes of shock. Enumerate various types of shock. Describe the stages of shock Describe the following types of shock in detail. Describe Circulatory shock and Hypovolemic shock. Describe Neurogenic shock. Describe Septic shock. Describe Anaphylactic shock	• Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 4(Chapter 24,Page 293)	1.https://youtu.be/VZtBOaAMG9w 2. https://my.clevelandclinic.org/health/diseases/17837-cardiogenic-shock	1.C1 2.C1 3.C1 4.C1 5.C1 6.C1 7.C1 8.C1 9.C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Coronary circulation, Atherosclerosis & acute coronary occlusion	Understand the physiologic anatomy of coronary blood supply and normal coronary blood flow Discuss the control of coronary blood flow	Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 33, Page 610) Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 15,Page 265) Textbook of Medical Physiology by Guyton & Hall.14th Edition.. (Chapter 21, Page 262)	1. https://www.msdmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/overview-of-coronary-artery-disease 2. https://youtu.be/WKrVxKJVh00 3. https://www.uptodate.com/contents/mechanisms-of-acute-coronary-syndromes-related-to-atherosclerosis	1.C2 2.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Cardiac cycle, Events of cardiac cycle and its graphical representation, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping (SDL)	Describe the cardiac cycle in detail Enumerate and explain its events Explain the events of cardiac cycle	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 9, Page 117)	1. https://youtu.be/XbivIaFPoQI 2. https://www.sciencedirect.com/science/article/pii/S0010027721003309 3. https://youtu.be/sLLLOaZ85Lk 4. https://teachmephysiology.com/cardiovascular- system/cardiac-cycle- 2/cardiac-cycle/ 5. https://youtu.be/HNkwXZSSssU	C1 C1/C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

		• Textbook of Medical Physiology by Guyton & Hall.14th Edition.Section 04. (Chapter 14, Page 173) (Chapter 17, Page 205)				
Capillary circulation, Concept of vasomotion and starling forces	Explain the details of types of starling forces . Expalin role of starling forces in different pathological conditions	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 31, Page 577) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 170) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 02(Chapter 6,Page 119) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 04. (Chapter 16, Page 193)	1. https://youtu.be/YNROPnYy1tc 2. https://www.osmosis.org/learn/Microcirculation_and_Starling_forces	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Functions of veins, Venous return and factors affecting venous return	Describe how veins are different from arteries Explain Various factors that affect venous return	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 158) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.Section 4. (Chapter 15, Page 188)	1. https://youtu.be/FKJr5uqPv5s 2. https://www.sciencedirect.com/topics/medicine-and-dentistry/venous-return	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Introduction to ECG & its clinical importance	Enumerate and describe normal components of ECG Draw normal ECG Describe the method of recording ECG Describe the following. Bipolar limb leads.	• Ganong's Review of Medical Physiology.25TH Edition.Section 01,Immunity,Infection and Inflammation(Chapter 29, Page 522)	1. https://youtu.be/SEFhbK8ZCgk 2. https://my.clevelandclinic.org/health/diagnostics/16953-electrocardiogram-ekg	C1 C1 C1 C1 C1 C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST

	Describe Einthovians law and Enthovian triangle. Describe Chest leads and Augmented unipolar limb leads Describe how to read normal ECG Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 491) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Chapter 09,Page 170) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 11, Page 135)		C1		based Assessment) OSPE
Cardiac output & its control, measurement of cardiac output, pathologically high and low cardiac output	Explain cardiac output Understand various method to measure cardiac output Explain various factor which help in regulation of heart rate and stroke volume	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 543) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 500-507) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 149,154-158) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 04. (Chapter 20, Page 245)((Chapter 22, Page 280)	1. https://youtu.be/WuGMqezV3eo 2. https://teachmephysiology.com/cardiovascular-system/cardiac-output/	C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Vectorial analysis & arrhythmias I	Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG Define arrhythmia Describe abnormal sinus rhythms	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 526) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 09,Page 179,180-189) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03.	1. https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/ 2. https://youtu.be/6LrptveKYus 3. https://www.medicalnewstoday.com/articles/8887#definition	C1 C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)

		(Chapter 12, Page 143)((Chapter 13, Page 157)				OSPE
Cardiac cycle - I, Events of cardiac cycle and its graphical representation	Describe the cardiac cycle in detail Enumerate and explain its events Explain the events of cardiac cycle	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 9, Page 117)	1. https://youtu.be/XbivIaFPoQI 2. https://www.sciencedirect.com/science/article/pii/S0010027721003309 3. https://youtu.be/sLLLOaZ85Lk 4. https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/ 5. https://youtu.be/HNkwXZSSssU	C1 C1, C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Arrhythmias II	Describe abnormal rhythms resulting from the block of heart signals within the intra cardiac conduction pathways Define ectopic beats Explain the following with the help of relevant ECGs. Premature contractions. Paroxysmal tachycardia. Ventricular fibrillation. Atrial fibrillation. Atrial flutter. Cardiac arrest. Describe different degrees of heart block and ECG changes Explain atrial and ventricular flutter and fibrillation	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 527) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 09,Page 180-189) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 13, Page 157)	1. https://youtu.be/6LrptveKYus 2. https://www.medicalnewstoday.com/articles/8887#definition	C1 C1 C2 C2 C2 C2 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Cardiac cycle – II, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping	Draw various events during cardiac cycle Explain regulation of heart pumping	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 9, Page 117-126)	1. https://youtu.be/dmPtaJxgRQU 2. https://youtu.be/VI9zo_CzQ9g 3. https://youtu.be/pli2zs8Kekw 4. https://youtu.be/kMJ-US6Qfqc 5. https://youtu.be/qhtAhbyBSfs 6. https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
ECG changes in myocardial hypertrophies, ischemic heart disease	Discuss ECG changes in different diseases	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 532) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 12,Page 151)	• https://youtu.be/SEFhbK8ZCgk • https://youtu.be/D0V_aQXtRSw • https://www.msdmanuals.com/home/heart-and-blood-vessel-disorders/diagnosis-of-heart-and-blood-vessel-disorders/electrocardiography	1.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Short term regulation of blood pressure	Explain short term regulation of blood pressure Explain central nervous system ischemic response & cushing reaction	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 32, Page 585,590) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15,Page 517,528) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163)	1. https://youtu.be/HUf1LtkPj1k 2. https://www.sciencedirect.com/topics/nursing-and-health-professions/blood-pressure-regulation 3. https://www.cliffsnotes.com/study-guides/anatomy-and-physiology/the-cardiovascular-	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

		• Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 18,Page 217)	system/control-of-blood-pressure			
Congestive cardiac failure	Define cardiac failure. Classify cardiac failure Enumerate the causes of cardiac failure and discuss in detail. Discuss and differentiate between compensated heart failure and decompensated heart failure Discuss and differentiate between Low and high output cardiac failure Define Cardiac reserve.	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 30, Page 538) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 22,Page 271)	1. https://www.webmd.com/heart-disease/guide-heart-failure 2. https://youtu.be/EDCaFKgtXks 3. https://www.healthline.com/health/congestive-heart-failure	C1/C2 C1 C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Long term regulation of blood pressure	Explain the role of kidneys in long term regulation of blood pressure	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 16,page 282) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 19, Page 229)	1. https://youtu.be/5S9xEpAdAgA 2. https://jps.biomedcentral.com/articles/10.1007/s12576-012-0192-0 3. https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Splanchnic circulation, cutaneous circulation	Describe the Physiologic anatomy of cerebral blood flow Describe the blood flow in normal state and local control of blood flow	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 173) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 7,page 146)	1. https://youtu.be/hr6oGuW7mVA 2. https://www.sciencedirect.com/topics/medicine-and-dentistry/splanchnic-blood-flow	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)

			3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2999290/			OSPE
Skeletal muscle blood flow, Cardiovascular changes during exercise	Discuss the blood flow regulation in skeletal muscle at rest and during exercise.	Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 30, Page 549) Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 178) Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 07,Page 148) Textbook of Medical Physiology by Guyton & Hall.14th Edition.. (Chapter 18, Page 226)(Chapter 21,Page 259)	1. https://www.sciencedirect.com/topics/medicine-and-dentistry/muscle-blood-flow 2. https://youtu.be/H6Fd8sfE2eQ	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Fetal circulation & cardiac abnormalities in fetal circulation	Describe the fetal circulation Discuss the pathophysiology of cardiac abnormalities related to it	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 33, Page 614) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 4(Chapter 23,Page 288)	1. https://youtu.be/rYVGjbzmAtg 2. https://www.sciencedirect.com/science/article/abs/pii/0033062072900151 3. https://myhealth.ucsd.edu/Conditions/Heart/Congenital/90,P01790	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Circulatory Shock	Define shock. Describe the physiologic causes of shock. Enumerate various types of shock. Describe the stages of shock Describe the following types of shock in detail.	• Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 4(Chapter 24,Page 293)	1. https://youtu.be/VZtBOaAMG9w 2. https://my.clevelandclinic.org/health/diseases/17837-cardiogenic-shock	1.C1 2.C1 3.C1 4.C1 5.C1 6.C1 7.C1 8.C1 9.C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST

	Describe Circulatory shock and Hypovolemic shock. Describe Neurogenic shock. Describe Septic shock. Describe Anaphylactic shock					based Assessment) OSPE
Coronary circulation, Atherosclerosis & acute coronary occlusion	Understand the physiologic anatomy of coronary blood supply and normal coronary blood flow Discuss the control of coronary blood flow	Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 33, Page 610) Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 15,Page 265) Textbook of Medical Physiology by Guyton & Hall.14th Edition.. (Chapter 21, Page 262)	1. https://www.msdmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/overview-of-coronary-artery-disease 2. https://youtu.be/WKrVxKJVh00 3. https://www.uptodate.com/contents/mechanisms-of-acute-coronary-syndromes-related-to-atherosclerosis	1.C2 2.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Cardiac cycle, Events of cardiac cycle and its graphical representation, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping (SDL)	Describe the cardiac cycle in detail Enumerate and explain its events Explain the events of cardiac cycle	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 9, Page 117)	1. https://youtu.be/XbivIaFPoQI 2. https://www.sciencedirect.com/science/article/pii/S0010027721003309 3. https://youtu.be/sLLLOaZ85Lk 4. https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/ 5. https://youtu.be/HNkwXZSSssU	C1 C1/C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Topics	Learning Objectives	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Capillary circulation, Concept of vasomotion and starling forces	Explain the details of types of starling forces . Expalin role of starling forces in different pathological conditions	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 31, Page 577) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 170) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 02(Chapter 6,Page 119) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 04. (Chapter 16, Page 193)	3. https://youtu.be/YNROPnYy1tc 4. https://www.osmosis.org/learn/Microcirculation_and_Starling_forces	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Short term regulation of blood pressure	Explain short term regulation of blood pressure Explain central nervous system ischemic response & cushing reaction	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 32, Page 585,590) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15,Page 517,528) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 18,Page 217)	4. https://youtu.be/HUf1LtkPj1k 5. https://www.sciencedirect.com/topics/nursing-and-health-professions/blood-pressure-regulation 6. https://www.cliffsnotes.com/study-guides/anatomy-and-physiology/the-cardiovascular-system/control-of-blood-pressure	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Long term regulation of blood pressure	Explain the role of kidneys in long term regulation of blood pressure	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 16,page 282) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 19, Page 229)	4. https://youtu.be/5S9xEpAdAgA 5. https://jps.biomedcentral.com/articles/10.1007/s12576-012-0192-0 6. https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Topics Of SDL	Learning Objective	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tool
ON CAMPUS: Heart Sounds	1. Describe four heart sound and differences between 1st and 2nd heart sounds	• Ganong's Review of Medical Physiology.25TH Edition.Section 05, Cardiovascular Physiology (Chapter 30, Page 542) ❖ Textbook of Medical Physiology by Guyton & Hall.14th Edition.Section 04. (Chapter 23, Page 283)	**1.** https://youtu.be/dBwr2GZCmQM **2.** https://www.utmb.edu/pedi_ed/CoreV2/Cardiology/cardiologyV2/cardiologyV23.html	C1/C2	SDL	MCQSEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)OSPE SDL Evaluation
Capillary circulation, Concept of vasomotion and starling forces	1. Explain the details of types of starling forces. 2. Expalin role of starling forces in different pathological conditions	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 31, Page 577) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 170) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 02(Chapter 6,Page 119) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 04. (Chapter 16, Page 193)	1. https://youtu.be/YNROPnYy1tc 2. https://www.osmosis.org/learn/Microcirculation_and_Starling_forces	1.C2 2.C2	SDL	MCQSEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)OSPE SDL Evaluation

Introduction to ECG & its clinical importance	• Enumerate and describe normal components of ECG • Draw normal ECG • Describe the method of recording ECG • Describe the following. Bipolar limb leads.	• Ganong's Review of Medical Physiology.25TH Edition.Section 01,Immunity,Infection and Inflamma tion(Chapter 29, Page 522)	1. https://youtu.be/SEFhbK8ZCgk 2. https://my.clevelandclinic.org/health/diagnostics/16953-electrocardiogram-ekg	C1 C1 C1 C1 C1 C1 C1 C1 C1	SDL	MCQSEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)OSPE SDL Evaluation
	• Describe Einthovians law and Enthovian triangle. • Describe Chest leads and Augmented unipolar limb leads • Describe how to read normal ECG • Describe the principles of vectorial analysis of ECG. • Describe the vectorial analysis of normal ECG	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 491) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Chapter 09,Page 170) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 11, Page 135)		C1 C1 C1 C1 C1 C1 C1 C1 C1		
Cardiac cycle - I, Events of cardiac cycle and its graphical representation	• Describe the cardiac cycle in detail • Enumerate and explain its events Explain the events of cardiac cycle	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 9, Page 117)	1.https://youtu.be/XbivIaFPoQI 1. https://www.sciencedirect.com/science/article/pii/S001 0027721003309 2. https://youtu.be/sLLLOaZ8 5Lk 3. https://teachmephysiology. com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/ 4. https://youtu.be/HNkwXZS	1. C1 2. C1/ C2 3. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

			SssU			
Arrhythmias	• Describe the principles of vectorial analysis of ECG. • Describe the vectorial analysis of normal ECG • Define arrhythmia • Describe abnormal sinus rhythms	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 526) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 09,Page 179,180-189) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 12, Page 143)((Chapter 13, Page 157)	1.https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/ 2.https://youtu.be/6Lrptve KYus 4. https://www.medicalnewstoday.com/articles/8887#definition	1. C1 2. C1 3. C1 4. C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Congestive cardiac failure	Explain the characteristics and functions of monocytes. • Explain monocyte-macrophge system; importance	• Ganong's Review of Medical Physiology.25TH Edition.Section 01,Immunity,Infection and Inflammation(Chapter 03, Page 67) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 03, Blood(Chapter 21,Page 371)(Chapter 22,Page 387) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 06. (Chapter 34, Page 450-452)	1. https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system 2.https://bmcbiol.biomedcentral.com/articles/10.1186/ s12915-017-0392-4	1.C2 2.C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

Long term regulation of blood pressure	1. Explain the role of kidneys in long term regulation of blood pressure	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 16,page 282) Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 19, Page 229)	1. https://youtu.be/5S9xEpAd AgA 2. https://jps.biomedcentral.com/articles/10.1007/s12576- 012-0192-0 3. https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x	C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Skeletal muscle blood flow,	1. Discuss the blood flow regulation in skeletal muscle at rest and during exercise.	Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 30, Page 549)	1. https://www.sciencedirect.com/topics/medicine-and- dentistry/muscle-blood- flow	C2	SDL	MCQ SEQ VIVA VOCE
Cardiovascular changes during exercise		Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 178) Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 07,Page 148) Textbook of Medical Physiology by Guyton & Hall.14th Edition.. (Chapter 18, Page 226)(Chapter 21,Page 259)	2. https://youtu.be/H6Fd8sfE2 eQ			MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

(OFF CAMPUS): Introduction to CVS	• 1. Describe scheme of circulation through the heart and body	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Cardiovascular Physiology(Chapter 14,Page 469) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 117) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 02,(Chapter 05,Page 101)	**1.** https://youtu.be/28CYhgjr BLA **2.** https://training.seer.cancer.gov/anatomy/cardiovascular/#:~:text=The%20cardiovascular%20system%20is%20sometimes,arteries%2C%20veins%2C%20and%20capillaries.	1.C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Classification of blood vessels & Biophysical considerations	1.Enumerate Classification of blood vessels. 2.Explain structure and functions of types of blood vessels	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,Cardiovascular Physiology (Chapter 31, Page 567,571) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15,Page 513) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 119) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 04 (Chapter 15,Page 183)	**1.** https://youtu.be/ar2_UPiGz mU **2.** https://training.seer.cancer.gov/anatomy/cardiovascular/blood/classification.html	1.C1 2. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

Regulation of blood flow	1.Define and describe Resistance to Blood flow Describe regulation of Blood pressure and Poiseuilles law • Describe factors related with Blood viscosity and its role in regulation	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,Cardiovascular Physiology (Chapter 31, Page 575) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 02(Chapter 5,Page 107)(Chapter 6,page 110) • Textbook of Medical Physiology by Guyton & Hall.14th Edition..Section 04. (Chapter 14, Page 173) (Chapter 17, Page 205)	1. https://youtu.be/cocB- M3h9k0 2. https://journals.physiology.org/doi/full/10.1152/advan. 00074.2010	1.C1 2.C1 3.C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Introduction to ECG & its clinical importance	• Enumerate and describe normal components of ECG • Draw normal ECG • Describe the method of recording ECG • Describe the following. Bipolar limb leads. • Describe Einthovians law and Enthovian triangle. • Describe Chest leads and Augmented unipolar limb leads • Describe how to read normal ECG • Describe the principles of vectorial analysis of ECG.	• Ganong's Review of Medical Physiology.25TH Edition.Section 01,Immunity,Infection and Inflamma tion(Chapter 29, Page 522) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 491) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Chapter 09,Page 170) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 11, Page 135)	1. https://youtu.be/SEFhbK8Z Cgk 2. https://my.clevelandclinic.org/health/diagnostics/16953 -electrocardiogram-ekg	C1 C1 C1 C1 C1 C1 C1 C1 C1 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
	• Describe the vectorial analysis of normal ECG					

Vectorial analysis & arrhythmias	• Describe the principles of vectorial analysis of ECG. • Describe the vectorial analysis of normal ECG • Define arrhythmia • Describe abnormal sinus rhythms	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 526) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 09,Page 179,180-189) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 12, Page 143)((Chapter 13, Page 157)	1. https://www.brainkart.com/ article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/ 3. https://youtu.be/6Lrptve KY us 2. https://www.medicalnewstoday.com/articles/8887#def inition	C1 C1 C1 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Ca c cycle	• Describe the cardiac cycle in detail • Enumerate and explain its events • Explain the events of cardiac cycle	• Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 03. (Chapter 9, Page 117)	1. https://youtu.be/XbivIaFPo QI 2. https://www.sciencedirect.com/science/article/pii/S001 0027721003309 3. https://youtu.be/sLLLOaZ8 5Lk 4. https://teachmephysiology. com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/ 5. https://youtu.be/HNkwXZS SssU	C1 C1/C2 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

Splanchnic circulation, cutaneous circulation	• Describe the Physiologic anatomy of cerebral blood flow • Describe the blood flow in normal state and local control of blood flow	• Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 173) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 7,page 146)	1. https://youtu.be/hr6oGuW7 mVA 2. https://www.sciencedirect.c om/topics/medicine-and-dentistry/splanchnic-blood-flow 3. https://www.ncbi.nlm.nih.g ov/pmc/articles/PMC29992 90/	1.C2 2. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Regulation of blood pressure	1. Explain short term regulation of blood pressure • Explain central nervous system ischemic response & cushing reaction	• Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 32, Page 585,590) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15,Page 517,528) • Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 18,Page 217)	1. https://youtu.be/HUf1LtkPj 1k 2. https://www.sciencedirect.c om/topics/nursing-and- health-professions/blood-pressure-regulation 3. https://www.cliffsnotes.co m/study-guides/anatomy- and-physiology/the-cardiovascular-system/control-of-blood- pressure	1.C2 2. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

Practicals				
Topic	**Learning Objectives At The End Of Practical Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Blood Pressure atrest and during exercise	• Define B. P	C1	Skill Lab	OSPE Viva
	• Detail study of apparatus	P		
	• How to use apparatus	P		
	• Indentify changes in blood pressure during exercise	P		
Examination of arterial pulse andJVP	• Importance of radial pulse & JVP	C1	Skill Lab	OSPE Viva
	• Procedure	P		
	• Various characteristic of pulse	P, C2		
ECG	• Detail study of ECG leads	C2	Skill Lab	OSPE Viva
	• How to apply leads	P		
	• Recording	P		
	• Discussion about normal ECG	P, C2		
	• Clinical importance	C2		
Clinical examinationof chest (Heart sounds)	• Inspection	P	Skill Lab	OSPE Viva
	• Palpation	P		
	• Auscultation of all areas of heart	P		
	• Locate apex beat	P		
CPR	• Steps of CPR	P	Skill Lab	OSPE Viva
	• Importance of CPR in daily life	C2, P		
Triple Response	• Steps of Examination	P	Skill Lab	OSPE Viva
	• Clinical Importance	C2		

Biochemistry				
Theory				
Topic	**Learning Objectives At the end of lecture students should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Definition and Biological importance of lipids.	• Define lipids	C1	LGIS	MCQs SAQs Viva
	• Classify lipids	C2		

	• Describe Biomedical significance of lipids	C2		
Fatty acids	• Classify fatty acids	C1	LGIS	MCQsSAQs Viva
	• Describe physical and chemical properties of fatty acids	C2		
Simple lipids	• Elaborate Structure and physical properties of Triglycerides	C2	LGIS	MCQsSAQs Viva
	• Discuss Chemical properties of Triglycerides and their clinical significance	C2		
Compound lipids (Phospholipids, glycolipids, lipoproteins)	• Classify compound lipids • Discuss structure and functions of compound lipids • Interpret the clinical role of compound lipids	C2 C2 C3	LGIS	MCQsSAQs Viva
Derived lipids	• Describe derived lipids	C2	LGIS	MCQsSAQs Viva
Cholesterol	• Describe Structure and physical properties of Cholesterol • Discuss Chemical properties and functions • Interpret clinical findings of hypercholesterolemia	C2 C2 C3	LGIS	MCQsSAQs Viva
Prostaglandins	• Classify Prostaglandins • Describe functions and clinical significance of Prostaglandins. • Interpret the role of drugs in prostaglandin synthesis	C2 C2 C3	LGIS	MCQsSAQs Viva
Carbohydrate Chemistry				
Introduction and classification of carbohydrates	• Classify carbohydrates • Explain different types of carbohydrates and their clinical significance	C2 C2	LGIS	MCQsSAQs Viva
Isomerism, optical activity and mutarotation	• Discuss Different properties of carbohydrates (Isomerism, optical activityand mutarotation)	C2	LGIS	MCQsSAQs Viva

Monosaccharide	• Classify monosaccharide • Describe chemical properties of monosaccharide • Interpret the clinical role of sorbitol, mannitol and cardiac glycosides	C2 C2 C3	LGIS	MCQsSAQs Viva
Disaccharides	• Describe Structure and functions of Individual sugars	C2	LGIS	MCQs SAQs Viva
Homopolysaccharides	• Explain Structure, physical and chemical properties of homopolysaccharide and their biological importance.	C2	LGIS	MCQs SAQs Viva
Heteropolysaccharides	• Explain Structure, physical and chemical properties of heteropolysaccharides and their biological importance. • Apply the role of heteropolysaccharides in clinical cases	C2 C3	LGIS	MCQs SAQs Viva

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction of lipidsand carbohydrates	• Classify lipids and carbohydrates	C1	SGD	MCQs,SAQs Viva
	• Discuss importance of lipids and carbohydrates	C2		
Fatty acids	• Classify fatty acids	C1	SGD	MCQsSAQs Viva
	• Describe physical and chemical properties of fatty acids	C2		
Cholesterol	• Describe Structure and physical properties ofCholesterol	C2	SGD	MCQsSAQs Viva
	• Discuss Chemical properties and functions	C2		
	• Interpret clinical findings of hypercholesterolemia	C3		
Heteropolysaccharides	• Explain Structure, physical and chemical properties of heteropolysaccharides and their biological importance. • Apply the role of heteropolysaccharides in clinicalcases	C2C3	SGD	MCQsSAQs Viva

Topic	Learning Objectives At the end of lecture students should be able to	References
Protein chemistry		
Classifications andfunctions of carbohydrates	• Classify carbohydrates • Explain different types of carbohydrates and their clinicalsignificance	• Textbook of Lippincott 8th Edition Chapter No.7 pg 92,93 • Text Book of Harper 32 S T Editionchap No. 15 pg 141, 142 ,144 ,147
Classifications andfunctions of lipids	• Define lipids • Classify lipids • Describe Biomedical significance of lipids	• Textbook of Harper 32 S T Edtion Chapter No.21 pg 196
Fatty acids and simplelipids	• Classify fatty acids • Describe physical and chemical properties of fatty acids • Elaborate Structure and physical properties ofTriglycerides • Discuss Chemical properties of Triglycerides and theirclinical significance	• Textbook of Lippincott 8th Eidtion Chapter No.15 pg 196 -199
Classification and Chemical reactions ofmonosaccharide	• Classify monosaccharide • Describe chemical properties of monosaccharide • Interpret the clinical role of sorbitol, mannitol and cardiacglycosides	• Text Book of Harper 32 S T Editionchap No.15 pg 142, 145
Disaccharides	• Describe Structure and functions of Individual sugars	• Text book of Harper 32 S T EditionChap No.15 pg 145, 156
Compound lipids	• Classify compound lipids • Discuss structure and functions of compound lipids • Interpret the clinical role of compound lipids	• Textbook of Lippincott 8th Eidtion Chapter No. 21 pg 199-202
Prostaglandins	• Classify Prostaglandins • Describe functions and clinical significance ofProstaglandins. • Interpret the role of drugs in prostaglandin synthesis	• Textbook of Lippincott 8th Eidtion Chapter No. 17 pg 236 • Text Book of Lehninger 7th Editionchap No. 10.3 pg 375,376
Heteropolysaccharides	• Explain Structure, physical and chemical properties ofheteropolysaccharides and their biological importance. • Apply the role of heteropolysaccharides in clinical cases	• Textbook of Lippincott 8th Eidtion Chapter No. 14 pg 173-175 • Text Book of Harper 32 S T EditionChap No.15 pg 147 ,148

Practicals				
Topic	**Learning Objectives At The End Of Practical Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Carbohydrates	• Perform Tests for the detection of carbohydrates and reducing sugars(Molisch's test)	P	Skill lab	OSPE
Carbohydrates	• Perform Tests for the detection of carbohydrates and reducing sugars(Benedict's tests)	P	Skill lab	OSPE
Carbohydrates	Perform Tests for differentiation between Mono and disaccharides; Aldo and ketosugars (Barford's and Salvinoff's test)	P	Skill lab	OSPE
Carbohydrates	• Perform Iodine test	P	Skill lab	OSPE

Basic and Clinical Sciences (Vertical Integration)

Anatomy, Physiology & Biochemistry			
Theory			
Subjects	**Topics**	**At the end of the session the student should be able to**	**Learning Domains**
Anatomy	• Cardiac Temponade	Apply basic knowledge of subject to study clinical case.	C3
	• Coarctation of Aorta	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• Pitting edema	Apply basic knowledge of subject to study clinical case	C3
	• Palpitations / Tachycardia	Apply basic knowledge of subject to study clinical case	C3
Biochemistry	• Atherosclerosis	Apply basic knowledge of subject to study clinical case.	C3
	• Heparin/dextran	Apply basic knowledge of subject to study clinical case.	C3

Community Medicine				
Theory				
Topic	**Learning Objectives** **At the end of lecture students should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Risk factorsof coronaryvascular disease	• Students should be able to identify and explain the major risk factors for coronary vascular disease, including lifestyleand genetic factors, and how they contribute to the development of the condition.	C1, C2	LGIS	MCQ
	• Students should be able to describe the common symptomsof coronary vascular disease and outline effective prevention strategies, including lifestyle modifications andmedical interventions.	C2, C3		

Pediatrics				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Murmurs	• Differentiate between cyanotic and acyanotic congenital heart diseases on the basis of clinical features	C2	LGIS	MCQs

Pharmacology				
Theory				
Topic	**Learning Objectives** **At the end of lecture students should be able to**	**Learning Domain**	**Teaching Strategy**	**AssessmentTool**
Clinical Pharmacology of Anti hypertensivedrugs	• Students should be able to explain the mechanisms of action of different classes of antihypertensive drugs, such as ACE inhibitors, beta-blockers, and calcium channel blockers, and how they lower blood pressure.	C2	LGIS	MCQ
	• Students should be able to assess the therapeutic uses of various antihypertensive drugs and identify common side effects and contraindications associated with each class of medication.	C2		

Pathology				
Theory				
Topic	**Learning Objectives** **At the end of lecture students should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Edema	• Define edema	C1	LGIS	MCQ
	• Classify edema	C2		
	• Discuss pathophysiology of edema with clinical correlation	C2		

Medicine				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Hypertension	• Define Hypertension	C1	LGIS	MCQs
	• Discuss various causes and grades.	C2		
	• Explain the clinical presentation.	C2		
	• Compare between primary and secondary hypertension.	C2		
	• Enlist the lab investigations to be done for hypertension.	C2		
	• Discuss the treatment plan of hypertension.	C2		
Overview of acutecoronary syndrome	• Discuss ACS and its various causes.	C2	LGIS	MCQs
	• Illustrate the clinical presentation of ACS.	C2		
	• Explain the workshop to be done in E.R for ACS	C2		
	• Discuss the treatment of ACS	C2		
Management ofheart failure	• Discuss the stepwise management of heart failure.	C2	LGIS	MCQs
Management ofshock	• Discuss the management according to various types of shock.	C2	LGIS	MCQs

Obstetrics & Gynecology				
Theory				
Topic	**At The End Of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**AssessmentTool**
Cardiovascular changes in pregnancy, common cardiac diseases	• Understand physiological changes in cardiovascular system during pregnancy (incl. plasma volume, stroke volume, cardiac output, blood pressure)	C2	LGIS	MCQs
	• Know physiological versus pathological symptoms related to CVS	C2		
	• Briefly describe clinical presentations of common cardiac diseases during pregnancy (rheumatic heart disease, cardiomyopathy, cardiac failure)	C2		
	• The effect of cardiac disease on fetus and the mother	C2		
Hypertensive disorders in	• Define gestational hypertension	C1	LGIS	MCQs
	• Describe the spectrum of hypertensive disordersduring pregnancy with proper definitions	C2		
	• Comprehend pathophysiology of these disorders	C2		
	• Know clinical presentation of hypertensive disorders	C2		
	• Justify relevant laboratory investigations	C2		
	• Understand principles of management	C2		
	• Enlist maternal and fetal complications	C2		

Eye				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Retinal changes inhypertension	• Define hypertensive retinopathy	C1	LGIS CBL	MCQs
	• Describe stages of hypertensive retinopathy	C2		
	• Explain pathophysiology of hypertensive retinopathy	C2		

Radiology				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Chest radiograph withperspective of cardiovascular system	• Interpret normal x-rays of Chest	C2	LGIS	MCQs
	• Discuss radiological features of different structures in chest	C2		

Spiral Courses

Content

- **Longitudinal Themes**
    - **The Holy Quran Translation**
    - **Family Medicine**
    - **Behavioral Sciences & Biomedical Ethics**
    - **Early Clinical Exposure (ECE)**

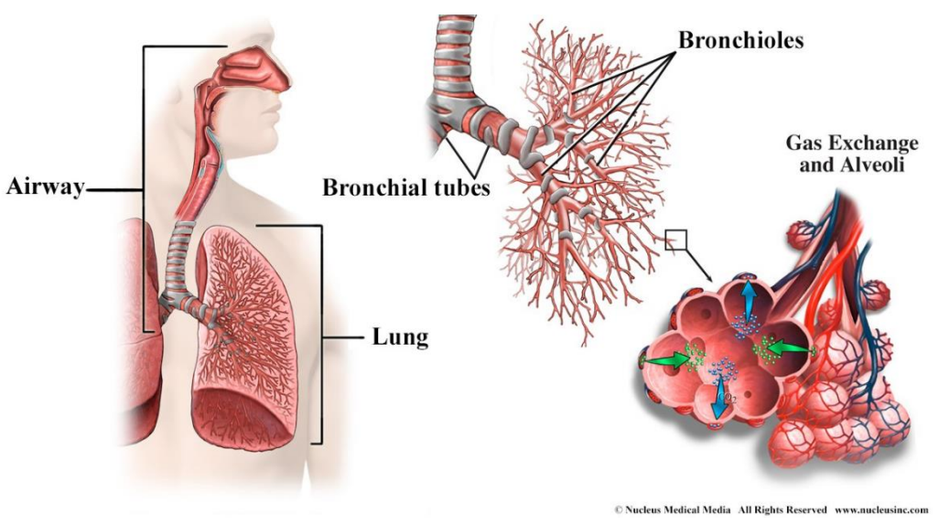
Behavioral Sciences & Biomedical Ethics				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Sociology & Health	• The student should be able to understand sociology & health, social groups, social classes & child rearing practice	C1, C2	LGIS	MCQS
Anthropology & Health	• The student should be able to understand culture & its influence on health care	C1, C2	LGIS	MCQS

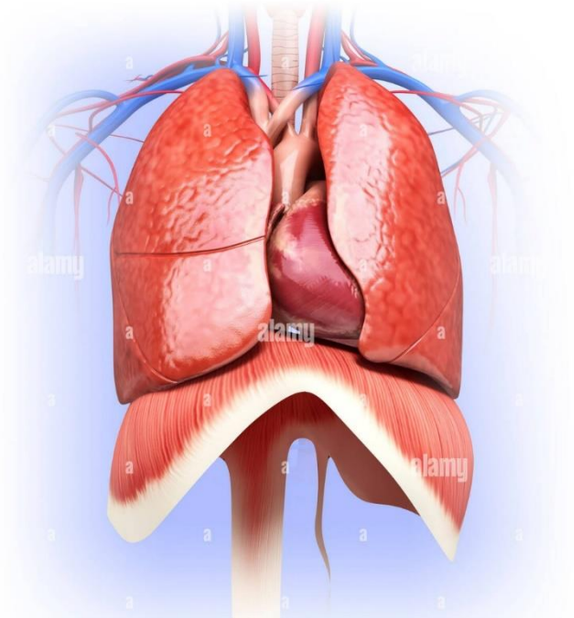
Family Medicine				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Approach to a patientwith chest pain	• Describe chest pain	C1	LGIS	MCQs
	• Discuss various causes	C2		
	• Explain the clinical presentation.	C2		
	•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

Block-III

Module No. 6 - Respiratory System

Duration 4 Weeks





Respiratory Module Team

Module Name	:	Respiratory Module
Duration of module	:	04 Weeks
Coordinator	:	Dr. Rahat
Co-coordinator	:	Dr. Qurat ul Ain
Reviewed by	:	Module Committee

Module Committee		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar
2.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf
3.	Director DME	Prof. Dr. Ifra Saeed
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar
5.	Chairperson Biochemistry	Dr. Aneela Jamil
6.	Focal Person Anatomy First Year MBBS	Asso. Prof. Dr. Mohtashim Hina
7.	Focal Person Physiology	Dr. Sidra Hamid
8.	Focal Person Biochemistry	Dr. Aneela Jamil
9.	Focal Person Pharmacology	Dr. Zunera Hakim
10.	Focal Person Pathology	Dr. Asiya Niazi
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom
13.	Focal Person Quran Translation Lectures	Dr. Uzma Zafar
14.	Focal Person Family Medicine	Dr. Sadia Khan

Module Task Force Team		
1.	Coordinator	Dr. Rahat (Senior Demonstrator of Physiology)
2.	DME Focal Person	Dr. Farzana Fatima
3.	Co-coordinator	Dr. Qurat ul Ain (Senior Demonstrator of Anatomy)
4.	Co-Coordinator	Dr. Almas Ejaz (Demonstrator Biochemistry)
5.	Co-coordinator	Dr. Fareed Ullah Khan (Senior Demonstrator Physiology)

DME Implementation Team		
1.	Director DME	Prof. Dr. Ifra Saeed
2.	Assistant Director DME	Dr. Farzana Fatima
3.	Implementation Incharge 1st & 2nd Year MBBS	Prof. Dr. Ifra Saeed Dr. Farzana Fatima Dr. Saira Aijaz
4.	Editor	Muhammad Arslan Aslam

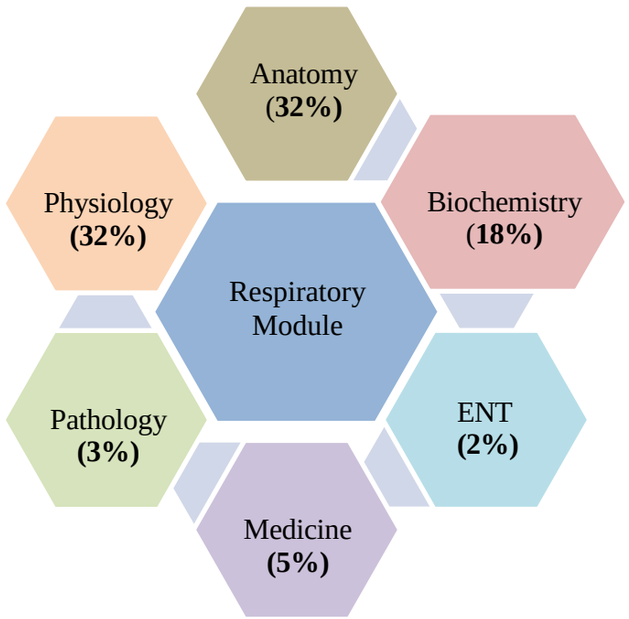
Themes					
Block	**Module**	**General Anatomy**	**Embryology**	**Histology**	**Gross Anatomy**
III	• Anatomy		• Embryology of Respiratory System	Histology of Upper & Lower • Respiratory System	• Gross Anatomy of Upper & Lower Respiratory System
	• Biochemistry	• pH, Electron transport chain, Oxidative phosphorylation, Water soluble vitamins riboflavin, biotin, pyridoxine, pantothenic acid, Normal acid base regulation			
	• Physiology	• Pulmonary Ventilation, Pulmonary Volumes and Capacities, Alveolar Ventilation, Functions of the Respiratory Passageways • Pulmonary Circulation, Pulmonary Edema, Physical Principles of Gas Exchange; Diffusion of Oxygen and Carbon Dioxide Through the Respiratory Membrane Transport of Oxygen and Carbon Dioxide in Blood and Tissue Fluids • Regulation of Respiration • Useful Methods for Studying Respiratory Abnormalities, Respiratory Insufficiency, Hypoxia & Oxygen Therapy, Hypercapnia & Artificial Respiration Respiratory changes during Exercise, Aviation, Space & Deep-Sea Diving Physiology			
	Spiral Courses				
	• The Holy Quran Translation	• Immaniat- V & VI • Ibaadat-V			
	• Artificial Intelligence	• Artificial Intelligence basic concepts			
	• Family Medicine	• Approach to a patient with cough hemoptysis & shortness of breath			
	• Climate Change & Health	• Effects of Climate Changes on Body Systems (IHD, Skin Diseases & Heat Stroke) • Effects of Climate Changes on Respiratory System (Asthma, COPD, Allergies & Cancers) • Greenhouse effect • Global warming and climate change			
	• Bioethics Professionalism & Behavioral Sciences	• Crises intervention and disaster Conflict resolution and empathy			
	Vertical Integration				
	• Medicine	• Tuberculosis			
	• Pathology	• Clinical disorders of Respiration			
	• ENT	• Foreign body nose & ear &Tonsillitis			
	Early Clinical Exposure (ECE)				
	• Medicine	• Dyspnea Observe/see patients			
		• Cyanosis & see Asthma case COPD cases			

		• Tuberculosis cases with fibrosis of lungs
	• Surgery	• See cases of Flail chest & Pneumothorax • Chest intubation
	• Radiology	• Radiology of chest • Chest X-ray at different level with reference to Anatomy and Pathologies
	Clinical Relevance	
	• Obstructive Lung Diseases • Pneumonia • Pathophysiology and Management of Asthma • Mechanisms and Clinical Presentation of COPD • Diagnosis and Initial Management of Pulmonary Embolism • Respiratory Distress Syndrome in Newborns • Pneumonia: Causes, Symptoms, and Treatment • Hypoxemia: Mechanisms and Clinical Manifestations • Clinical Presentation of Tuberculosis (TB) and Its Management • Acid-Base Disorders in Respiratory Failure (e.g., respiratory acidosis) • Clinical Features of Pleural Effusion and Its Diagnosis • Chronic Bronchitis: Pathology and Treatment	

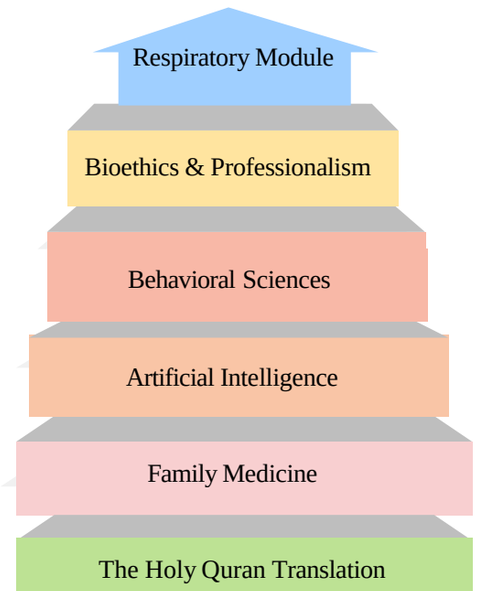
Implementation of Terms of Reference (TORS)

- Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are predefined as per the guidelines of PMDC and to be strictly followed.
- The hours mentioned within each module are the mandatory minimum required.
- The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. However, the level of cognition can be kept at a higher level.
- The Table of Specifications provided will be used for the three papers of the first professional examination.
- The same table of specifications should be used for the respective block exams for internal assessment.
- The criteria defined for continuous internal assessment is to be followed for each module and block respectively

Integration of Disciplines in Respiratory Module



Spiral / General Education Cluster Courses (8%)



Module No. 6 - Respiratory

Rationale: A respiratory system's function is to allow gas exchange. The space between the alveoli and the capillaries, the anatomy or structure of the exchange system, and the precise physiological uses of the exchanged gases vary depending on the organism. In humans' respiratory system include airways, lungs, and the respiratory muscles. Molecules of oxygen and carbon dioxide that are passively exchanged, by diffusion, between the gaseous external environment and the blood. This exchange process occurs in the alveolar region of the lungs.

In this present module has been designed to unfold structural organization function congenital anomalies and diseases of respiration. It explains the anatomy, control, gases exchange, reflexes of respiratory system. It also helps to include the radiological examination of the respiratory system.

Module Outcomes

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

Knowledge:

1. Integrate the basic science knowledge with clinical sciences in order to describe the pathogenesis, clinical presentations of common respiratory disorders, e.g. COPD
2. Use technology based medical education including
   Artificial Intelligence.
3. Appreciate concepts & importance of **Family Medicine**
   Biomedical Ethics
   Research.

Skill:

1. Describe the gross anatomy of mediastinum along with clear understanding of structures present in it.
2. Correlate between histological structure of respiratory membrane and its role in diffusion of gases.

Attitude:

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

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Syllabus of Respiratory System (Module No. 6)

Anatomy				
Theory				
Topic	**Learning Objectives** **At the end of lecture students should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Respiratory system 1 (Histology)	• Explain division of the respiratory system	C2	LGIS	MCQ SAQ VIVA
	• Describe different functions of respiratory system.	C2		
	• Describe details of respiratory epithelium	C2		
	• Discuss microscopic structure of vestibule	C2		
	• Describe structural specialization in mucosa of nasal cavity proper	C2		
	• Appreciate differences between respiratory mucosa and olfactory mucosa	C1		
	• Describe the features of olfactory mucosa	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Respiratory system II (Histology)	• Describe microscopic structure of paranasal sinuses	C2	LGIS	MCQ SAQ VIVA
	• Describe general histological organization of respiratory system	C2		
	• Appreciate different histological layers of nasopharynx	C1		
	• Describe histological structure of laryngeal cartilages	C2		
	• Discuss components of tracheal wall	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		

	• Read a research article	C3		
Respiratory System III (Histology)	• Describe division of bronchial tree	C2	LGIS	MCQ SAQ VIVA
	• Discuss microscopic structure of extra and intra pulmonary bronchi	C2		
	• Describe histological structure of bronchioles	C2		
	• Appreciate differences between bronchi and bronchioles Discuss microscopic structure of terminal bronchioles	C1		
	• Appreciate the significance of Clara cells with their functions	C2		
	• Discuss other cells present in terminal bronchioles	C2		
	• Describe the microscopic structure of respiratory bronchioles	C2		
	• Describe differences between respiratory and terminal bronchioles Describe characteristics of alveolar ducts	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Respiratory System IV (Histology)	• Describe histological structure of alveolar ducts and their functions	C2	LGIS	MCQ SAQ VIVA
	• Identify type 1 and type II alveolar cells	C1		
	• Describe histological structure of interalveolar septum	C2		
	• Discuss role of alveolar macrophages	C2		
	• Describe Blood – Air barrier in detail	C2		
	• Discuss histology of pleura in detail	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		

	• Read a research article	C3		
Development of Nose and Paranasal sinuses	• Describe role of pharyngeal arches in development of nose	C2	LGIS	MCQ SAQ VIVA
	• Describe development of nose and paranasal sinuses	C2		
	• Describe the Congenital anomalies of nose and paranasal sinuses	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Development of Larynx & Trachea	• Describe formation of respiratory primordium	C2	LGIS	MCQ SAQ VIVA
	• Describe the role of pharyngeal arches in development of larynx	C2		
	• Discuss formation of laryngotracheal diverticulum	C2		
	• Describe formation of trachea esophageal septum and its importance	C2		
	• Describe Congenital defects associated with development of Trachea	C3		
	• Describe formation and division of respiratory buds	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
	• Discuss development of bronchi and bronchopulmonary segments	C2	LGIS	MCQ SAQ VIVA
	• Describe development of pleural cavities	C2		
	• Discuss process of maturation of lungs	C2		
	• Enlist different stages of lung maturation	C1		
	• Explain the production and significance of Surfactant	C2		

Development of Lungs	• Describe role of fetal breathing movements in maturation of lungs	C2		
	• Discuss postnatal development of lungs	C2		
	• Describe congenital anomalies associated with lungs	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Development of Diaphragm	• Describe the development of diaphragm	C2	LGIS	MCQ SAQ VIVA
	• Elaborate formation of septum transversum and its role in development of diaphragm	C2		
	• Discuss congenital defects associated with diaphragm	C3		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Nose & Paranasal Sinuses	• Describe anatomy of nasal cavity	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Describe the blood supply and the site of anastomosis in the nose.	C2		
	• Discuss the nerve supply of nose	C2		
	• Discuss the applied and the related clinical.	C3		
	• Define and enumerate para nasal sinuses.	C1		
	• Discuss the shape, location and their point of openings.	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		

	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Larynx & Trachea	• Enumerate the components of larynx	C1	Skill Lab	MCQ SAQ Viva OSPE
	• Describe paired and unpaired cartilages of larynx Describe Intrinsic and extrinsic muscles of larynx (origin, insertion nerve supply and action).	C2		
	• Describe Intrinsic and extrinsic membrane (attachments and structure piercing the membranes).	C2		
	• Discuss the movements of vocal cords and their effects on the voice and respiration.	C2		
	• Discuss the blood supply and nerve supply of larynx.	C2		
	• Discuss the applied and the related clinical.	C3		
	• Describe the level of commencement of trachea, its termination and the tracheal cartilages.	C2		
	• State the level of division of trachea	C1		
	• Describe in detail the nerve supply and blood supply of trachea.	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Overview of Thoracic wall	• Enumerate the bones of the thorax.	C1	Skill Lab	MCQ SAQ Viva OSPE
	• Describe and classify the typical ribs (side determination, features, attachments, relations, types and ossification.	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Skeleton of thoracic wall (Ribs)	• Describe and classify the atypical ribs (side determination, features, attachments, relations, types and ossification.	C2		MCQ SAQ Viva OSPE
	• Differentiate between typical and atypical ribs.	C2		
	• Discuss costal cartilages and their attachments.	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		

	• Practice the principles of Bioethics	C3	Skill Lab	
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Skeleton of thoracic wall (Sternum)	• Identify different parts of sternum.	C1	Skill Lab	MCQ SAQ Viva OSPE
	• Describe the bony features, attachments ossification of sternum	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Joints of thoracic wall	• Classify the joints of the thorax.	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Discuss the type, ligaments and relations of the joints of the thorax (Manubriosternal, xiphisternal, costoverterbal, costotransverse, costochondral, chondrosternal, • interchondral and intervertebral joints).	C2		
	• Discuss the components functions of the intervertebral disc.	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Thoracic apertures	• Discuss the boundaries, shape and structure passing through superior thoracic aperture (viscera, blood vessels, nerve and muscles)	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Describe the thoracic inlet syndrome.	C3		
	• Discuss the boundaries, shape and structures passing through the inferior thoracic aperture.	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Intercostal spaces /	• Discuss the thoracic wall.	C2		MCQ SAQ
	• Describe the intercostals muscles (origin, insertion, direction of fibers, nerve supply and actions.	C2		

Movements of thoracic wall	• Discuss in detail the formation, branches, distribution and the related clinical of the intercostals nerves.	C3	Skill Lab	Viva OSPE
	• Explain the formation, course, relations, distribution and branches of the thoracic sympathetic trunk.	C2		
	• Differentiate between the typical and atypical intercostals space.	C1		
	• Compare the typical and atypical intercostals space.	C2		
	• Describe the types and axis of movements of vertebral column (flexion, extension, lateral flexion and rotation).	C2		
	• Define the respiratory movements on the basis of principles, factors and the different types (pump handle, bucket handle and piston).	C1		
	• Discuss the related physiological and pathological changes occurring (related to age movement etc).	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
	• Describe the small and large openings in the diaphragm (vertebral level, location, formation, structures passing through and effects on the openings and structures by the diaphragmatic contraction).	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Vessels and lymphatics of thoracic wall	• Explain the arterial supply of intercostals space (anterior / posterior, parent vessels, branches, course, relations and termination).	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Differentiate between the arterial supply of typical and atypical intercostal space with the related clinicals.	C3		
	• Explain the venous drainage of the intercostal spaces (anterior / posterior, parent vessels, tributaries, course, relations and termination).	C2		
	• Differentiate between the venous drainage of typical and atypical intercostal space with the related clinicals	C3		
	• Correlate the clinical conditions	C3		

	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Innervation of Thoracic Wall	• Discuss the origin of intercostal nerves.	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Discuss course of nerves.	C2		
	• Discuss branches and related area supplied by these	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Pleura	• Discuss visceral and parietal pleura	C2	Skill Lab	MCQ SAQ Viva OSPE
	• Discuss the pleural recesses and pleural cavity.	C2		
	• Describe the nerve and blood supply of pleura.	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
Lungs	• Identify the features of right and left lung.	C1	Skill Lab	MCQ SAQ Viva OSPE
	• Discuss the bronchopulmonary segments and their clinical significance	C3		
	• Discuss and differentiate between the root of lung and the hilum of lung.	C2		
	• Describe the nerve plexuses related to the lungs.	C2		
	• Explain the blood supply of lungs	C2		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
	• Identify heart borders	P1		MCQ SAQ
	• aortic knuckle,	P1		
	• costophrenic angles,	P1		

Surface Marking	• cardio phrenic angles,	P1	Skill Lab	Viva OSPE
	• domes of diaphragm,	P1		
	• counting of ribs	P1		
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		

Topics Of SDL	Learning Objective	References
Nose, paranasal sinuses, larynx, and trachea	• Describe anatomy of nasal cavity	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 395, 396, 973, 974, 978, 979) https://youtu.be/UPrY8JqXYCc https://youtu.be/IDBYF2i9vqU https://www.ncbi.nlm.nih.gov/books/NBK513272/
	• Describe the blood supply and the site of anastomosis in the nose.	
	• Discuss the nerve supply of nose	
	• Discuss the applied and the related clinical.	
	• Define and enumerate para nasal sinuses.	
	• Discuss the shape, location and their point of openings.	
	• Clinical significance with surgical interventions.	
	• Enumerate the components of larynx	
	• Describe paired and unpaired cartilages of larynx Describe Intrinsic and extrinsic muscles of larynx (origin, insertion nerve supply and action).	
	• Describe Intrinsic and extrinsic membrane (attachments and structure piercing the membranes).	
	• Discuss the movements of vocal cords and their effects on the voice and respiration.	
	• Discuss the blood supply and nerve supply of larynx.	
	• Discuss the applied and the related clinical.	
	• Describe the level of commencement of trachea, its termination and the tracheal cartilages.	
	• State the level of division of trachea	

	• Describe in detail the nerve supply and blood supply of trachea. • Correlate the clinical aspects • Read relevant research article • Use digital library	
Skeleton of thoracic wall	• Describe and classify the atypical ribs (side determination, features, attachments, relations, types and ossification. • Differentiate between typical and atypical ribs. • Discuss costal cartilages and their attachments. • Discuss the applied and the related clinicals. • Identify different parts of sternum. • Describe the bony features, attachments ossification of sternum • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 299). https://youtu.be/PoA-Uq9w-7s https://www.ncbi.nlm.nih.gov/books/NBK557710/
Movements of thoracic wall and Intercostal spaces	• Discuss the thoracic wall. • Describe the intercostals muscles (origin, insertion, direction of fibers, nerve supply and actions. • Discuss in detail the formation, branches, distribution and the related clinical of the intercostals nerves. • Explain the formation, course, relations, distribution and branches of the thoracic sympathetic trunk. • Differentiate between the typical and atypical • intercostals space. • Compare the typical and atypical intercostals space. • Describe the types and axis of movements of vertebral column (flexion, extension, lateral • flexion and rotation). • Define the respiratory movements on the basis of • principles, factors and the different types (pump handle, bucket handle and piston). • Discuss the related physiological and pathological changes occurring (related to age movement etc). • Correlate the clinical aspects	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 306, 307, 308). https://youtu.be/NwDxbNqEVaA https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4534848/

	• Read relevant research article • Use digital library	
Anatomy of diaphragm	• Describe the small and large openings in the diaphragm (vertebral level, location, formation, structures passing through and effects on the openings and structures by the diaphragmatic contraction). • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 297, 313, 314, 391, 396, 397, 412, 455, 457, 521, 523). https://youtu.be/6IK-YHK1ToM https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5184786/
Pleura	• Discuss visceral and parietal pleura • Discuss the pleural recesses and pleural cavity. • Describe the nerve and blood supply of pleura. • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 333, 334, 335, 336). https://youtu.be/66PR3IYWb0A https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332049/
Lungs	• Identify the features of right and left lung. • Discuss the bronchopulmonary segments and their clinical significance • Discuss and differentiate between the root of lung and the hilum of lung. • Describe the nerve plexuses related to the lungs. • Explain the blood supply of lungs • Correlate the clinical aspects • Read relevant research article • Use digital library	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 337-347). https://youtu.be/66PR3IYWb0A https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332049/

Practicals				
Topic	**Learning Objectives At The End Of Practical Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Olfactory /Nasal mucosa	• Identify microscopic structure of respiratory and nasal mucosa under microscope.	P1	Skills Lab	OSPE
	• Illustrate histological structures of olfactory / nasal mucosa	C1		
	• Write two points of identification	C1		
Epiglottis	• Identify types of cells and epithelium of epiglottis under microscope	P1	Skills Lab	OSPE
	• Illustrate histological structure of epiglottis.	C1		
	• Write two points of identification	C1		
Trachea	• Identify microscopic structure of trachea.	P1	Skills Lab	OSPE
	• Illustrate microscopic structure of trachea.	C1		
	• Write two points of identification	C1		
Lungs	• Identify microscopic structure of, bronchi, terminal bronchiole, respiratory bronchiole, alveoli, alveolar duct of the respiratory tract on the basis of ○ Types of epithelial cells present ○ Relative amount of gland, cartilage, smooth muscles and connective tissue fibers present in wall of the tubes.	P1	Skills Lab	OSPE
	• Illustrate microscopic structure of different layers of respiratory passages.	C1		
	• Write points of identification of each part	C1		

Physiology						
Theory						
Topics	**Learning Objectives**	**References**	**Learning Resources**	**Learning Domains**	**Learning Strategy**	**Assessment Tools**
Mechanics of pulmonary ventilation, Lung compliance	• Enumerate muscles of inspiration and expiration and • Describe mechanics of pulmonary ventilation • Describe surfactant, surface tension and collapse of alveoli • Define compliance. • Draw compliance diagram of lungs. • Explain relationship of surface tension, radius of alveoli, elastic forces of lungs with compliance	• Ganong's Review of Medical Physiology.25TH Edition. Section 06, Respiratory Physiology (Chapter 34, Page 621,629) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Mechanics of Breathing (Chapter 17,Page 569) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 189,197) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 36,Page 581) ,(Chapter 40,Page 629) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 38, Page 491,493)	**1.**https://www.ncbi.nlm.nih.gov/book s/NBK538324/ **2.**https://youtu.be/B TwgmMfqOW4	C1 C1 C1 C1 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Pulmonary circulation & Pulmonary capillary dynamics. Physical principles of gas exchange & diffusion through respiratory membrane	• Discuss the role of alveoli and pleural space in respiration and pressure changes during respiration • Enlist non-respiratory and respiratory functions of respiration • Define and explain the concept of respiratory membrane. • Define and draw respiratory unit • Draw a diagram showing the exchange of gases through the respiratory membrane • Enlist four factors affecting the rate of gas diffusion through the respiratory membrane • Define diffusing capacity of respiratory membrane. • Describe the diffusing capacity for oxygen. • Describe the diffusing capacity for carbon dioxide. • Describe the changes in diffusing capacity of oxygen and carbon dioxide during exercise • Compare the diffusing capacities of oxygen and carbon dioxide	• Ganong's Review of Medical Physiology.25TH Edition.Section 06,Respiratory Physiology (Chapter 34, Page 626,633,635) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Mechanics of Breathing (Chapter 17,Page 574) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 209) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 37,Page 592) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 39, Page 503) (Chapter 40, Page • 511,515)	1.https://youtu.be/aJPwUn ZtycQ 2. https://youtu.be/zv1fDFn 8BaM 3. https://pressbooks-dev.oer.hawaii.edu/biology/chapter/gas-exchange- across-respiratory-surfaces/ 4.https://www.sciencedirect.com/science/article/pii/S2666496822000194.	C2 C1 C1 C1 C1 C1 C1 C1 C1 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Pulmonary volumes, capacities & functions of respiratory tract	• Define lung volumes and capacities. • Define the four pulmonary volumes and capacities. • Enlist normal values of all the lung volumes and capacities • Draw a graph representing all the lung volumes and capacities. • Describe how lung volumes and capacities can be measured with spirometer. • Enlist the lung volumes and capacities which can't be measured by spirometer	• Ganong's Review of Medical Physiology.25TH Edition.Section 06,Respiratory Physiology (Chapter 34, Page 628) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Mechanics of Breathing (Chapter 17,Page 578) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 191) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter • 38, Page 495)	1. https://youtu.be/9VdHhD1vcDU 2. https://teachmephysiology.com/respiratory-system/ventilation/lung-volumes/	C1 C1 C1 C1 C1 C1	LGIS	M MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Transport of oxygen	• Describe in detail the transport of oxygen from lungs to tissues	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 35, Page 639) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Gas Exchange and Transport (Chapter 18, Page 599) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 210,213,216) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 38,Page 603) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter • 41, Page 521)	1. https://teachmephysiology.com/respirator y-system/gas-exchange/oxygen- transport/ 2. https://youtu.be/HU6 LQldvog	C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Ventilation perfusion ratio	• Define And Explain importance. • Draw ventilation perfusion diagram Explain the concept of physiologic shunt and dead space	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 34, Page 636) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Mechanics of Breathing (Chapter 17, Page 587) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 194,225,229) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 39,Page 612) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter • 38, Page 497)	1. https://youtu.be/UKsOLb5XWa0 2. https://teachmephysiology.com/respirator y-system/gas-exchange/ventilation -perfusion/	C1/C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE,

Oxygen hemoglobin dissociation curve	Describe the role of hemoglobin in oxygen transport. Draw oxy-hemoglobin dissociation curve. Enlist and explain factors which shift the curve towards right and left. • Briefly explain the transport of oxygen in plasma	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 35, Page 639-641) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Gas Exchange and Transport (Chapter 18, Page 608) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 218) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 41, Page 524)	1. https://www.science direct.com/topics/nur sing-and-health-professions/oxygen-dissociation-curve https://youtu.be/MU Kkv1rbOIM	C1 C1 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Lung function test	Describe all the non-invasive & invasive tests to assess the pulmonary functions	• Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Mechanics of Breathing (Chapter 17, Page 592) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter • 44, Page 553)	1. https://www.webmd. com/lung/types-of- lung-function-tests 2. https://youtu.be/6dH VhEjzj64	C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Transport of CO_2	Enumerate and explain the various transport forms of carbondioxide in blood.Also state percentages of all these forms Explain the carbondioxide dissociation curve Define respiratory exchange ratio. Describe haldanes effect ,bohr effect and chloride shift	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 35, Page 641) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 223) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. Section 05,(Chapter 38,Page 606) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter • 41, Page 528)	1. https://courses.lumen learning.com/wm-biology2/chapter/tra nsport-of-carbon-dioxide-in-the-blood/ 2. https://youtu.be/Vgp NSdWvrno	C1 C2 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Respiratory abnormalities (COPD, Tuberculosis, Pneumonia, Atelectasis)	Explain the physiologic peculiarities of chronic pulmonary emphysema, pneumonia, ateiectasis, asthma and tuberculosis	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 36, Page 664) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 43, Page 541)	1. https://www.phys io-pedia.com/Respir atory_Disor ders 2. https://yout u.be/S rKfsCdeqW c 3. https://yout u.be/h	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

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Nervous regulation of respiration	• Describe term respiratory center. • Enumerate the various respiratory centers. • Give the anatomical location of respiratory centers	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 36, Page 655) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Gas Exchange and Transport (Chapter 18, Page 614) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 231) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05(Chapter 41,Page 646) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter • 42, Page 531)	1. https://youtu.be/_KNAKKNbq20 2. https://teachmephysiology.com/respiratory-system/regulation/neural-control-ventilation/	C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Hypoxia, hypercapnia, cyanosis	• Define hypoxia and hypercapnia. Enumerate and explain its various types. • Enumerate the roles of oxygen therapy in different types of hypoxia	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 35, Page 646,650) • Physiology by Linda S. Costanzo 6th Edition.Respiratory Physiology (Chapter 5,Page 239) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,,(Chapter 41,Page 653) (Chapter 42,Page 662) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter • 43, Page 546)	1. https://youtu.be/w tn--qgs3Fg 2. https://www.verywellhealth.com/hypoxia-types-symptoms-and- causes-2248929	C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Chemical regulation of respiration & exercise changes	• Describe in detail the role of respiratory centers in the regulation of respiration. • Explain chemical control of respiration in detail • Describe changes in respiration during	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 36, Page 657,664) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section	1. https://youtu.be/gR_RLgo9Vn0 2. https://journals.physiology.org/doi/abs/10.1152/	C1 C2 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

	exercise. Enumerate and briefly explain factors which affect respiration. • Describe briefly the mechanism of periodic breathing and sleep apnea	05,(Chapter 41,Page 649) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 42, Page 533,536)	physr			
Space physiology	• Define and explain the process of acclimatization to low oxygen tension • Describe acute and chronic mountain sickness • Describe the effects of acceleratory forces on body in aviation and space physiology	• Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 42,Page 659,663) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 44, Page 553)	1. https://youtu.be/NFfHh_rQZJE 2. https://www.physoc.org/careers/research/space-physiology/	C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Miscellaneous factors affecting respiration (concept of voluntary control of respiration, lung J receptor, brain edema, anesthesia, chyne stokes breathing, sleep apnea)	• Describe in detail the role of respiratory centers in the regulation of respiration. • Explain chemical control of respiration in detail • Describe changes in respiration during exercise. Enumerate and briefly explain factors which affect respiration. • Describe briefly the	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 36, Page 662) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 41,Page 656) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 42,	1. https://www.physoc.org/careers/research/ space-physiology/ 2. https://www.brainkart.com/article/Factors-Affecting-Respiration_16533/		LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

	mechanism of periodic breathing and sleep apnea	Page 538)				
High altitude physiology	• Describe the effects of low oxygen pressure on body • Enumerate the acute effects of hypoxia on body • Define and explain the process of acclimatization to low oxygen tension • Describe acute and chronic mountain sickness Describe the effects of acceleratory forces on body in aviation and space physiology	Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 35, Page 648) • Physiology by Linda S. Costanzo 6th Edition.Respiratory Physiology (Chapter 5,Page 237) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 42,Page 659) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter • 44, Page 553,556,559)	1. https://youtu.be/6KHQGS4jJyI 2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2151 873/	C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Deep sea physiology	• Discuss Effect of high partial pressure of individual gasses on the body • Discuss Oxygen toxicity at high pressure Carbon dioxide toxicity at high pressure Explain in detail the process of decompression in deep sea divers	• Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 42, page 665) Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 44, Page 553)	1. https://medicoapps.org/m-physiology-of- deep-sea-diving/ 2. https://youtu.be/eeNMkPam9aU	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Topics	Learning Objectives	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Physiology of unusual environment	• Define and explain the process of acclimatization to low oxygen tension • Describe acute and chronic mountain sickness • Describe the effects of acceleratory forces on body in aviation and space physiology	• Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 42,Page 659,663) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 44, Page 553)	1. https://youtu.be/Nff Hh_rQZJE 2. https://www.physoc.org/careers/research/ space-physiology/	C1 C1 C1	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Mechanics of pulmonary ventilation & compliance (Second week)	• Enumerate muscles of inspiration and expiration and • Describe mechanics of pulmonary ventilation • Describe surfactant, surface tension and collapse of alveoli • Define compliance. • Draw compliance diagram of lungs. • Explain relationship of surface tension, radius of alveoli, elastic forces of lungs with compliance	• Ganong's Review of Medical Physiology.25TH Edition.Section 06,Respiratory Physiology (Chapter 34, Page 621,629) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Mechanics of Breathing (Chapter 17,Page 569) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 189,197) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 36,Page 581) ,(Chapter 40,Page 629) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. • (Chapter 38, Page 491,493)	• https://www.ncbi.nlm.nih.gov/books/NBK538324/ 3. https://youtu.be/BTwgmMfqOW4	C1 C1 C1 C1 C1 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Ventilation perfusion ratio & regulation of respiration (Second week)	• Define And Explain importance. Draw ventilation perfusion diagram Explain the concept of physiologic shunt and dead space	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 34, Page 636) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Mechanics of Breathing (Chapter 17, Page 587) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 194,225,229) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 39,Page 612) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 38, Page 497)	• https://youtu.be/U KsOLb5XWa0 • https://teachmephysiology.com/respiratory-system/gas-exchange/ventilation-perfusion/	1. C1/C2 C1	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Topics Of SDL	Learning Objective	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Mechanics of pulmonary ventilation, Lung compliance	• Enumerate muscles of inspiration and expiration and • Describe mechanics of pulmonary ventilation • Describe surfactant, surface tension and collapse of alveoli • Define compliance. • Draw compliance diagram of lungs. 1. Explain relationship of surface tension, radius of alveoli, elastic forces of lungs with compliance	• Ganong's Review of Medical Physiology.25TH Edition.Section 06,Respiratory Physiology (Chapter 34, Page 621,629) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Mechanics of Breathing (Chapter 17,Page 569) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 189,197) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 36,Page 581) ,(Chapter 40,Page 629) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 38, Page 491,493)	**1.** https://www.ncbi.nlm.nih.gov/books/NBK538324/ **2.** https://youtu.be/BTwgmMfqOW4	C1 C1 C1 C1 C1 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
Pulmonary circulation & Pulmonary capillary dynamics. Physical principles of gas exchange & diffusion through respiratory membrane	• Discuss the role of alveoli and pleural space in respiration and pressure changes during respiration • Enlist non-respiratory and respiratory functions of respiration • Define and explain the concept of respiratory membrane. • Define and draw respiratory unit • Draw a diagram	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 34, Page 626,633,635) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Mechanics of Breathing (Chapter 17, Page 574) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5, Page 209) • Physiological Basis of Medical Practice by Best & Taylor's.13th	1. https://youtu.be/aJPwUnZtycQ 2. https://youtu.be/zv1fDFn8BaM 3. https://pressbooks-dev.oer.hawaii.edu/biology/chapter/gas-exchange-across-respiratory-surfaces/ https://www.sciencedirect	C2 C1 C1 C1 C1 C1 C1 C1 C1 C1 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST

	showing the exchange of gases through the respiratory membrane • Enlist four factors affecting the rate of gas diffusion through the respiratory membrane • Define diffusing capacity of respiratory membrane. • Describe the diffusing capacity for oxygen. • Describe the diffusing capacity for carbon dioxide. • Describe the changes in diffusing capacity of oxygen and carbon dioxide during exercise • Compare the diffusing capacities of oxygen and carbon dioxide	Edition.Section 05,(Chapter 37,Page 592) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 39, Page 503) • (Chapter 40, Page 511,515)	4. .com/science/article/pii/S2 666496822000194			based Assessment) OSPE SDL Evaluation
Pulmonary volumes, capacities & functions of respiratory tract	• Define lung volumes and capacities. • Define the four pulmonary volumes and capacities. • Enlist normal values of all the lung volumes and capacities • Draw a graph representing all the lung	• Ganong's Review of Medical Physiology.25TH Edition.Section 06,Respiratory Physiology (Chapter 34, Page 628) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Mechanics of Breathing (Chapter 17,Page 578) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 191) • Textbook of Medical Physiology by	https://youtu.be/9VdHhD1vcDU https://teachmephysiology.com/respiratory-system/ventilation/lung-volumes/	C1 C1 C1 C1 C1 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment)

	volumes and capacities. • Describe how lung volumes and capacities can be measured with spirometer. • Enlist the lung volumes and capacities which can't be measured by spirometer	Guyton & Hall.14th Edition. (Chapter 38, Page 495)				OSPE SDL Evaluation
Transport of oxygen	• Describe in detail the transport of oxygen from lungs to tissues	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 35, Page 639) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Gas Exchange and Transport • (Chapter 18, Page 599) • Physiology by Linda S. Costanzo 6th Edition. Respiratory Physiology (Chapter 5,Page 210,213,216) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 38,Page 603) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 41, Page 521)	1. https://teachmephysiology.com/respiratory-system/gas-exchange/oxygen-transport/ 2. https://youtu.be/HU6_LQldvog	C1	SDL	MCQ SEQ VIVA VOCE

Chemical regulation of respiration & exercise changes	• Describe in detail the role of respiratory centers in the regulation of respiration. • Explain chemical control of respiration in detail • Describe changes in respiration during exercise. Enumerate and briefly explain factors which affect respiration. • Describe briefly the mechanism of periodic breathing and sleep apnea	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 36, Page 657,664) • Physiology by Linda S. Costanzo 6th Edition.Respiratory Physiology (Chapter 5,Page 233,235) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,(Chapter 41,Page 649) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 42, Page 533,536)	1. https://youtu.be/gR_RLgo9Vn0 2. https://journals.physiology.org/doi/abs/10.1152/physrev.1925.5.4.551?jo 3. urnalCode=physrev	C1 C2 C1 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
Hypoxia, hypercapnia, cyanosis	• Define hypoxia and hypercapnia. Enumerate and explain its various types. • Enumerate the roles of oxygen therapy in different types of hypoxia	• Ganong's Review of Medical Physiology.25TH Edition.Section 06, Respiratory Physiology (Chapter 35, Page 646,650) • Physiology by Linda S. Costanzo 6th Edition.Respiratory Physiology (Chapter 5,Page 239) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 05,,(Chapter 41,Page 653) (Chapter 42,Page 662) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. (Chapter 43, Page 546)	1. https://youtu.be/wtn--qgs3Fg 3. https://www.verywellhealth.com/hy poxia-types-symptoms-and-causes-2248929	C1 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation

Practicals					
Topic	**Learning Objectives**	**Reference**	**Learning Domains**	**Learning Strategy**	**Assessment Tools**
Measurement of different lung volume & capacities with the help of spirometer	• Description of its various parts • Importance of spirometer for measurements of various volumes • Define various lung volumes & capacity • How to measure them	Practical Notebook of Physiology First year MBBS by Dr Saqib Sohail	C1/C3 A3 P3	Practicals /skill lab	Viva Voce Ospe Video Assissted Assessment
Recording of normal and modified movement of respiration (Stethography)	• Introduction to stethography • How to use it and its clinical importance	Practical Notebook of Physiology First year MBBS by Dr Saqib Sohail	C1/C3 A3 P3	Practicals /skill lab	Viva Voce Ospe Video Assissted Assessment
Clinical examination of chest for respiration	• Detail introduction and explanation about inspection • Palpation • Percussion • Auscultation	Practical Notebook of Physiology First year MBBS by Dr Saqib Sohail	C1/C3 A3 P3	Practicals /skill lab	Viva Voce Ospe Video Assissted Assessment

Biochemistry				
Theory				
Topic	**Learning Objectives** **At the end of lecture students should be able to**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
PH And PKA	• Define of pH and pKa	C1	LGIS	MCQs SAQs Viva
	• Elaborate Henderson Hasselbalch equation.	C2		
	• Describe Measurement of pH by equation.	C2		
Body buffers	• Define buffers.	C1	LGIS	MCQs SAQs Viva
	• Discuss Mechanism of various buffers in maintenance of blood pH.	C2		
Electron transport chain	• Describe Components/ complexes of electron transport chain.	C2	LGIS	MCQs SAQs Viva
	• Enlist Enzymes and Co-enzymes of each component.	C1		
	• Enlist Inhibitors of these complexes.	C1		
Mechanisms of energy generation in the body.	• Discuss various mechanisms of energy generation in the body.	C2	LGIS	MCQs SAQs Viva
	• Discuss Oxidative phosphorylation.	C2		
	• Describe uncouplers.	C2		

Energy change.	• Define the terms:
	  ○ Free energy change.
	  ○ Standard free energy.
		C1	LGIS	MCQs SAQs
				Viva

	• Describe various sources of electrons.	C2		
Vitamins	• Define Vitamins • Discuss the distribution, daily requirement and deficiency of vitamins • Clinical indication of vitamins	C1 C2 C2	LGIS	MCQs SAQs Viva
Xenobiotics	• Define xenobiotics • Discuss its metabolism and its role in environment	C1 C2	LGIS	MCQs SAQs Viva

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Body buffers	• Define buffers.	C1	SGD	MCQs SAQs Viva
	• Discuss Mechanism of various buffers in maintenance of blood PH.	C2		
Electron transport chain	• Enlist Components/ complexes of electron transport chain.	C1	SGD	MCQs SAQs Viva
	• Describe Enzymes and Co-enzymes of each component.	C2		
	• Discuss Inhibitors of these complexes.	C2		
Mechanisms of energy generation in the body.	• Describe various mechanisms of energy generation in the body.	C2	SGD	MCQs SAQs Viva
	• Discuss Oxidative Phosphorylation.	C2		
	• Describe uncouplers of ETC.	C2		
Vitamin	• Define Vitamins • Discuss the distribution, daily requirement and deficiency of vitamins • Clinical indication of vitamins	C1 C2 C2	SGD	MCQs SAQs Viva

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
HH equation	• Define of pH and pKa	C1	SDL	MCQs SAQs Viva
	• Elaborate Henderson Hasselbalch equation.	C2		
	• Describe Measurement of pH by equation.	C2		
Role of Chemical Buffers in pH regulation	• Define buffers.	C1	SDL	MCQs SAQs Viva
	• Discuss Mechanism of various buffers in maintenance of blood pH. • Elaborate the carbonic acid-bicarbonate buffer system	C2		
pH meter and physiological buffers in pH regulation	• Measure the pH of solution in Pharmaceutical, Chemical, and Biotechnology Industry	C2	SDL	MCQs SAQs Viva
	• Elaborate the Bicarbonate and Phosphate system of Buffers and intracellular and extracellular proteins	C1		
		C1		
	• Discuss Vitamin B_6, used as a dietary supplement	C2		MCQs SAQs

Vitamin Pyridoxine	• Describe its deficiency and related clinical disorders	C2	SDL	Viva
		C2		
Xenobiotics	• Define xenobiotics • Discuss its metabolism and its role in environment	C1 C2	SDL	MCQs SAQs Viva

Practicals				
Topic	**Learning Objectives** **At The End Of Practical Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Henderson Hassel batch equation	Illustrate Henderson Hassel batch equation. Measure pH by equation.	P	Skill lab	OSPE
Buffers	Illustrate buffer actions and buffer zone.	P	Skill lab	OSPE
pH meter	Measure the acidity or basicity of water-based solutions	P	Skill lab	OSPE

Basic and Clinical Sciences (Vertical Integration)

Anatomy, Physiology & Biochemistry			
Clinical Themes			
Subject	**Topic**	**Learning Objectives** **At the end of the lecture the student should be able to**	**Learning Domain**
Anatomy	• Lung's cancer	Apply basic knowledge of subject to study clinical case.	C3
	• Chest trauma	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• Wheeze/Stridor	Apply basic knowledge of subject to study clinical case.	C3
	• Crib Death	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• CBL-ABGs	Apply basic knowledge of subject to study clinical case.	C3
	• CBL – uncouplers	Apply basic knowledge of subject to study clinical case.	C3

Pathology				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Clinical disorders of Respiration:	• Discuss Pneumonia in detail.	C1	LGIS	MCQs
	• Discuss Tuberculosis in detail.	C1		
	• Discuss Cystic fibrosis in detail.	C1		
	• Discuss Respiratory Failure Incidence in detail.	C1		
	• Discuss Sign and symptoms in detail.	C1		
	• Discuss Pathophysiology in detail.	C1		

Surgery				
Theory				
Topic	**At The End Of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Chest Deformities (Congenital)	• **Describe:** • Various chest deformities & congenital malformations	C2	LGIS	MCQs
	• Significance of deformities	C2		
	• General and operative management outline	C2		
Pneumothorax	• **Describe:** • Various types of Pnuemothorax	C2	LGIS	MCQs
	• Causes	C2		
	• Signs and symptoms Significance of tension pneumothorax	C2		
	• Emergency and definitive management	C2		
Hemothorax	• Describe: • Various types of Hemothorax	C2	LGIS	MCQ
	• Causes of Hemothorax	C2		
	• Signs and symptoms of Hemothorax	C2		
	• Emergency and definitive management			
Pleural effusion	• Describe: • Definition	C1	LGIS	MCQ
	• Causes	C2		
	• Signs &symptoms • General and operative management outlines	C2		

ENT				
Theory				
Topic	**At The End Of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Tonsillitis	• Define tonsillitis	C1	LGIS CBL	MCQs
	• Enlist the causes of tonsillitis	C1		
	• List the clinical features of tonsillitis	C2		
	• Enumerate the management of tonsillitis	C1		
Foreign body nose & ear	• Classify foreign bodies	C1	LGIS CBL	MCQs
	• Enumerate emergency situations for removal.	C2		

Medicine				
Theory				
Topic	**At the End Of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Tuberculosis	• Discuss TB.	C2	LGIS	MCQs
	• Discuss its diagnostic Criteria.	C2		
	• Describe How to treat a patient with TB.	C2		
Drowning & Strangulation	• Discuss How to manage a patient with drowning and strangulation.	C2	LGIS	MCQs

Spiral Courses

Content

- **Longitudinal Themes**
    - **The Holy Quran Translation**
    - **Behavioral Sciences & Biomedical Ethics**
    - **Climate Change & Health & Community Medicine**
    - **Artfifiial Intelligence (AI)**
    - **Family Medicine**
    - **Early Clinical Exposure (ECE)**

Behavioral Sciences & Biomedical Ethics				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Crises intervention and disaster	• To be able identify crises situations and learn the means to cope with them during disasters either natural or man made	C1 C2	LGIS CBL	MCQS
Conflict resolution and empathy	• To be able to identify crises situations and using empathy how to deal with these situations arising in clinical practice	C2	LGIS CBL	MCQS

Climate Change & Health & Community Medicine				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Air and Ventilation Air composition & indices of thermal comfort	• At the end of the session the students will be able to: • Enlist indices of thermal comfort	C1	LGIS	MCQ
	• Describe the factors responsible for vitiation of air	C2		
Air pollution and its factors	• Define air pollution	C1		
	• Identify sources of air pollution and air pollutants	C1		
Preventive measures to control air pollution	• Demonstrate selection of air sample for analysis	C2		
	• Enumerate the methods to prevent & control of air pollution	C1		
Air purification methods	• Enlist natural and artificial methods of air purification.	C1		
Greenhouse effect	• Describe the greenhouse effect	C2		
	• Enlist greenhouse gases.	C1		
	• Identify sources of greenhouse gases	C1		
Global warming and climate change	• Demonstrate global warming.	C2		
	• Define ozone hole. • Describe link between global warming and climate change	C1 C2		

Artificial Intelligence (AI)				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Artificial Intelligence basic concepts	• To learn the concept of deep and superficial neural networks in AI	C2	LGIS	MCQs

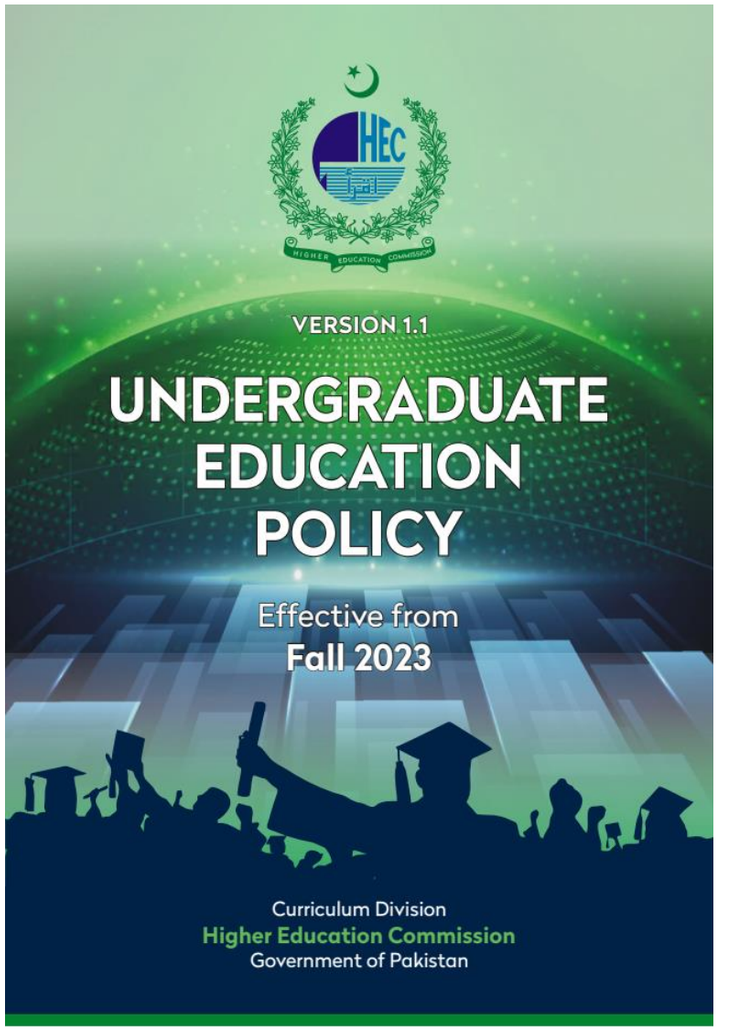
Family Medicine				
Theory				
Topic	**At the End of Lecture Students Should Be Able To**	**Learning Domain**	**Teaching Strategy**	**Assessment Tool**
Approach to a Patient with cough & hemoptysis	• Define cough & hemoptysis.	C1	LGIS	MCQs
	• Discuss differential diagnoses cough & hemoptysis.	C2		
	• When to refer a patient of cough & hemoptysis to pulmonologist	C2		

SECTION-X

Spirally Integrated Courses
HEC General Education Cluster (GEC) Module

Introduction

Preamble



In alignment with the Higher Education Commission's Undergraduate Policy 2023 and the Pakistan Medical and Dental Council's Guidelines 2024, This comprehensive module is designed to enrich the MBBS curriculum with a broad spectrum of interdisciplinary competencies.

The General Education Cluster encompasses essential domains—Leadership, Information Technology, Entrepreneurship, Expository Writing, Art and Humanities, Research, Bioethics, and Quran Translation—integrating these elements into a cohesive learning experience that extends across the five-year MBBS program.

This module is meticulously structured to enhance both professional and personal development, ensuring that medical graduates are not only adept in clinical skills but also well- rounded individuals equipped with a diverse skill set.

Rationale for the General Education Cluster Module

The General Education Cluster Module is conceived to address the multifaceted demands of modern medical education and practice. In accordance with the Higher Education Commission's Undergraduate Policy 2023 and the Pakistan Medical and Dental Council's Guidelines 2024, this module is designed to create a comprehensive educational framework that extends beyond traditional medical training.

he rationale behind this integrative approach includes:

1. Holistic Development: Medicine is a field that requires not only technical proficiency but also leadership, ethical judgment, and effective communication. By incorporating Leadership, Information Technology, Entrepreneurship, Expository Writing, Art and Humanities, Research and Bioethics, and Quran Translation into the curriculum, the module aims to develop well-rounded professionals who excel in both clinical and non-clinical aspects of healthcare.

2. Adaptation to Technological Advancements: The rapid advancement of technology and artificial intelligence is transforming healthcare. Proficiency in Information Technology and AI is crucial for modern medical practitioners to effectively use digital tools, engage in data-driven decision-making, and contribute to innovations in patient care and research.

3. Leadership and Management Skills: Effective leadership and management are essential for navigating the complexities of the healthcare environment. By focusing on leadership skills, the module prepares students to lead teams, manage healthcare systems, and address challenges with strategic vision and ethical integrity.

4. Entrepreneurial Mindset: Entrepreneurship fosters innovation and problem-solving. By integrating entrepreneurial principles into the curriculum, students are encouraged to think creatively, develop new healthcare solutions, and drive positive change in the industry.

5. Enhanced Communication Skills: Expository writing is a fundamental skill for clear and effective communication in medical practice. Mastery of this skill is vital for documenting patient care, conducting research, and engaging in academic discourse.

6. Cultural and Ethical Awareness: The inclusion of Art and Humanities helps students understand the broader human context of medicine, fostering empathy and cultural sensitivity. Concurrently, the continued study of Quran Translation and Islamiyat reinforces the integration of cultural and ethical perspectives with medical practice.

7. Strengthening Research and Bioethics: Advanced knowledge in research methodologies and bioethics ensures that students are well-prepared to conduct and evaluate research ethically, contributing to the advancement of medical science while adhering to high standards of ethical practice.

8. Preparation for a Dynamic Healthcare Environment: The General Education Cluster Module equips students with a diverse skill set necessary to thrive in a rapidly evolving healthcare landscape. It prepares them to be versatile, innovative, and ethical practitioners capable of addressing the multifaceted challenges they will encounter.

In essence, this module represents a strategic response to the evolving needs of the healthcare profession, ensuring that medical graduates are not only technically proficient but also capable of leading, innovating, and communicating effectively in a complex and dynamic field.

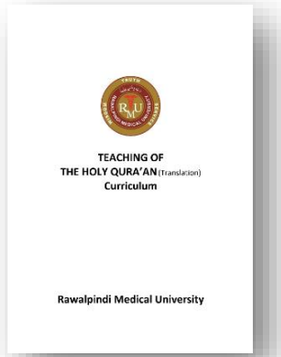
Alignment of RMU Spiral Courses as per HEC Undergraduate Policy 2023 and Guidelines of PMDC 2024

Title	**Hours recommended by HEC/PMDC (to be covered from 1st to 4th year)**	**Teaching hours in RMUCurriculum**
Quran Kareem	50 hours (PMDC)	55 Hours
Bioethics / Professionalism	25 Hours (PMDC)	50 Hours
Leadership	25 Hours (PMDC)	30 Hours
Islamic Studies	2 credit hours (HEC)	17 Hours
Ideology & Constitution of Pakistan/Pakistan Studies	2 credit hours (HEC)25 hours (PMDC)	17 Hours
Quantitative Reasoning/Research	2 credit hours (HEC)100 Hours (PMDC)	120 Hours
Entrepreneurship	2 credit hours (HEC)	50 Hours
Arts and Humanities (Videography)	2 credit hours (HEC)	20 Hours
Expository writing	2 credit hours (HEC)	16 Hours
Applications of information and communication technologies (ICT)	2 credit hours (HEC)25 Hours (PMDC)	25 Hours
Family medicine	----------	30 Hours
Artificial intelligence	----------	25 Hours
Behavioral Sciences	100 Hours (PMDC)	150 Hours

- 1 credit hour = 16 teaching hours
- The minimum requirement for the general education component is 30 credits in all the undergraduate/equivalent degree programs including associate degree. References: undergraduate-policy-2023-1pdf/261474627

The Holy Quran Translation

The Quran Translation Course for undergraduate medical students is designed to deepen students' understanding of the Quran by focusing on the translation of key verses and chapters. This course aims to foster spiritual growth, enhance ethical decision-making, and integrate Islamic values into medical practice. Students will explore themes such as compassion, patience, and justice, which are fundamental to both Islamic teachings and the medical profession. By connecting Quranic principles with their daily work, students can develop a more holistic approach to healthcare, rooted in empathy and moral integrity.



The Holy Quran Curriculum

Lectures Distribution as per Criteria

القرآن بمعہ ترجمعہ برائے جماعت ایم بی بی ایس سال اول تا پنجم											
سال	ایمانیات		عبادات		اخلاقیات		معاملات		معاشرت		کل لیکچرز
	فیصد	لیکچر	فیصد	لیکچر	فیصد	لیکچر	فیصد	لیکچر	فیصد	لیکچر	
سال اول	35	6	29	5	12	2	12	2	12	2	17
سال دوئم	35	6	24	4	18	3	12	2	12	2	17
سال سوئم	24	4	24	4	24	4	18	3	12	2	17
سال چہارم	18	3	12	2	24	4	24	4	24	4	17
سال پنجم	12	2	12	2	29	5	24	4	24	4	17
کل لیکچرز		21		17		18		15		14	85

سال اول

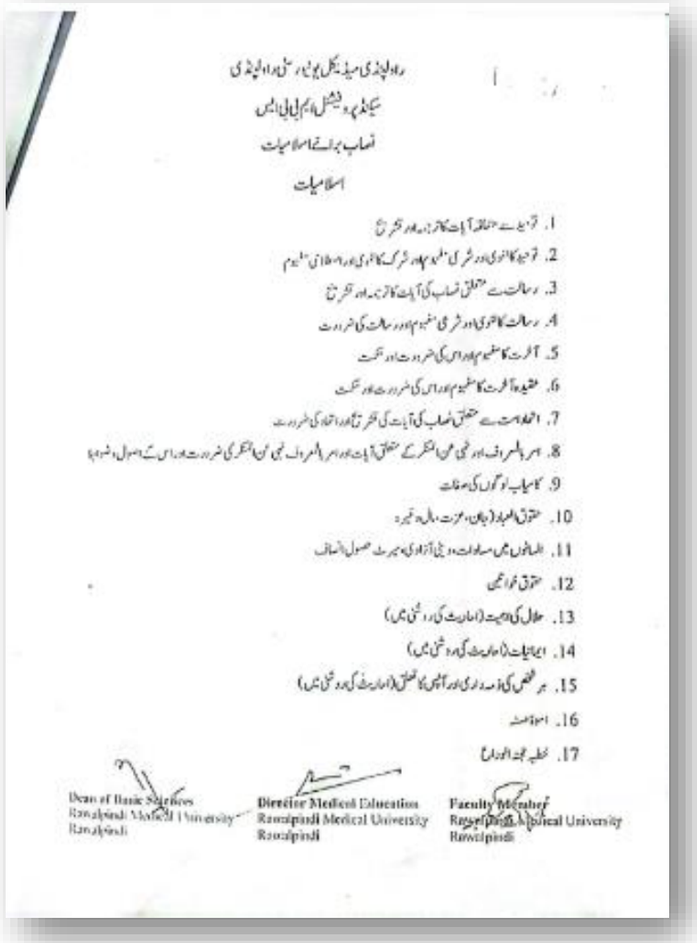
لیکچر نمبر	
1	تعارف قرآن و فضائل قرآن
2	قرآن و میڈیکل سائنس
	ایمانیات
3	قرآن مجید کا خلاصہ مسئلہ توحید کی وضاحت
4	پرہیز گا روں کی صفات جنت اور جہنم کے کچھ مناظر اور جنتی اور جہنمیوں کی باہم گفتگو
5	اللہ تعالی کی دس صفات عضیمہ
6	حضرت عزیر علیہ لسلام اور حضرت ابراہیم علیہ لسلام کا مردوں کے دوبارہ زندہ ہونے کا مشاہدہ
7	حضرت ابراہیم علیہ سلام کا اپنی قوم کو توحید کی دعوت دینے کا خوبصورت انداز
8	رسول اللہ ﷺ کے انسان کامل ہونے کی دلیل اور قیامت کے کچھ احوال اور اللہ تعا لی کی قدرت کے دلائل
	عبادات
9	عبدیت
10	طہارت اور صفائی
11	نماز
12	روزہ
13	زکوٰۃ و صدقات
	اخلاقیات
14	اولاد کی اخلاق تربیت
15	اخلاق حسنہ کے فوائد و فضائل
	معاملات
16	والدین کے حقوق
17	رشتہ داروں اور عام مسلمانوں کے حقوق
	معاشرت
18	پردہ
19	بدکاری اور بدکاری کا الزام

Islamiat

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

Pakistan Studies

The Pakistan Studies Course for undergraduate medical students offers an overview of Pakistan's history, culture, and civic structure. It highlights the country's development and its healthcare challenges, helping students understand the socio-political context of medical practice in Pakistan. The course fosters responsible citizenship and awareness of the role medical professionals play in nation-building.



راولپنڈی میڈیکل یونیورسٹی، سٹی راولپنڈی

سیکنڈ پروفیشنل ایم بی بی ایس

نصاب برائے اسلامیات

اسلامیات

1. توحید سے متعلق آیات کا ترجمہ اور تشریح
2. توحید کا لغوی اور شرعی مفہوم اور شرک کا لغوی اور اصطلاحی مفہوم
3. رسالت سے متعلق نصاب کی آیات کا ترجمہ اور تشریح
4. رسالت کا لغوی اور شرعی مفہوم اور رسالت کی ضرورت
5. آخرت کا مفہوم اور اس کی ضرورت اور حکمت
6. عقیدۂ آخرت کا مفہوم اور اس کی ضرورت اور حکمت
7. اخلاقیات سے متعلق نصاب کی آیات کی تفسیر تاکہ اتحاد کی ضرورت
8. امر بالمعروف اور نہی عن المنکر کے متعلق آیات اور امر بالمعروف نہی عن المنکر کی ضرورت اور اس کے اصول، ضوابط
9. کامیاب لوگوں کی صفات
10. حقوق العباد (جان، عزت، مال وغیرہ)
11. انسانوں میں مساوات، دینی آزادی، جبر کا اصول انصاف
12. حقوق خواتین
13. حلال کی اہمیت (احادیث کی روشنی میں)
14. ایمانیات (احادیث کی روشنی میں)
15. ہر شخص کی ذمہ داری اور آپس کا تعلق (احادیث کی روشنی میں)
16. احسان
17. خطبہ حجۃ الوداع

Dean of Basic Sciences
Rawalpindi Medical University
Rawalpindi

Director Medical Education
Rawalpindi Medical University
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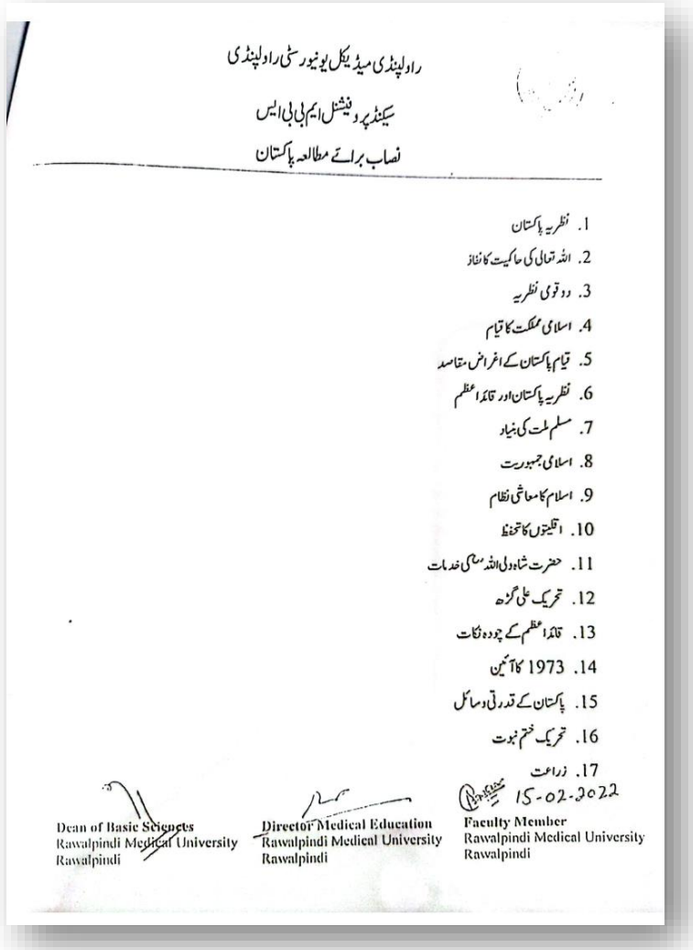
Faculty Member
Rawalpindi Medical University
Rawalpindi

Islammiayat / Pak Studies Curriculum



راولپنڈی میڈیکل یونیورسٹی راولپنڈی

سیکنڈ پروفیشنل ایم بی بی ایس

نصاب برائے مطالعہ پاکستان

1. نظریہ پاکستان
2. اللہ تعالیٰ کی حاکمیت کا نفاذ
3. دو قومی نظریہ
4. اسلامی حکومت کا قیام
5. قیام پاکستان کے اغراض، مقاصد
6. نظریہ پاکستان اور قائداعظم
7. مسلم ملت کی بنیاد
8. اسلامی جمہوریت
9. اسلام کا معاشی نظام
10. اقلیتوں کا تحفظ
11. حضرت شاہ ولی اللہ کی خدمات
12. تحریک علی گڑھ
13. قائداعظم کے چودہ نکات
14. 1973 کا آئین
15. پاکستان کے قدرتی وسائل
16. تحریک ختم نبوت
17. زراعت

15-02-2022

Dean of Basic Sciences
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Rawalpindi

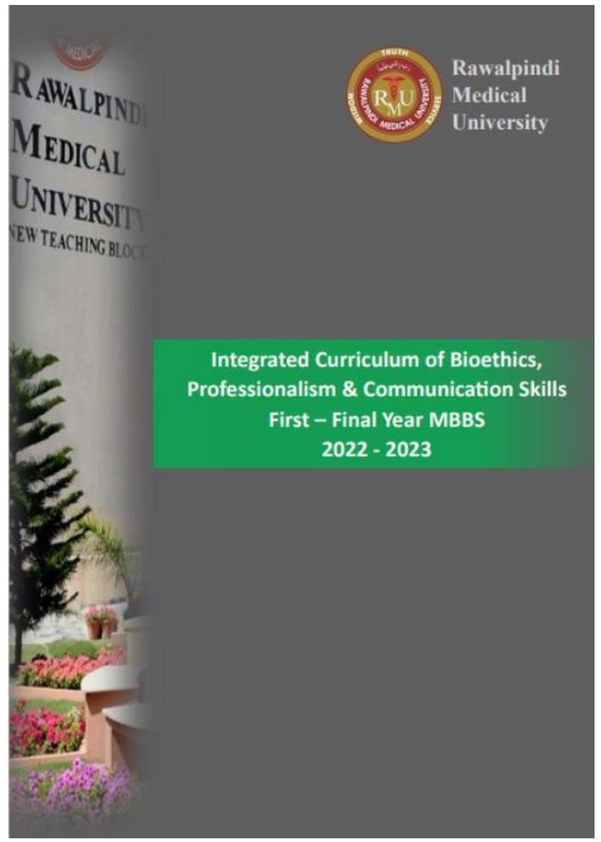
Director Medical Education
Rawalpindi Medical University
Rawalpindi

Faculty Member
Rawalpindi Medical University
Rawalpindi

Bioethics

The Bioethics Curriculum for undergraduate medical students integrates ethics and professionalism as a core, longitudinal theme across all five years of medical education. It aligns with global standards set by organizations like WFME and ACGME, as well as national guidelines from the Pakistan Medical Commission (PMC). The curriculum emphasizes key ethical principles such as patient welfare, autonomy, and social justice, while fostering professionalism, compassion, and accountability in medical practice. This integrated approach aims to develop not only scientifically competent doctors but also ethically responsible and community-oriented physicians.

At Rawalpindi Medical University (RMU), bioethics education includes both theoretical instruction and practical learning, drawing on national resources like the National Bioethics Committee (NBC) of Pakistan and international guidelines such as the WHO Bioethics Curriculum. The curriculum covers critical themes such as the doctor-patient relationship, professional integrity, conflict resolution, and group dynamics, ensuring that students are equipped with the skills necessary for ethical decision-making and compassionate care. Assessment of bioethics is incorporated throughout the program, with a focus on cultivating critical thinking, communication skills, and a humanistic approach to healthcare.



Biomedical Ethics Curriculum

Framework of Bioethics Curricula at Rawalpindi Medical University

Module - I - Foundation Module

Theoretical Component (Integrated Bioethics Method: IBM-1) Theme:

In first year MBBS, Theoretical component (UGBC-1) aims to make new entrants cognizant with historical perspective of Medical ethics. The history of medical ethics developed over centuries, as it has been highlighted that ethics are "…born in scandal and rendered in protectionism. In the allopathic system of medicine, such developments commenced from the time of Hippocrates (the Hippocratic Oath) and over time, it has led to development of several codes. (These include the Helsinki Declaration, World Medical Code and Belmont Report).

Since ethics is context specific entity and influenced by sociocultural and religious perspective, development of bioethics curriculum based on country and religious specific situations is considered very necessary to make teaching of ethics more relevant. Moreover, ethical requirement ethical Code of Conduct & Professionalism as per statutory body PM&DC.

Practical Component (Student Practical Component: SPC-1) Theme

An Empirical Approach towards making undergraduate medical students cognizant about Ethical Dilemma in historical perspective of medical ethics and its relevance in teaching Ethics in the Medical Curriculum. Understand the importance of maintaining animals' rights and dignity while performing animal experimentation. Establish professionalism and Communication skills during Laboratory sessions .Make the students learn how to collaborate with each other to work effectively as team member, how to maintain team dynamics, show mutual respect and complete assigned task in professional manner.

Ethics Curriculum 1st year MBBS

Theoretical Component (Integrated Bioethics Methods -1)					
	Broad Major syllabus Learning objectives	**Teaching strategy topic with sub-topics**		**Assessment tools**	**Suggested reading sources**
	Cognitive Domain				
Introduction to History of Medical Ethics	Discussion will cover; • Introduction to the Hippocratic Oath (5th Century BCE), basis of modern oaths administered to medical graduates • Understand evolution of contemporary bioethics, its characteristics and relevance to research and practice	At the end of the session students should be able to; • Appraise the historical perspective of Hippocratic Oath (5th Century BCE) . **C2** • Understanding the beginnings of Contemporary Bioethics to address ethical dilemmas raised by rapid advances in medical science and biotechnology. **C2**	LGIS 1hr contact session in 2-4 parallel classes will be conducted by Senior Faculty from basic sciences (Anatomy, Physiology & Biochemistry)	1 MCQs of level C1 to C3 in relevant block examination Result / marks obtained will contribute towards Internal assessment (IA) in 1st Prof. MBBS exam.	Guidelines and Teachers Handbook for Introducing Bioethics to Medical and Dental Students http://nbcpakistan.org.pk/as sets/may-16-bioethicsfacilitator-book---may16%2C-2017.pdf Pakistan Medical and Dental Council, and Higher Education Commission, Islamabad. Curriculum of MBBS. Date unknown [cited 2019 Jun 30]. Available from: http://pmdc.org.pk/LinkClick.aspx?fileticket=EKfBIOSDTkE%3d&tabid=102&mid=556 WHO : Module for Teaching Medical Ethics to Undergraduates file:///C:/Users/drkas/Downloads/WHO%20Module%20for%20Teaching%20Medical%20Ethics%20to%20Undergraduate.pdf

Islamic concept of Bioethics	•Islamic concept of Bioethics: Perception, Scope and Application in medical and healthcare	At the end of the session students should be able to; • Enlist 5 principles of medical Ethics. **C1** • Correlate the concept of Islamic principles of medical ethics with its application in medical and healthcare settings .**C2**	LGIS 1hr contact session in 2-4 parallel classes will be conducted by Senior Faculty from basic sciences (Anatomy, Physiology & Biochemistry)	1 MCQs of level C1 to C3 will cover this session teachings in relevant block examination Result / marks obtained will contribute towards Internal assessment (IA) in 1st Prof. MBBS exam.	Regional Committee for the EM/RC52/7 Eastern Mediterranean Islamic code of medical and health ethics https://applications.emro.who.int/docs/em_rc52_7_en.pdf Islam and the four principles of medical ethics Mustafa, Y. (2014). *Islam and the four principles of medical ethics. Journal of Medical Ethics, 40(7), 479–483.* doi:10.1136/medethics-2012-101309 Ahmed AS (1993) Living Islam. (BBC Books, London), pp 21–56.Google Scholar Gatrad AR, Sheikh A Medical ethics and Islam: principles and practice. Archives of Disease in Childhood 2001;84:72-75.

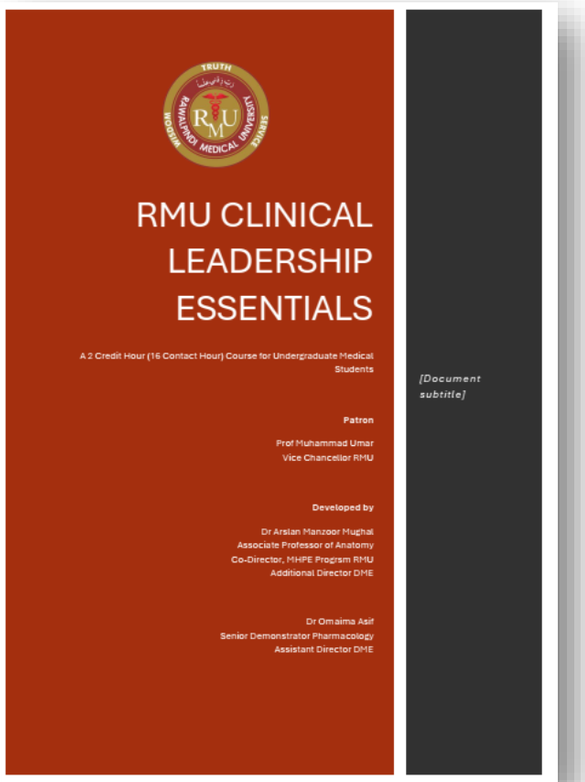
Introduction to Professional Ethics and PM&DC Code of Conduct	Discussion will cover; • Introduction to Professional Ethics and PM&DC Code of Conduct • Purpose of medical code of conduct by Regulatory body PM&DC; covering following subtopics • What Is the 'Professional Ethics and Code of Conduct'? • Why 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 Result / marks obtained will contribute towards Internal assessment (IA) in 1st Prof. MBBS exam.	PMDC Code of Ethics: http://www.pmdc.org.pk/LinkClick.aspx?fileticket=v5WmQYMvhz4%3D&tabid=102&mid=554
History of Medical Ethics	Discussion on History of medical 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	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** • 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.	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 Result / marks obtained will contribute towards Internal assessment (IA) in 1st Prof. MBBS exam.	Guidelines and Teachers Handbook for Introducing Bioethics to Medical and Dental Students http://nbcpakistan.org.pk/assets/may-16bioethics-facilitator-book---may-16%2C-2017.pdf The Nuremberg Code: http://www.hhs.gov/ohrp/archive/nurcode.html 10 WMA Declaration of Helsinki: http://www.wma.net/en/30publications/10policies/b3/

	• General ethical principles including explanation of 04 basic principles of Beneficence, nonmaleficence, respect and justice. - Interpretation research ethics for; Informed consent and confidentiality in research HR	**C2** • Discuss the development of indigenous ethical codes in the SouthEast Asian Region. **C2.** Demonstrate sensitivity to cultural diversity in medical care.**C3**			CIOMS Guidelines: http://www.cioms.ch/publications/layout_guid e2002.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	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) 1 MCQs of level C1 to C3 s in relevant block examination OSPE in practical exam of relevant block examination Result / marks obtained will contribute towards Internal assessment (IA) in 1st Prof. MBBS exam.	- Real life scenarios in form of Case base learning /problem based learning To be share with students one week before the session Introduction to criteria for assessment of behavior, code of conduct and professionalism at RMU
Ethics of research involving animals	• Scientific rationale for using animals in different phases of teachings of medical students	• Understand the importance of maintaining animals rights and dignity while performing animal experimentation	Small group interactive 4-6 interactive parallel sessions	Students seminar/ group presentation OSPE in practical exam of relevant block examination	https://www.nuffieldbioethics.org/wpcontent/uploads/Theethics-of-researchinvolving-animals-fullreport.pdf

Ethical Dilemma	- • Historical perspective of famous ethical dilemmas and its relevance with development of codes and components of contemporary bioethics (an individual components will be expanded/repeated using real cases from historical breaches in ethics)	• Understand the historical perspective of medical ethics and its relevance in development of modern codes and law Explicate the background of ethical codes and importance of ethics in history of health research	Short presentation: Ethical principles in medical practice • Brainstorming: interactive session to identify the potential breaches of ethical principle in medical practice. • Group work: Measures to promote ethical principles in medical practice.	Role plays Video demonstration "The Deadly Deception," Nova video written, produced and directed by Denisce Di Anni, WGBH Boston, 1993 production. [This video is owned by many libraries and is currently distributed by Films for the Humanities and Sciences, P.O. Box 205, Princeton, NJ 08543-2053 https://onlineethics.org/cases/ethics-scienceclassroom/tuskegeesyphilis-study	Cases in Medical Ethics https://www.scu.edu/ethics/focusareas/bioethics/resources/cases-inmedical-ethics-studentled-discussions/ WHO Handbook of Medical Ethics: Part 1/ Chapter 1: Ethics and medical ethics and Chapter 2: Human civilization and medical ethics from WHO Handbook of Medical Ethics, 2009 George J Annas; Michael A Grodin, eds. The Nazi doctors and the Nuremberg Code: human rights in human experimentation, New York: OUP; 1992 Watts J. Tokyo Victims of Japan's notorious Unit 731 sue. Lancet. 2002 August 24; 360 (9333): 628 Final Report of the Tuskegee Syphilis Study Legacy Committee1. University of Virginia Health Systems. 1996.

Leadership & Professionalism

Professionalism in medicine is the foundation of public trust in healthcare providers, encompassing values such as competence, integrity, ethical conduct, and accountability. It involves prioritizing patient welfare, maintaining confidentiality, effective communication, and continuous professional development. Rawalpindi Medical University (RMU) integrates professionalism throughout its curriculum to prepare students for the complexities of healthcare, fostering respect, accountability, and compassion. Through theoretical instruction, practical training, and mentorship, RMU emphasizes ethical conduct and patient-centered care. This approach ensures that graduates are not only skilled but also committed to improving healthcare standards and outcomes with integrity and professionalism.



1st Year MBBS:

Focus: Introduction to Leadership Concepts and Self-Awareness

Interactive Lectures:

Leadership Concepts (1 hour)

Differences between a leader and manager Types of leadership

Leading groups and teams (1 Hour)

Group dynamics Types of team members Roles in teams

Group Leadership Exercise:

Perform various roles (Group leader, Scribe, time keeper etc) in Problem Based Learning teams (1 Hours)

Self-Assessment:

Conduct initial self-assessment using tools like leadership style and Big five personality tests (1 Hour)

Reflective Journaling:

Write online reflections on your experiences

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.

MODULAR CURRICULUM OF BEHAVIOURAL SCIENCES FOR FIRST YEAR MBBS

Institute of Psychiatry

Benazir Bhutto Hospital

Year	LGIS	SDL	CLINICAL ROTATION		Total
1st Year	**12 hours**	**20 hours**	**No clinical rotation**		**32 hours**
2nd Year	8 hours	20 hours	No clinical rotation		28 hours
3rd Year	**12 hours**	**30 hours**	**20 hours** 8am-10:30am 4 days a week, 2 weeks rotation	**28 hours** 2pm -6pm 7 days in 2 weeks rotation	90 hours
Total					**150 hours**

Foundation Module

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Mode of Teaching
Introduction to behavioral sciences	The student should be able • To define bio-psychosocial model of health care • To describe Holistic and Traditional Allopathic medicine. • To obtain information from the patient according to bio-psychosocial model	C1/C2	LGIS
Management of stress	The student should be able • To define stress and its types of stress • To enlist causes of stress • To describe ways to manage stress • To interview a patient suffering from stress	C1/C2	LGIS

MSK-I Module

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Mode of teaching
Healthcare models and their clinical application • **Bio-psychosocial model** • **Integrated health care model** • **Publica health care model**	The student should be able • To define bio-psychosocial model of health care. • To describe Integrated model of healthcare • To describe Public health care model • To describe Holistic and Traditional Allopathic medicine. • To obtain information from the patient according to bio-psychosocial model • Elaborate the importance of health belief model in clinical setting	C1 C2 C2 C1	LGIS
Relevance of ethics in life of a doctor	The student should be able • To demonstrate the scope, meaning • Guiding principles of medical ethics • To address the common ethical issues • To address the common ethical dilemmas in health professional life	C3 C3	LGIS

MSK-II Module

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Mode of Teaching
Rights and responsibilities of patients and doctors	The student should be able to • Understand the rights and responsibilities of doctors • Understand the rights and responsibilities of patients • Analyze critical situations/ challenges in clinical practice to solve clinical problems	 C1 C1	LGIS
Psychological relation in doctor-patient relationship	The student should be able to • Understand the ethical boundaries of conduct in doctor patient relationship • Understand the phenomena of social bonding, dependance and resistance • Understand and differentiate Transference and Countertransference • Elaborate the Unwell Physician / Burn-out	 C2 C2 C2	LGIS

Blood & Immunity Module

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Mode of Teaching
Professionalism in Healthcare	The student should be able to • To understand the importance of knowledge, skills and attitude in the clinical settings and dealing with the patients	C1/C2 C2	LGIS
Psychology in Medical Practice	The student shall be able to understand • Psychological factors in the aetiology of health problems • Role of psychological factors in the precipitation (triggering) of illnesses • Psychological factors in the management of illnesses • Psychological and social factors in diseases causing disability. handicap and stigma • Role of psychological factors in patient's reactions to illness • Medically Unexplained Physical Symptoms (MUPS)	 C1/C2 C2 C1	LGIS

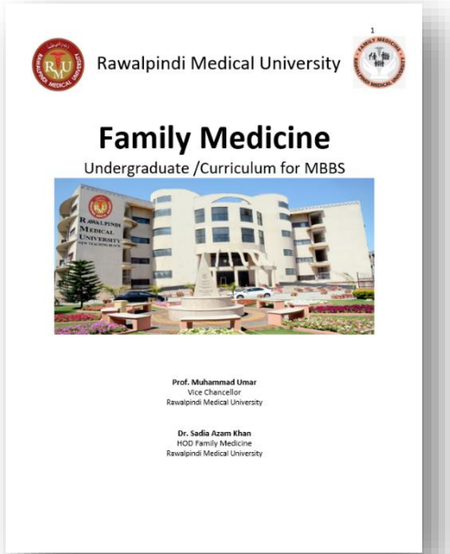
CVS Module

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Mode of Teaching
Sociology and Health	The student should be able to Explain following cultural and social aspects in medical practice: • Sociology and Health • Social Groups • Social Class • Child Rearing Practices • Roles, Social Support, religion, Stigma, Sick role, Death and Dying • Impact of social factors on Treatment Adherence	 C2 C1	LGIS
Anthropology and health	The student should be able to • Understand culture in health care • Understand the influence of culture on health care • Elaborate culturally sensitive clinical assessment	 C1 C2	LGIS

Respiration Module

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Mode of teaching
Defence mechanism	The student should be able to: • Understanding the Purpose and Function of defence mechanism • Identifying Common Defense Mechanisms • Evaluate Adaptive and Maladaptive Use.	 C1/C2 C2	LGIS
Personality development and theories	The student should be able to • Elaborate the developmental theories of Piaget, Erikson and Freud • Understand the determinants of personality development • Explain the personality types	 C1 C2	LGIS

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.

Summary of hours distribution of different teaching methods in Family Medicine training

Activity	Method of learning	Duration of activity	Frequency of activity in days	No of students	Total hours
Lecture to full class	Didactic	45 hours	9	Full class	45 hours
Workshops at campus	Experiential learning	10hours	2	~30	10 hours
Outdoor clinical teaching	Apprenticeship	45 hours	9 days	~2-3 per teacher	45 hours
Total					**100 hours**

Family Medicine Curriculum

Overview Of Training Structure

The total duration of Family Medicine training will be 100 hours. The Family Medicine training will be spread over 5 years with focused learning as follows:

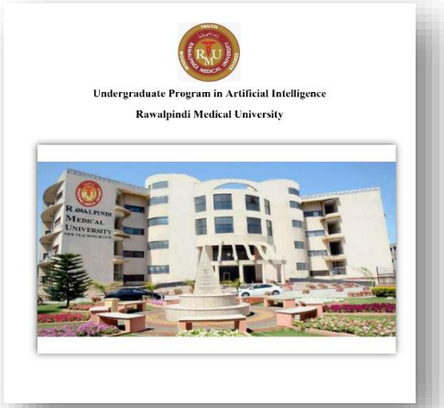
Topic	Year of study	Hours	Teaching method	Assessment		
				K (Knowledge)	S (Skills)	A (Attitude)
1. Communication skills and consultation skills in Family Medicine Practice	1 st	5	Lectures		Rotation	Rotation
2. Ethics in Clinical Practice	2nd	5	Lectures			
3. Focused history taking, examination & assessment skills	3rd	10	Lectures	CBD	CBD	CBD
4. Appropriate use of clinical equipment and charts	3rd	10	Workshop		Rotation	Rotation
5. Define Family Medicine	4th	1	Lecture	Portfolio		
6. Role of Family Medicine in the health care system	4th	1	Lecture	Portfolio		
7. Core concepts of Family Medicine	4th	2	Lecture	Portfolio		
8. Scope of Family Medicine specialty	4th	2	Lecture	Portfolio		
9. Patient centered approach	4th	2	Lecture	Portfolio		Rotation
10. Family Medicine rotation in community based Family Practices	4th	45	Field posting	Portfolio CBD	Rotation CBD	Rotation CBD
11. Danger signs and referral system	5th	2	Lecture	SAQ		
12. Basic concepts of Elderly care	5th	2	Lecture	SAQ		
13. Basic concepts of Palliative Care	5th	2	Lecture	SAQ		
14. Practice Management in community setting	5th	2	Lecture	SAQ		
15. Cost effective and safe approach to Fever without any localizing symptoms in community setting	5th	1	Lecture	SAQ		
16. Cost effective and safe approach to Generalized weakness in community setting	5th	1	Lecture	SAQ		
17. Cost effective and safe approach to Generalized aches and pains in community setting	5th	1	Lecture	SAQ		
18. Cost effective and safe approach to Dizziness in community setting	5th	1	Lecture	SAQ		
19. Cost effective and safe approach to an unconscious patient in community setting	5th	1	Lecture	SAQ		
20. Application of Bio-Psycho-Social Model of Healthcare in community setting	5th	4	Lecture	SAQ		Portfolio

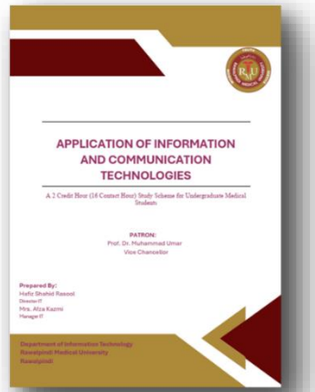
Specific Learning Objectives

Subject	Topic	Hours needed	S. No	Learning Objectives At the end of this module, the students of MBBS will be able to:
A) Population Centered Care				
Community medicine	Social determinants of health	1	1	Describe the social determinants of health
	Environmental and climate factors in disease causation		2	Explain the role of environmental and climate factors in disease causation
	Principles of prevention and health promotion	1	3	Describe the Principles of prevention and health promotion
			4	Describe, the role of counseling and patient education in health promotion and disease prevention
Medical education	Patient safety, clinical governance and quality improvement	1	5	Explain the concept of patient safety, clinical governance and quality improvement in primary healthcare
Family Medicine	Violence against Healthcare Professionals	2	6	Describe violence and its types
			7	Explain, how to de-escalate violence against healthcare professionals
			8	Discuss the importance of effective communication
			9	Describe Rights & Responsibilities of Healthcare workers in violent situations
	Gender Based Violence	2	10	Define gender base violence
			11	Differentiate the different forms of gender- based violence
			12	Describe issues of gender, rights, equality, and gender-based violence including knowledge of how to access resources and support
			13	Describe the recommended ethical standards for reporting on issues related to the prevention of gender-based violence
			14	Discuss the preventing strategies for gender-based violence
			15	Describe the national and international legal frameworks for gender-based violence
B) Principles & practice of Family Medicine				
FM/ CM/ Medicine	History and current structure of general practice	1	16	Describe the historical perspectives of general practice
			17	Explain the structure of general practice nationally and internationally
	Models of healthcare and universal health coverage	1	18	describe the models of healthcare Learn the concept of universal health coverage
	Ethics in clinical practice	2	19	Define ethics , understand the scope ethical practice to realize the importance of applying ethics in clinical practice
	GP as a coordinator in healthcare (referral mechanisms)		20	Describe the role of a GP in monitoring and coordinating patients' treatment plans, educate them about their condition, connect them with health care providers, and evaluate their progress
			21	Describe the referral mechanisms in healthcare
	Holistic Approach in Family Practice	2	22	Explain the concept of Holistic Care

			23	Discuss Patient centered care
			24	Explain the influence of social, economic and environmental factors on the health status of individuals and groups, and suggest appropriate measures
			25	Discuss delivery of evidence based, comprehensive continuing care to the individuals and families
			26	Discuss quality care in preventive, therapeutic, rehabilitative and palliative curative and preventive domains of health care
			27	Describe effective use of available resources
	Documentation & Medical Records		28	Discuss the importance of documentation in medical practice.
			29	List the main elements of documentation
			30	Documentation of the diagnosis, management plan, treatment, safety netting and follow up arrangements
			31	Describe disease notification and reporting in primary care.
	Consultation Models in Family Practice		32	Describe various consultation models
			33	Discuss how to encourage the patient's contribution
			34	Explain, how to put patient's complaint in appropriate psychosocial contexts
			35	Describe patient's ideas, concerns, expectations and shared management plan
Pharmacology	Rationale use of drug prescribing in Family practices	1	36	Explain the steps of rational use of drug prescribing in family practices

Information Technology & 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.

Focus: Introduction to ICT Components, Application Software and Usage, File Management/Settings

Interactive Lectures:

• Introduction to ICT

• Application and System Software

• I/O Devices and Storage Devices

• Types of Software

• File Management (Online)

• Internet and Email (Online)

Collaborative Learning:

Creating an Email Account, sending Emails to Peers, Email Account

Flipped Classroom:

• Students will be given guidelines to understand File Management, and content will be shared with students. During Class, an activity will be given to manage files on different platforms (Online or Local Directory).

Hands-on Exploration:

• Exploration of the internal Storage of Your Computer System and its properties

Artificial Intelligence Curriculum

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.

Aim

Aim of Integrated undergraduate research curriculum is to create center of excellence for future doctors by establishing intellectual foundation to promote critical thinking and practice evidence based medicine with the aspiration to improve clinical outcomes, population health and health care services delivery across the nation beyond traditional medical care

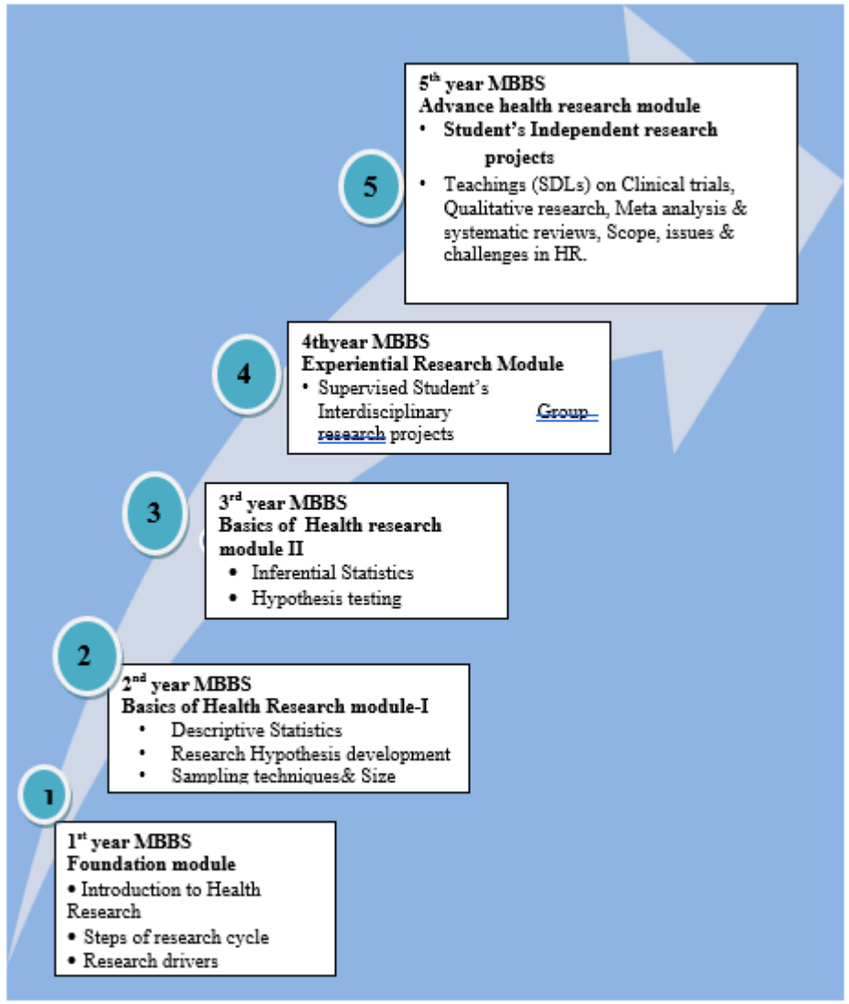
Research Curriculum (IUGRC)

Objectives

- To develop the research competent behavior in our future seven star doctors.
- The aims & objectives of Integrated Undergraduate Research Curriculum (IUGRC) RMU can be further elaborated as under;
- Enhance the students' capability in performing quality research
- Develop the skill of data collection, analysis and interpret it scientifically.
- Inculcate lifelong self-directed independent learning.
- Develop the skills in critical evaluation and synthesis of new information.
- Inspire the habit of practicing evidence-based medicine.
- Explicit and measurable research related to curricular outcomes should be articulated.
- Promote innovation and research to improve overall health status of the community
- Align collaborative learning and research outcome-based objectives according to the needs of society .

- Develop interdisciplinary research projects to foster overall learning.
- Develop innovative community health needs based research projects to attract research grants.
- Collaboration with HEC, PSCIT, Health department, UNICEF, WHO and other potential agencies for research funding for community need centered proposals.
- Develop institutional culture & infrastructure for long term sustainability and acceptability for research
- Transform medical education with integrated research curricula, e-learning technologies, contemporary infrastructure and community based learning by Developing liaison with medical education, University Library, RSRS and IT Department for the arrangement of research methodology workshops, computer skills & on relevant software's hands on training.
- Collaboration with other departments to promote interdisciplinary research.
- Assess the impact pilot program by program evaluation and 360 degree feedback after five years.
- Regular seminars, conferences and talks on our population health issues & challenges by people from all walks of life and professions, to build communities of practice and interdisciplinary connections to enrich the students' experience.
- Active involvement of all stake holders of Health research ethics, the institutional Committee which should draw upon all disciplines, including the nursing staff, representation from the student body(RSRS), editors of scientific publications and city community representatives . Ethics circle should review proposed research work to develop recommendations from the Code of Ethics given by the PM&DC
- Setting the standard of excellence in research among under graduate medical students;
- Retain, support and attract the diverse pool of highly motivated faculty for mentorship
- Develop field based research projects to gain practical experience of research in communities.
- Involving students in completion of research supportive infrastructure of the institution like demographic, clinical, diagnostics data capturing & achieving project.
- Encouragement & facilitation of participation of medical students in research competitions, seminars, symposia and research outcomes publishing.
- Establish the facility of virtual learning environment including e-learning modalities
- Establish the reward system and annual appraisals
- Alliance with external faculties & institutions for participation and dissemination of scholarly work at national and international level

Schema & Contents of IUGRC At One Glace



Year of MBBS course	Total Hrs. allocated to Com-Med by PMDC	Hrs allocated to IUGRC [a] Visible within overall MBBS timetable	Actual Hrs invested in IUGRC teachings & class Pattern	Course title	Mode of Teaching
I	25	4hrs	4 x 4 = 16hrs (1/4th, 4 Parallel LGIS [b])	Health Research Foundation Module	Formal [d]
II	25	6hrs	6 x 4 = 24hrs (1/4th, 4 Parallel LGIS)	Basics of Health Research Module-I	
III	50	8hr	8 x 4 = 32hrs (1/4th, 4 Parallel LGIS)	Basics of Health Research Module-II	
IV Formal Year of CM	150	20hrs 10 contact sessions [c] Each comprising 2hrs	[c] 14 x2 x 10 =280hrs (small group based teachings) **14 (7 sessions each day for 2days) parallel contact sessions, each extending over 2hrs (one contact)**	Experiential Health Research Module	
V	4 (added)	4 hrs	4 x 4 = 16hrs (1/4th, 4 Parallel LGIS)	Advance Health Research Module	
	250hrs total (254)	**42hrs (15% of total hrs allocated to CM by PMDC are devoted to research)**	**368hrs visible time effort** (part of student's regular time-table) **in addition to informal contact sessions & Web based**		

Component-I for 1st year MBBS

Premise:

a. In the first year research relevant teachings are designed to be lighter in contents, softer in transfer but using modern medical teaching methods in the pursuit of active involvement of the students in learning process. Purpose of first year research teachings is to introduce the budding doctors with what & why of health research and able to perceive research needs in their profession context. It is desired to involve students in research process beyond the curriculum needs with a true spirit to best serve the health needs of human community. First year research learning also expose students to published research to enable them to properly understand scientific literature, induce high level thinking and provoke for their individual research ideas.

b. **Internet based learning:** In addition to formal class divisions for research learning, small groups (7% of total class) are created for the purpose of minute level coaching ("peer-share-learn" Eric Mazur Model) through an internet web based office (WBO) under mentorship of a dedicated faculty for each group. This mechanism operates throughout the MBBS course from 1st to 5th year. Students in initial groups' formation in first year undertake their "group research project" in 4th year in the same group and under same mentor. Role of mentor at this stage of learning is to transfer both the technical and ethical aspects of good standards and practices. Mentors will be responsible for professional development that includes both explicit conduct of scientific research and implicit development of standards of research including norms of confidentiality, respect, communications and judgment.

Using the **Peer Instruction Method** students complete work ***prior*** to the lecture by reading ***assigned course readings and review of literature available*** **,** and then answer questions individually by logging onto the course webpage to record their answers. This method builds in student accountability. Next session begins with a student question which is obtained from the course website after reviewing student answers. Each student records his or her answer through web to assigned supervisor by using either their smart phone or laptop.

c. Course outlines for each formal contact session are notified one week before for prior readings & coming to class with prepared minds, under intimation that their level of prior preparedness on the session topics are judged by questioning at the start & during session and the results are reflected in log-books accordingly. Students in groups are guided on pre- & post contact sessions work through WBO and are provided with learning resources including books, journals and free web based lectures & exercises etc.

a. **Schedule of Assessment:**

   a. 1 MCQs covers each of the four session's teachings in relevant block examination and 04 MCQs in total under 04 max marks. Result / marks obtained contribute towards Internal assessment (IA) under total max 04 marks in 1st Prof. MBBS exam.

   b. At the end of module or 4th contact session each individual student is required to submit a one page individual research proposal based upon his learning experience under given specifications, guidelines and schedule of submission by the relevant faculty in charge **(Reflective writing)**. Work output of each student is assessed under total 06 marks. Result share in IA in 1st Prof. MBBS exam.

   c. **Overall assessment:** Each student is subjected to assessment under max 10 marks (04 for MCQs and 06 for assignment-Reflective writing) and result is made part of IA in 1st Prof. MBBS exam. Student's credits are also entered in log book.

Contact session-1; Duration 60-90 min

Session Theme: what & Why, Health research

Underlying idea is to introduce fresh medical students to health research in a soft way and to inculcate a pro research attitude in students as a need of their profession. First year MBBS Students are Introduced to meanings & concept of Research & steps of research cycle, fundamental types & drivers of research and research need in health profession.

Session title	Course outlines for the session	Learning outcomes	Teaching strategy	Assessment tools
Introduction to Health Research (HR) & Research Cycle (Health Research Methods)	Discussion will cover to understand; • Background and value of research in health & human development • Definitions of Research & steps of Health research study (research cycle/HRM). • Fundamental types and fields of health research incl.; - Basic & Applied Research - Quantitative & Qualitative Research - Collaborative & Multidisciplinary research - Health Research triangle a. Drivers of research Including; - Curiosity - Health needs - Opportunity - Profit	At the end of the session students should be able to; - Appreciate role of HR in healthcare practices and human development - Define HR and illustrate its meanings - State steps of Research cycle - Identify various types and fields of health research - Explain how various drivers of research play role in selecting a field of research.	b. One week before students are communicated on prior readings through WBO. c. Long Group Interactive Session (LGIS) d. Duration- 60-90m e. 2 parallel classes are conducted by Senior Faculty (AP or Subject Specialist) -Attendance are monitored objectively	1 MCQ (C1-C3)

Contact session-2 Duration: 60-90 min

Session theme: Students will introduced to basic characteristics of Research Process and attributes of the researcher to understand scientific needs of research activity and the capacities required to undertake a health research project

Session title	Session course outlines & theme	Learning outcomes	Teaching strategy	Assessment tools
Characteristics of research process and attributes of the	Discussion will cover to understand what are; **Characteristics of Re-Process in terms of;** Systematic, Rigorous, Controlled, valid, verifiable , reproducible, empirical, critical, logical reasoning and use of probability theory, **Attributes of Researcher in terms of;** Honesty & Rigor, Curiosity, Positivity of purpose, Objectivity, **Session Theme:** Taking advantage of above terms students are introduced to basic	At the end of the session students should be able to - Explain meanings of various characteristics of health research process so as to be able to differentiate research activity from non-research activity. - Interpret certain ingredients of the researcher - Explain the importance of comprehending certain pre-requisite competencies (knowledge & skills) before undertaking a research study.	-1week prior to teaching session students are provided copy of purposely selected research articles for prior readings -LGIS 2 parallel classes spanning over a period of 60-90min Each session conducted by Senior faculty	1 MCQs of level C1 to C3

	capacities including medical statistics & probability theory, study designs, sampling techniques & sample size calculation, & hypothesis testing, required to undertake research.			
Contact session-III. Session Theme: Students are introduced towards general principles of ethics in research so they could perceive basic ethical needs of the health research				
Session title	Session course outlines	Learning outcomes	Teaching strategy	Assessment tools
Health Research Ethics Basic	Discussion on Health Research ethics including; - Background, Nuremburg code and importance of ethics in health research - General ethical principles of HR including explanation of 06 basic principles: autonomy, beneficence, non-maleficence, respect &justice and truthfulness. - Value of Informed consent and confidentiality in health research involving human subjects. - Ethics in research methods* - Responsibility for ethics in HR - Intro to working of Institutional review board	At the end of the session students should be able to; - Recognize value of ethics in conduct of Health Research. - Relate principles of research ethics with a research in real world. - Interpret method & explains value informed consent and confidentiality in HR. - Justify ethics of health research methods* - Tell responsibility for ethics in HR. - Explain Process of IRB.	- 1 week earlier students will guided for specific readings through WBO. - LGIS 2 parallel classes spanning over a period of 60-90min. Each session conducted by Senior faculty	1 MCQs of level C1 to C3
Contact session-IV. Time: 60-90 min				
Session Theme: Students are introduced to basic elements of health research proposal writing so they would be able to conceive their research ideas and perceive their learning requirements to materialize their research thinking or for undertaking a small research project in future years. Class room teachings are based on discussion on an "abstract or full text purposely selected article of an original public health research (cross-sectional study) article published in some standard medical journal.				
Session title	Session course outlines	Learning outcomes	Teaching strategy	Assessment tools
Translating a research idea into a workable research proposal.	Considering elements of article under discussion, teachings will cover basic elements of Health research Proposal (HRP) writing focusing; - Sources of research ideas - Criteria for research topic selection - Literature review & making citations- (Purpose, method, Sources & ethics) - 04 Parts of Introduction (background, update literature, rationale and expected utility) - Constructing Statement of objectives - Elements of Methodology section: (emphasizing data collection techniques & tools / Questionnaire & check list,	At the end of the session students should be able to ; - Clarify means and criterion used for selecting a topic for research - Explain purpose and sources of update information on topic - Narrate elements of introduction - Explain purpose of statement of objectives - Narrate necessary components of methodology section and appreciate value of each. - Explain parts of questionnaire and types of questions used.	1week prior to session-IV, students are communicated through WBO to read at least one original full text research article preferably a cross-sectional study under precise guidelines tailored to the need of contact session IV. SGID: 4 Parallel sessions are held under uniform teaching guidelines.	1 MCQs (level C1-C3)

	study objectives & variables etc)			
Suggest reading	I. Text Book of Public Health & Community Medicine by Muhammad Ilyas, Muhammad IrfanullahSiddique II. Short Book of ‘Research Methodology and Biostatistics” by Prof.Sira Afzal III. WHO : Eastern Mediterranean Region. A Practical Guide for Health Researcher Srviers-30. IV. USMLE- High Yield Biostatistics. V. https://www.who.int/ethics/research/en/			

Innovation & 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.

RAWALPINDI MEDICAL UNIVERSITY
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Ph: +92-51-9290853

No: ____/ORIC/RMU/24 — 30th Jan , 2024

Vice Chancellor
Rawalpindi Medical University
Rawalpindi

Subject: INNOVATION & ENTERPRENEURSHIP FOR UNDERGRADUATE CURRICULUM

This initiative seeks to embed a dynamic Innovation and Entrepreneurship module within the undergraduate curriculum. Focused on nurturing a culture of creativity and strategic thinking, the program will empower students with essential skills for today's rapidly evolving business landscape. Emphasizing hands-on experiences, the module will guide students through ideation, prototyping, and business model development. By fostering an entrepreneurial mindset, we aim to equip undergraduates with the tools to identify opportunities, solve real-world problems, and instigate positive change. This transformative addition ensures graduates are not only job-ready but also capable of driving innovation and contributing meaningfully to the global entrepreneurial ecosystem.

I am thankful to Prof Iftikhar Hanif and all Seniors who are supporting this idea.

Dr Asif Maqsood Butt
Manager I&C
ORIC RMU

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.

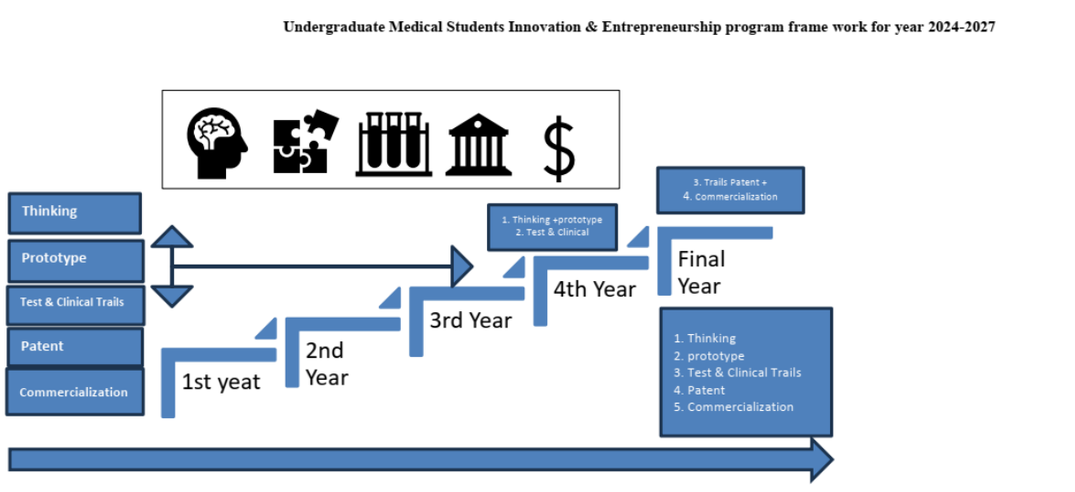
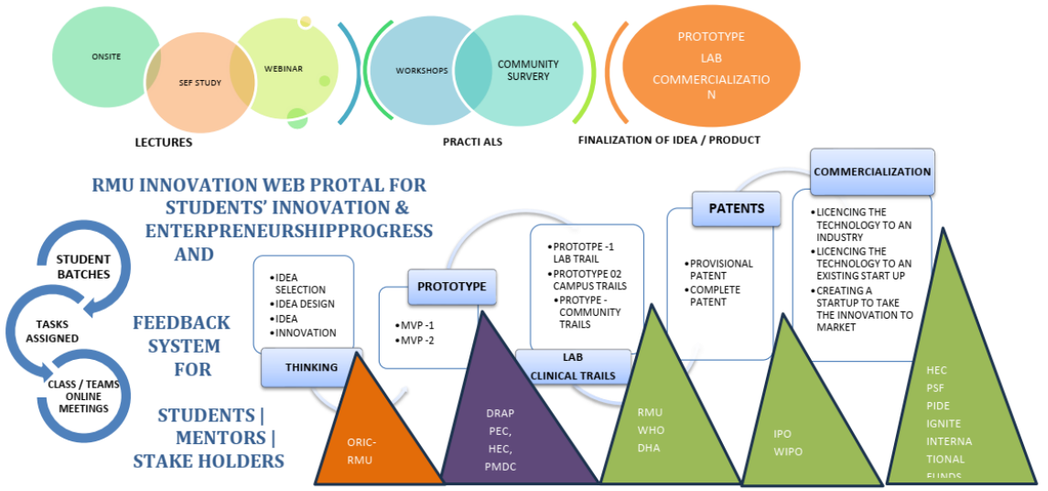
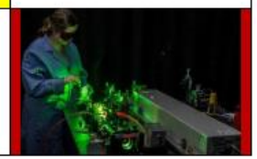


Fig:01 Innovation & Entrepreneurship; Year 2024-2027 plan of Undergraduate Medical Students of Rawalpindi Medical University, Rawalpindi

Class / Activity	Innovation / Physical Lecture Groups formation	Ideas Presentations Webinars	Protype Physical lecture Groups	Test & Clinical Trails	Patent	Commercialization
1st Year						
2nd Year						
3rd Year						
4th Year						
Final Year						



Year 01 to year 5th Sequence of academic Activities

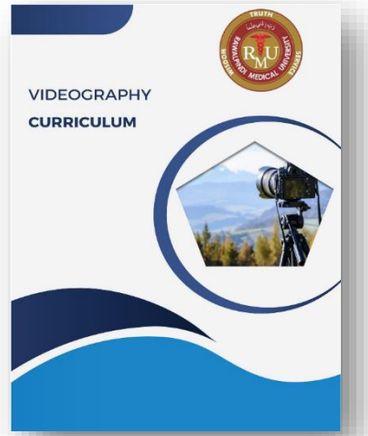
		1st year	2nd Year	3rd year	4th Year	Final Year	
Physical	Feb	Innovation / Lecture	Thinking	Protype * 	Test & Clinical Trails Patent	Commercialization	Start UP With Start UP Industry
Webinar	Marh	Groups formation	Innovation Idea designing	- Introduction to basic medical equipment and devices. - Participating in simple prototyping exercises to understand design principles.			
SDL	April						
Webinar	May		Idea presentations				
Physical	June		Idea maturation Pitch Idea final approval				
Group Task	August		Final selection Idea for MVP - 1& II & Seed Grant			Grant Submission Applied in exhibitions	

YEARLY ACTIVITIES FOR A MEDICAL STUDENT FOCUSING ON IDEAS GENERATION, PROTOTYPING, TESTING, CLINICAL TRIALS, PATENTING, AND COMMERCIALIZATION:

First Year:

1. **Ideas:**
   - Brainstorming sessions to generate ideas for medical innovations or research projects.
   - Exploring basic medical concepts and identifying areas for improvement or innovation.
2. **Prototype:**
   - Introduction to basic medical equipment and devices.
   - Participating in simple prototyping exercises to understand design principles.
3. **Test & Clinical Trials:**
   - Observing basic clinical procedures to understand testing protocols.
   - Learning about the importance of evidence-based medicine through case studies.
4. **Patent:**
   - Introduction to intellectual property rights and patenting process.
   - Understanding the significance of patenting in protecting medical innovations.
5. **Commercialization:**
   - Introduction to medical entrepreneurship and commercialization.
   - Exploring the process of bringing medical products to market.

Videography Curriculum



In an age where visual communication and digital media play pivotal roles in healthcare education, research dissemination, and public outreach, the importance of videography as a skill cannot be overstated. This comprehensive course at Rawalpindi Medical University is designed to equip students with the essential knowledge, technical proficiency, and creative acumen necessary to excel in utilizing video as a powerful tool in the medical field. Spanning four years and totaling 24 hours of instruction, this course integrates theoretical foundations with hands-on practical experience tailored to the unique needs of future healthcare professionals. Through interactive lectures, immersive workshops, and project-based assessments, students will embark on a transformative journey from mastering fundamental camera operations and lighting techniques to refining advanced video editing skills and project management capabilities.

First Year MBBS
Introduction to Videography (6 hours)

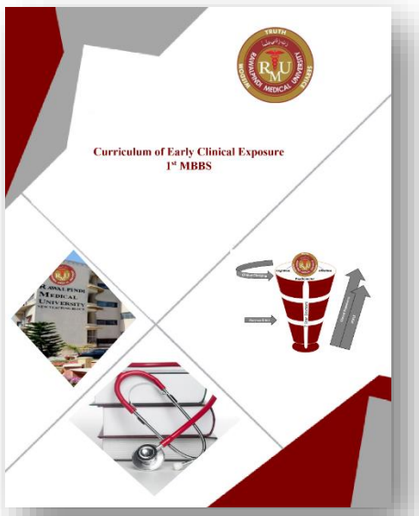
Sr No.	Topic	Learning Objectives	Teaching Strategy	Assessment Tool
1.	Fundamentals of Videography	Understand the historical context and evolution of videography. Identify different types of cameras and their primary uses.	LGIS	MCQs
2.	Camera Operation Basics	Learn essential camera settings such as exposure, focus, and white balance. Practice basic camera movements and their effects on shot composition.	LGIS	MCQs
3.	Shot Composition Techniques	Master framing and composition principles for effective storytelling. Analyze how different camera angles influence viewer perception.	LGIS	MCQs
4.	Introduction to Lighting	Understand the importance of lighting in videography. Identify basic lighting equipment and their functions.	LGIS	MCQs
5.	Ethical Considerations in Media Production	Explore ethical dilemmas related to privacy, consent, and representation in media. Understand the responsibility of videographers in creating ethical content.	LGIS	MCQs
6.	Basic Video Production	Apply knowledge gained to plan and shoot a short video project. Demonstrate competency in basic camera operations and shot composition.	LGIS	MCQs

SECTION-XI

Early Clinical Exposure (ECE)

Early Clinical Exposure (ECE)

Introduction



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.

Vision

1. To create a seamless integration of theoretical knowledge and clinical skills, where students can apply classroom lessons in real-world healthcare settings from the start of their education. This approach aims to break down the traditional barriers between preclinical and clinical phases of medical training.
2. To shape well-rounded healthcare professionals who are not only clinically competent but also empathetic, ethical, and communicative. It emphasizes the development of soft skills, such as empathy, teamwork, and patient communication, alongside hard clinical skills.
3. To foster a culture of innovation and adaptability in future healthcare professionals. As medicine is a rapidly evolving field, students should be prepared to continually update their knowledge and adapt to new technologies and treatments.
4. To instill a strong foundation in patient-centered care, where students learn to put the needs and values of patients at the forefront of their clinical decision-making process.
5. Encouraging students to develop their professional identity from the outset of their training, helping them to understand and embody the roles, responsibilities, and ethical standards of the medical profession.
6. To promote understanding and collaboration among different healthcare disciplines, recognizing that modern healthcare is a team effort requiring coordinated multi-disciplinary approaches.
7. Encouraging an inclination towards scientific inquiry and research, integrating research skills early in the module to foster a mindset of evidence-based practice.

8. To equip students with a global perspective on health, understanding both local and international health challenges, and preparing them for a career in an increasingly interconnected world.

Mission

The mission of the early clinical module is to profoundly transform medical education by integrating clinical experiences from the very beginning. This approach aims to enrich the learning process, making it more relevant and engaging by immediately applying theoretical knowledge to real-world clinical settings. It focuses on developing essential clinical skills, fostering empathy, and ensuring patient-centered care.

The module is designed to nurture a strong professional identity and ethical grounding in students, preparing them for the realities of a career in medicine. It encourages adaptability, resilience, and a commitment to lifelong learning in the face of the ever-evolving field of healthcare. By exposing students to a variety of medical specialties and healthcare environments early on, it also aids them in making more informed career choices. Overall, this module seeks to produce well-rounded, competent, and compassionate healthcare professionals ready to meet the challenges of modern medicine.

Aim and Objectives

1. To provide students with the opportunity to start developing essential clinical skills, such as basic patient examination, history taking, and simple procedural skills.
2. To bridge the gap between theoretical knowledge and its practical application. This helps students understand how their preclinical learning is relevant to clinical settings.
3. To instill a sense of professionalism and an understanding of medical ethics from the very beginning of medical training. This includes aspects such as patient confidentiality, empathy, and communication skills.
4. To emphasize the importance of patient-centered care, helping students understand the patient's perspective, and the impact of illness on patients and their families.
5. To introduce students to the workings of the healthcare system, including the roles of various healthcare professionals and the challenges faced in delivering effective care.
6. To encourage students to engage in reflective practice and self-assessment, fostering a habit of lifelong learning and continuous improvement in their professional skills.
7. To expose students to the multidisciplinary nature of healthcare, teaching them the value of teamwork and collaboration with other healthcare professionals.
8. To provide exposure to a range of clinical environments, such as hospitals, primary care clinics, and community health centers, to give students a broader understanding of different aspects of healthcare.
9. To allow students to explore various medical specialties early in their education, aiding in informed career decision-making later on.

10. To help students build confidence in their clinical abilities and reduce the anxiety associated with transitioning from theoretical learning to clinical practice.
11. To cultivate empathy and compassion towards patients, which are key components of effective patient care.
12. To encourage the development of critical thinking and problem-solving skills essential for clinical practice.

Outcomes

1. Early clinical experiences can help students understand the clinical relevance of the basic sciences they are studying. This integration of theoretical knowledge with practical application can deepen their understanding and retention of key concepts.
2. Engaging with patients and healthcare professionals early in their training helps students develop effective communication skills, which are crucial for patient care and interprofessional collaboration.
3. Students get an opportunity to start developing essential clinical skills, such as history taking, physical examination, and clinical reasoning, from the beginning of their medical education.
4. Early clinical exposure can increase students' motivation and interest in their studies by providing a clear context for the relevance of their coursework to their future roles as doctors.
5. Interacting with patients and healthcare teams early in their training can aid students in forming their professional identity and understanding the roles and responsibilities of being a physician.
6. Exposure to real-world clinical scenarios can help students develop critical thinking and decision-making skills.
7. Students begin to encounter and learn to manage the emotional and ethical challenges inherent in medical practice earlier, which can prepare them for the realities of their profession.
8. Exposure to various medical specialties and settings can aid students in making informed decisions about their future career paths.
9. Long-term, students trained with early clinical exposure may develop into more competent and empathetic physicians, potentially leading to better patient outcomes.
10. Engaging in clinical settings early can spark an interest in clinical research, leading to contributions in medical science.

1st Year MBBS ECE Curriculum

S. No	Rotations	Sessions
1	Medicine and Allied	This rotation focuses on providing students with a foundational understanding of internal medicine, emphasizing clinical skills such as history taking, physical examination, and diagnosis formulation. It fosters a patient-centered approach to care. Sessions are on, History Taking General Physical Examination Investigations (X-rays, CT scans, MRIs) Medical Equipment (Glucometer, Defibrillator)
2	Surgery and Allied	Introducing basic surgical principles and patient management, this rotation covers preoperative, postoperative care, and the importance of informed consent and patient privacy. Sessions are on, History Taking General Physical Examination Informed Consent and Patient Privacy Preoperative & Postoperative Care
3	Emergency	The Emergency Department rotation exposes students to fast-paced, critical patient care environments, focusing on triage, monitoring vitals, and emergency procedures. Sessions are on, Introduction to Triage System Setting IV Drips and IM Injections Insertion of Foley Catheter Nebulization Procedures
4	Radiology	This rotation introduces students to diagnostic imaging, focusing on reading X-rays and other imaging modalities critical for patient diagnosis. Sessions are on, How to Read Bone X-rays Bone Age Assessment Fractures of Distal Bones
5	Gynae/Obstetrics	The Gynecology/Obstetrics rotation provides students with insight into reproductive health and maternal care, focusing on abnormalities and their management. Sessions are on, Placental Abnormalities Uterine Abnormalities Pregnancy and Congenital Uterine Abnormalities

Early Clinical Exposure
Foundation Module
Rotation in Discipline of Medicine and Allied

Premise

The "Medicine and Allied Module" in an early clinical exposure module is a crucial component designed to lay a comprehensive foundation in medicine and its interconnected specialties. A significant focus is placed on the development of practical skills essential for any aspiring physician. This includes history taking, physical examination, interpreting diagnostic tests, and formulating differential diagnoses, all within a real-world clinical setting to enhance learning effectiveness. The module emphasizes a patient-centered approach, teaching students to consider and incorporate the patient's perspective, experiences, and needs in the management process, thereby fostering empathy and enhancing communication skills. Additionally, the module encompasses interprofessional education, encouraging students to engage with and learn from

First Year MBBS Foundation Module Discipline of Medicine and Allied 2024		
Session	**Learning Objectives**	**Teaching Strategy**
1 History Taking	At the end of this session, the students after observing senior faculty and interviewing various patients of the ward will be able to record. • Patient profile • Presenting complaints • History of present illness • Systemic inquiry • Relevant patient history • Family history • Socio economic history • Drug history	• Bedside teaching • Duration 1.5 hrs • Conducted by senior faculty member of medicine unit
II General physical Examination	At the end of this session, the student will practice on various patients and will be able to Record vital signs • Blood pressure • Pulse • respiratory rate • Temperature • Do general physical examination	• Bedside teaching • Duration 2 hrs • Conducted by senior faculty member of medicine unit
III Investigations	At the end of this session, the student will be able to identify • X-Rays	• Bedside teaching • Duration 2 hrs • Conducted by senior faculty

	• CT Scan • MRI • ECG	member of medicine unit
IV Medical Equipment/ instruments	At the end of this session, the student will be able to do identify • Glucometer • Defibrillator • Umbo bag • Monitors • Oximeters • ECG	• Bedside teaching • Duration 2 hrs • Conducted by senior faculty member of medicine unit

Rotation to Surgery and Allied Module

Premise

The "Surgery and Allied Module" in an early clinical exposure module is strategically designed to introduce medical students to the fundamentals of surgical care and its associated specialties at an early stage in their education. This module aims to lay a strong foundation in understanding basic surgical principles, including wound healing, and the physiological impacts of surgical interventions. Students are also guided through the comprehensive process of patient assessment and management, covering preoperative and postoperative care, which is crucial for understanding the entire surgical journey of a patient.

Ethical and legal considerations specific to surgery, such as informed consent and patient privacy, are integral to the module, ensuring students are well-versed in the complexities of surgical care. Additionally, the module promotes an understanding of the interplay between surgery and other medical disciplines, highlighting the importance of a collaborative approach to patient care.. Overall, this module is tailored to equip students with a comprehensive and practical understanding of surgery, preparing them for future clinical rotations and potential careers in these dynamic and challenging areas of medicine

Surgery and Allied Module First MBBS 2024		
Session	**Learning Objectives**	**Teaching Strategy**
1 (History Taking)	At the end of this session, the students after interviewing various patients of the ward will be able to record. • Patient profile • Presenting complaints • History of present illness • Systemic inquiry • Relevant medical history • Family history • Socio economic history	• Bedside teaching • Duration 1.5 hrs • Conducted by senior faculty member of surgical unit

	• Drug history	
II (General physical Examination)	At the end of this session, the student will practice on various patients and will be able to Record vital signs • Blood pressure • Pulse • Respiratory rate • Temperature • Do general physical examination	• Bedside teaching • Duration 1.5 hrs • Conducted by senior faculty member of surgical unit
III Informed consent Patient privacy	At the end of this session, the student will be able to do • To comprehend the ethical and legal foundations of informed consent in healthcare. • To recognize the importance of informed consent as a patient right and a key aspect of patient-centered care. • To understand the principles of patient privacy and confidentiality as per legal standards	Bedside teaching • Duration 1 hour • Conducted by senior faculty member of surgical unit
IV Preoperative & Postoperative care	• Understand how to conduct a thorough preoperative assessment, including medical history, physical examination, and relevant investigations. • Learn to identify and optimize underlying medical conditions that could affect surgical outcomes, such as managing chronic diseases (like diabetes, hypertension) and addressing malnutrition or anemia. • To recognize the normal process of healing and recovery after surgical interventions. • To assess and manage postoperative pain using appropriate pain scales and interventions. • To assess and manage surgical wounds, including dressing changes, monitoring for signs of infection, and understanding wound healing stages.	• Bedside teaching • Duration 1 hour • Conducted by senior faculty member of surgical unit

Rotation to Emergency

Premise

The Emergency Department (ED) stands as a unique and vital arena in the landscape of medical education. Recognizing the immense educational value that early clinical exposure holds for medical students, our program has been designed to introduce first year MBBS students to the dynamic and challenging environment of the ED. This initiative is rooted in our commitment to cultivating a new generation of medical professionals who are not only academically proficient but also adept in handling the practical and often unpredictable realities of patient care.

The purpose of this program is to bridge the gap between theoretical knowledge and practical application, thereby enhancing the overall competence and confidence of our future physicians. Exposure to the ED environment aims to provide students with invaluable insights into real-world medical scenarios, fostering critical thinking, decision-making skills, and a deep understanding of patient-centered care.

Emergency Department First MBBS 2024		
Session	**Learning Objectives At the end of the session, student will be able to**	**Teaching Strategy**
I Introduction to ER services regarding triage system & Monitoring of vitals	• Describe principles and protocols of the triage system used in the ED. • Categorize patients based on the severity of their conditions, utilizing established triage criteria such as the Emergency Severity Index (ESI). • Recognize the importance of prompt and accurate triage to ensure that patients receive care in a timely and efficient manner according to their medical needs. • Accurately measure and interpret basic vital signs: heart rate, blood pressure, respiratory rate, temperature, and oxygen saturation. • Appreciate the significance of changes in vital signs and how they relate to various medical conditions. • Recognize critical values of vital signs that require immediate medical intervention.	• Bedside teaching • Duration 2 HRS • Conducted by senior faculty member of surgical unit
II Setting of IV drips Observation of IV cannulas IM injections	• Monitor and assess IV cannula sites for signs of infection, infiltration, phlebitis, or other complications. • Maintenance of IV cannulas, including changing dressings, flushing the line, and ensuring the patency of the IV line. • Identify when an IV cannula needs to be re-sited and the protocol for safe removal of an IV cannula. • Demonstrate techniques for administering IM injections, including site selection and needle selection based on patient age and body mass. • Prepare medication for IM injection, including calculations for proper dosages. • Understand safe administration practices, including aseptic technique,	• Bedside teaching • Duration 1.5 hrs • Conducted by senior faculty member of surgical unit

	correct needle disposal, and patient aftercare to minimize discomfort and complications. • Recognize and manage any adverse reactions or complications associated with IM injections.	
III Insertion of folleys catheter Nebulization	• Enlist indications and contraindications for Foley's catheter insertion. • Practice sterile technique for catheter insertion, including patient preparation, catheter placement, and securing the catheter. • Acknowledge patient privacy and comfort, • Recognizing and managing potential complications such as infection or injury. • Enlist indications for nebulization, including different medications used for nebulization and their purposes. • understand the components and operation of a nebulizer machine. • Prepare the medication for nebulization, administering the treatment, and monitoring the patient during the procedure.	• Bedside teaching • Duration 1.5 hrs • Conducted by senior faculty member of surgical unit

Musculoskeletal- I Module

Class will be divided into 3 batches.
There will be 3 days of clinical rotations.

Rotation in Orthopedic Department

Orthopedic Department First MBBS 2024		
Sessions	**Learning Objectives At the end of the session ,students will be able to**	**Teaching Strategy**
I See the fracture case Fracture of Distal bone. Management of Fracture	• Assess and identify different types of fractures, with a specific focus on fractures of distal bones (such as the distal radius, ulna, and phalanges). • Understanding the mechanism of injury, • Recognizing signs and symptoms of fractures, and conducting a thorough physical examination. • interpret radiographic images (X-rays) to confirm the diagnosis of a fracture. • Understand management strategies for fractures of distal bones, including both conservative and surgical options. • Describe indications for different treatment modalities, such as casting, splinting, or surgical intervention.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit

	• Practice principles of fracture reduction and immobilization techniques.	
II Complications of malunion.	• Identify malunion and understand its causes, focusing on factors like inadequate fracture reduction and improper immobilization. • Recognize the clinical signs of malunion, • Understand the range of complications arising from malunion, • Manage and treatment options for malunion, encompassing both conservative methods and surgical interventions. • Understand prevention strategies for malunion • patient education for optimal bone healing and adherence to treatment plans.	•Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit
III Rehabilitation (Physiotherapy)	• Practice post-treatment care for fractures, including pain management, wound care, and monitoring for potential complications like infection or delayed healing. • Understand the role of physiotherapy and rehabilitation in the recovery process to restore function and prevent stiffness or muscle atrophy. • Educate patients about self-care, follow-up appointments, and signs that warrant medical attention during the healing process.	Bedside teaching •Duration 1.5 hrs Conducted by senior faculty member of surgical unit

Rotation in Radiology Department

Radiology Department First MBBS 2024		
Sessions	**Learning Objectives At the end of the session, students will be able to**	**Teaching Strategy**
I How to Read Bone X- ray.	• Describe the principles of X-ray production and how it is used to visualize bones. • Understand the differences between various types of X-ray studies (e.g., plain radiographs, CT scans, MRI) and when each is indicated. • Review the normal anatomy of various skeletal regions as seen on X-rays, including the spine, pelvis, upper and lower extremities, and skull. • Identify key anatomical landmarks that are critical for interpreting bone X-rays. • Distinguish between normal anatomical variations and pathological findings. • Understand the concept of anatomical variants that may mimic disease. • Learn to identify common pathologies visible on bone X-rays, such as fractures, dislocations, degenerative changes, and bone lesions.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit

	• Recognize artifacts and common pitfalls in image interpretation.	
II How to find Bone age	• Explain the significance of bone age and its role in assessing the growth and development of children. • Understand the differences between chronological age and bone age and why bone age can be a better indicator of maturation in certain contexts. • Review normal skeletal anatomy and development, including the process of ossification and the timing of appearance and fusion of growth plates. • Understand the variations in bone development due to sex, genetic factors, and environmental influences. • Learn about the different methods and standards for assessing bone age, including the Greulich-Pyle and Tanner-Whitehouse methods. • Practice identifying and evaluating specific radiographic landmarks used in bone age assessment. • Discuss the ethical considerations in ordering radiographs for the purpose of bone age assessment, including issues related to radiation exposure.	•Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit
III Fractures of distal Bones	• Review the anatomy of distal bones, including the distal radius, ulna, femur, tibia, fibula, and the bones of the hand and foot. • Understand the biomechanical functions of these bones and how they contribute to the mobility and stability of joints. • Discuss how different mechanisms of injury can affect fracture patterns and treatment approaches. • Learn to interpret radiographic findings and other diagnostic imaging modalities used in the evaluation of distal bone fractures. • Discuss the general principles of fracture management, including the importance of achieving and maintaining reduction, ensuring stable fixation, and preventing complications. • Learn about the various treatment options for distal bone fractures • Discuss the role of physical therapy and rehabilitation in the recovery process following distal bone fractures..	Bedside teaching •Duration 1.5 hrs Conducted by senior faculty member of surgical unit

Rotation to Gynae/Obstetrics Department

Discipline of Gynae/Obs First MBBS 2024		
Sessions	**Learning Objectives** **At the end of the session, students will be able to**	**Teaching Strategy**
I Placental abnormalities	• Review normal placental anatomy, structure, and function, and physiological changes across trimesters. • Classify different types of placental abnormalities, including placenta previa, placental abruption, placenta accreta spectrum disorders, and placental insufficiency. • Understand risk factors, epidemiology, and potential outcomes of various placental abnormalities. • Learn diagnostic techniques, including prenatal screening and imaging methods like ultrasound and MRI, for identifying placental abnormalities. • Discuss management options for placental abnormalities, considering maternal and fetal well-being and the timing of delivery. • Identify potential complications for the mother and fetus associated with placental abnormalities, including hemorrhage and fetal growth restriction. • Develop effective communication strategies for discussing diagnosis, management plans, and potential outcomes with patients and their families.. • Explore current research, emerging technologies, and innovative treatments in the diagnosis and management of placental abnormalities.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit
II Uterine abnormalities	• Review the normal anatomy and physiology of the uterus to establish a baseline for understanding abnormalities. • Classify uterine abnormalities, including congenital anomalies (such as Müllerian duct anomalies), fibroids, adenomyosis, polyps, and uterine scarring (Asherman's syndrome). • Describe the impact of uterine abnormalities on fertility, pregnancy outcomes, and gynecological health. • Understand the diagnostic techniques for identifying uterine abnormalities, including ultrasound, hysteroscopy, MRI, and saline infusion sonography. • Discuss the clinical implications of various uterine abnormalities, focusing on symptomatology and potential complications. • Assess the impact of uterine abnormalities on reproductive techniques, including assisted reproductive technologies (ART) and the approach to	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

	patients desiring fertility. • Discuss strategies for counseling patients with uterine abnormalities, including discussing fertility implications, treatment options, and long-term prognosis. • Explore current research and emerging trends in the diagnosis and management of uterine abnormalities to stay updated on advances in gynecological care.	
III Pregnancy and effects of congenital uterine abnormalities	• Understand the types of congenital abnormalities that can affect pregnancy outcomes, including chromosomal, structural, and genetic disorders. • Learn how to use prenatal screening and diagnostic tools, such as ultrasound, amniocentesis, and cell-free DNA testing, to detect congenital abnormalities early in pregnancy. • Discuss the impact of identified congenital abnormalities on pregnancy management, including considerations for continued pregnancy, intervention options, and planning for delivery. • Explore counseling strategies for parents facing a diagnosis of congenital abnormalities, focusing on communication of risks, outcomes, and support resources. • Review the latest research and guidelines on the prevention and management of congenital abnormalities during pregnancy to inform evidence	Bedside teaching •Duration 1.5 hrs Conducted by senior faculty member of surgical unit

Rotation to Pediatrics Department

Pediatrics Department First MBBS 2024		
Sessions	**Learning Objectives At the end of the session, students will be able to**	**Teaching Strategy**
I X-ray in pediatric age group	• Understand the principles of X-ray imaging and radiation safety specifically tailored to the pediatric age group, emphasizing the "As Low As Reasonably Achievable" (ALARA) principle for minimizing radiation exposure. • Review the normal anatomical and developmental variations in the pediatric population that impact the interpretation of X-ray images, including the appearance of growth plates, ossification centers, and the variability with age. • Learn to identify common pediatric-specific conditions visible on X-ray, such as developmental dysplasia of the hip, Legg-Calvé-Perthes disease, and slipped capital femoral epiphysis, along with common fractures and their	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit

	management in children. • Develop a systematic approach to reviewing pediatric X-rays, incorporating a checklist to ensure all aspects of the image are analyzed thoroughly and accurately. • Discuss the indications for X-ray in the pediatric population, including the clinical scenarios where X-ray is preferred and how to effectively communicate the need for imaging to parents and caregivers.	
II Pathologies like Rickets, congenital dislocation of hip joint and other abnormalities	• Understand the etiology and pathophysiology of metabolic bone diseases such as Rickets and Osteomalacia, including the roles of vitamin D, calcium, and phosphate metabolism. • Learn to identify the clinical features and diagnostic criteria for Rickets and Osteomalacia, focusing on both biochemical markers and characteristic findings on physical examination and imaging studies. • Review the management strategies for Rickets and Osteomalacia, including dietary modification, supplementation, and the role of UV exposure, as well as monitoring for treatment efficacy and potential complications. • Understand the developmental and anatomical aspects of congenital dislocation of the hip joint, including risk factors, screening methods, and the importance of early detection. • Learn the principles of management for congenital dislocation of the hip, including the use of harnesses, casting, and surgical options, and the outcomes associated with early versus late treatment. • Discuss other common pediatric skeletal abnormalities, such as clubfoot, scoliosis, and limb length discrepancies, including their diagnosis, treatment options, and long-term management considerations. • Engage in case studies or interactive sessions to apply knowledge in diagnosing and developing treatment plans for patients with these conditions, enhancing clinical decision-making skills. • Counsel parents of children with congenital abnormalities	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

Musculoskeletal - II Module

Class will be divided into 3 batches.
There will be 3 days of clinical rotations

Rotation in Medicine and Allied

Medicine and Allied Department First MBBS 2024		
Sessions	**Learning Objectives** **At the end of the session, students will be able to**	**Teaching Strategy**
I **Cases of myopathies/ muscular dystrophy/**	• Discuss pathophysiological mechanisms behind myopathies and muscular dystrophies • Develop skills to identify the clinical features and diagnostic criteria of myopathies and muscular dystrophies • Understand current treatment options and management strategies for myopathies and muscular dystrophies. • Engage with the latest research and explore future directions in the treatment of muscle disease	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit
II **Polymyositis/Muscle atrophy**	• Learn the basic causes of polymyositis and muscle atrophy, focusing on how inflammation and lack of use can lead to muscle weakness and loss. • Recognize common symptoms of both conditions and understand the simple steps doctors use to diagnose them, such as checking for muscle weakness and using basic tests. • Explore the main treatments available, including simple medications and therapies that can help reduce symptoms and improve muscle strength. • Understand the role of teamwork in care, emphasizing how doctors, therapists, and patients work together to manage these conditions and improve health. • Discover the impact of exercise and nutrition on managing and potentially improving conditions like polymyositis and muscle atrophy, highlighting the benefits of specific types of physical activity and dietary choices. • Learn about the patient's experience with polymyositis and muscle atrophy, including how these conditions can affect daily life and the importance of support and adaptation strategies. • Introduce the concept of ongoing research in the field of muscle diseases, encouraging curiosity about how future discoveries might lead to new treatments for polymyositis and muscle atrophy.	• Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit
	• Understand the significance of enzyme level variations in diagnosing muscle damage, learning how increases or decreases in specific enzymes can indicate	Bedside teaching •Duration 1.5 hrs

III **Muscle enzyme interpretation**	different types of muscle conditions. • Identify common muscle enzymes tested in clinical practice, such as creatine kinase (CK), aldolase, AST, and ALT, and understand what high levels of each might suggest about muscle health. • Explore case studies or examples where muscle enzyme interpretation played a key role in diagnosing and managing muscle disorders, to contextualize theoretical knowledge and enhance problem-solving skills.	•Conducted by senior faculty member of surgical unit

Rotation to Surgery and Allied

Surgery and Allied Department **First MBBS 2024**		
Sessions	**Learning Objectives** **At the end of the session, students will be able to**	**Teaching Strategy**
I Burns and Plastic Surgery	• Identify and classify burns based on their depth, extent, and severity, understanding the specific challenges presented by burns in critical areas such as the face, hands, and over major joints. • Describe the initial assessment and management steps for burn patients, emphasizing the importance of securing the airway, supporting breathing and circulation, accurately estimating the extent of burns for fluid resuscitation, and recognizing when to refer to specialized care. • Understand the principles of wound care in burn patients, including the appropriate use of cleaning, debridement, topical antimicrobials, and dressing choices to promote healing and prevent infection. • Gain knowledge of the surgical interventions used in the treatment of burns, including the indications for and techniques of skin grafting, and the role of plastic surgery in the reconstruction of post-burn deformities to restore function and appearance. • Recognize the psychological impact of burn injuries on patients and the importance of integrating psychological support and rehabilitation services into the care plan to address the physical, emotional, and social aspects of recovery.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit
II Management of superficial and deep burns	• Distinguish between superficial and deep burns based on their characteristics and clinical presentations, understanding the differences in pathophysiology, potential complications, and healing outcomes. • Describe the principles of initial management for burn injuries, including immediate first aid measures, pain management strategies, and criteria for hospital referral, with an emphasis on the unique approaches required for superficial versus deep burns.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of

	• Explain fluid resuscitation strategies for deep burn injuries, including the calculation of fluid requirements using formulas such as the Parkland formula, and monitoring of fluid balance to prevent both under-resuscitation and fluid overload. • Identify the indications for and methods of wound care in both superficial and deep burns, covering cleaning, debridement, the use of topical antimicrobial agents, and the selection and application of appropriate dressings. • Understand the role of surgical intervention in the management of deep burns, including the timing and types of surgical debridement, skin grafting techniques, and the principles of reconstructive surgery for the restoration of function and appearance. • Recognize the importance of multidisciplinary care in the management of burn patients, including the need for nutritional support, physical and occupational therapy, psychological support, and long-term rehabilitation to optimize recovery and quality of life. • Counseling of burn patient and family	surgical unit

Rotation to Radiology Department

Radiology Department First MBBS 2024		
Sessions	**Learning Objectives At the end of the session, students will be able to**	**Teaching Strategy**
I X-Ray of Hip Bone and Hip Joint	• Describe the anatomy of the hip bone and joint, highlighting the pelvis, femur, acetabulum, and their articulations, along with the identification of bony landmarks visible on an X-ray. • Discuss basic principles of radiography relevant to the hip, including the production of X-rays, the significance of anteroposterior and lateral views, and how these principles assist in visualizing hip anatomy. • Identify and describe the normal radiographic anatomy of the hip joint, recognizing the appearance of hip bones, joint spaces, and associated soft tissues on X-rays. • Recognize basic pathological findings on hip X-rays, such as fractures, developmental abnormalities, degenerative changes, and signs of infection. • Emphasize the importance of safety measures in radiography, including the use of protective equipment and minimizing radiation exposure, alongside ethical considerations in the ordering and interpretation of radiographic examinations.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit

II X ray of pelvis,	• Describe the anatomy of the hip bone and joint, highlighting the pelvis, femur, acetabulum, and their articulations, along with the identification of bony landmarks visible on an X-ray. • Elaborate basic principles of radiography relevant to the hip, including the production of X-rays, the significance of anteroposterior and lateral views, and how these principles assist in visualizing hip anatomy. • Identify and describe the normal radiographic anatomy of the hip joint, recognizing the appearance of hip bones, joint spaces, and associated soft tissues on X-rays. • Recognize basic pathological findings on hip X-rays, such as fractures, developmental abnormalities, degenerative changes, and signs of infection. • understand the importance of safety measures in radiography, including the use of protective equipment and minimizing radiation exposure, alongside ethical considerations in the ordering and interpretation of radiographic examinations.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit
III X ray of long Bones	• Introduce the anatomy of the hip bone and joint, highlighting the pelvis, femur, acetabulum, and their articulations, along with the identification of bony landmarks visible on an X-ray. • Cover the basic principles of radiography relevant to the hip, including the production of X-rays, the significance of anteroposterior and lateral views, and how these principles assist in visualizing hip anatomy. • Equip students with the ability to identify and describe the normal radiographic anatomy of the hip joint, recognizing the appearance of hip bones, joint spaces, and associated soft tissues on X-rays. • Provide an introduction to recognizing basic pathological findings on hip X-rays, such as fractures, developmental abnormalities, degenerative changes, and signs of infection. • Emphasize the importance of safety measures in radiography, including the use of protective equipment and minimizing radiation exposure, alongside ethical considerations in the ordering and interpretation of radiographic examinations.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

Blood and Immunity Module

Class will be divided into 3 batches.
There will be 3 days of clinical rotations.

Rotation in Medicine and Allied

Medicine and Allied First MBBS 2024		
Sessions	**Learning Objectives** **At the end of the session, students will be able to**	**Teaching Strategy**
I Immunodeficiency cases	• Describe immune system's structure and function, including distinctions between innate and adaptive immunity and the roles of different immune cells. • Develop the ability to identify signs and symptoms indicative of immunodeficiency, such as frequent infections, slow growth in children, autoimmune disorders, and increased risk of opportunistic infections. • Appreciate broad spectrum of immunodeficiency disorders, encompassing both primary (genetic) and secondary (acquired from external factors) causes. • Discuss the general management strategies for immunodeficiency, highlighting the importance of prophylactic measures, targeted therapies like immunoglobulin replacement, and advanced treatments such as stem cell transplantation. • Develop communication skills, particularly in conveying complex medical information in a clear and compassionate manner, discussing treatment plans, and supporting patients and their families emotionally. • Demonstrate professionalism in patient care, emphasizing respect for patient confidentiality, empathy, and maintaining an unbiased approach to treatment. • Address ethical considerations in managing chronic conditions, including informed consent, autonomy in treatment decisions, and weighing the benefits and risks of therapeutic interventions.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit
	• Develop a foundational understanding of the anatomy and physiology of the liver and spleen, emphasizing their roles in the body's immune response, metabolism, and filtration of blood.	

II Hepatosplenomegaly	• Learn to recognize the clinical signs and symptoms associated with hepatosplenomegaly, including but not limited to abdominal distension, discomfort, and signs of underlying systemic diseases. • Understand the common causes of hepatosplenomegaly, such as infectious diseases (e.g., viral hepatitis, malaria), hematologic disorders (e.g., leukemia, lymphoma), metabolic and storage diseases (e.g., Gaucher's disease, amyloidosis), and liver diseases (e.g., cirrhosis, fatty liver disease). • Acquire skills in the physical examination of patients with hepatosplenomegaly, including techniques for palpating the liver and spleen, assessing liver size and spleen consistency, and identifying associated signs (e.g., ascites, jaundice). • Familiarize with the diagnostic approach to hepatosplenomegaly, including the use of laboratory tests (e.g., liver function tests, complete blood count) and imaging studies (e.g., ultrasound, CT scan) to identify the underlying cause. • Gain insights into the basic management principles for patients with hepatosplenomegaly, understanding that treatment varies widely based on the underlying diagnosis and may include addressing infections, managing chronic diseases, or supportive care. • Enhance communication skills to effectively discuss findings, diagnoses, and management plans with patients and their families, providing clear explanations and compassionate support. • Observe and practice professionalism in patient interactions, demonstrating respect, confidentiality, and empathy, while also being mindful of cultural and individual differences. • Appreciate the importance of a multidisciplinary approach in the management of hepatosplenomegaly, recognizing the roles of various specialists such as hepatologists, hematologists, infectious disease experts, and primary care physicians. • Encourage self-reflection on the learning experiences at the bedside, identifying personal areas of strength and opportunities for growth in clinical skills, knowledge application, and professional behaviors.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit
III Lymphadenopathy	• Develop a foundational understanding of the anatomy and physiology of the liver and spleen, emphasizing their roles in the body's immune response, metabolism, and filtration of blood. • Learn to recognize the clinical signs and symptoms associated with hepatosplenomegaly, including but not limited to abdominal distension, discomfort, and signs of underlying systemic diseases. • Understand the common causes of hepatosplenomegaly, such as infectious diseases (e.g., viral hepatitis, malaria), hematologic disorders (e.g., leukemia, lymphoma), metabolic and storage diseases (e.g., Gaucher's disease, amyloidosis), and liver diseases (e.g., cirrhosis, fatty liver disease). • Acquire skills in the physical examination of patients with hepatosplenomegaly, including	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

	techniques for palpating the liver and spleen, assessing liver size and spleen consistency, and identifying associated signs (e.g., ascites, jaundice). • Familiarize with the diagnostic approach to hepatosplenomegaly, including the use of laboratory tests (e.g., liver function tests, complete blood count) and imaging studies (e.g., ultrasound, CT scan) to identify the underlying cause. • Gain insights into the basic management principles for patients with hepatosplenomegaly, understanding that treatment varies widely based on the underlying diagnosis and may include addressing infections, managing chronic diseases, or supportive care. • Enhance communication skills to effectively discuss findings, diagnoses, and management plans with patients and their families, providing clear explanations and compassionate support. • Observe and practice professionalism in patient interactions, demonstrating respect, confidentiality, and empathy, while also being mindful of cultural and individual differences.	

Rotation in Pediatrics

Pediatrics **First MBBS 2024**		
Sessions	**Learning Objectives** **At the end of the session, students will be able to**	**Teaching Strategy**
I Neonatal Jaundice	• Understand the physiological and pathological mechanisms underlying newborn jaundice, distinguishing between conditions like physiological jaundice, which is common and usually harmless, and pathological jaundice, which can indicate serious underlying diseases. • Learn to recognize the clinical signs and symptoms of jaundice in newborns, including the yellowing of the skin and eyes, and understand the significance of the timing of jaundice onset in diagnosing its underlying cause. • Enlist the different causes of neonatal jaundice, including hemolytic diseases, infection, metabolic disorders, and breast milk jaundice, along with the importance of identifying risk factors in the prenatal and perinatal history. • Develop skills in assessing jaundice using physical examination techniques, such as the Kramer's rule, and understand the role of transcutaneous bilirubinometer as a non-invasive method for estimating bilirubin levels. • Acquire knowledge on the diagnostic approach to neonatal jaundice, including the use of serum bilirubin levels to determine the severity of jaundice and the need for further investigations to identify its cause. • Understand the principles of managing neonatal jaundice, including phototherapy, exchange	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit

	transfusion, and the management of underlying conditions, while considering the potential complications of untreated severe jaundice, such as kernicterus. • Enhance communication skills in discussing the findings and management plan with parents or caregivers, providing clear explanations about the condition, its potential implications, and the rationale behind treatment choices.	
II ABO/ Rh Incompatibility	• Grasp the basic immunological concepts related to ABO and Rh blood group systems, including the antigens and antibodies involved, and how maternal-fetal blood group incompatibility can lead to hemolytic disease of the newborn (HDN). • Learn to identify the clinical signs and symptoms of HDN resulting from ABO/Rh incompatibility, such as jaundice within the first 24 hours of life, anemia, and hepatosplenomegaly. • Understand the importance of prenatal screening for blood group antigens and antibodies in preventing and managing HDN, including the administration of Rh immunoglobulin to Rh-negative mothers. • Become familiar with the diagnostic approach to HDN, including the direct Coombs test, which indicates the presence of antibodies attached to the newborn's red blood cells, and the importance of blood typing and antibody screening. • Acquire knowledge on the management strategies for HDN due to ABO/Rh incompatibility, including phototherapy for jaundice, intravenous immunoglobulin (IVIG) therapy, and exchange transfusion in severe cases. • Enhance communication skills for effectively discussing the condition, its implications, and the management plan with the parents or caregivers, ensuring they understand the rationale behind treatment options and the importance of follow-up care. • Practice professionalism and empathy in the care of newborns and their families, demonstrating respect for their concerns and providing support during the diagnostic and treatment processes	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit
III Lymphadenopathy/ Hepatosplenomegaly	• Develop a foundational understanding of the anatomy and physiology of the lymphatic system and the liver and spleen, highlighting the clinical significance of lymphadenopathy and hepatosplenomegaly. • Learn to recognize the signs and symptoms associated with lymphadenopathy and hepatosplenomegaly, including the palpation techniques for detecting enlarged lymph nodes and liver or spleen. • Understand the wide range of etiologies behind lymphadenopathy and hepatosplenomegaly, including infectious, neoplastic, autoimmune, and metabolic causes. • Acquire skills in conducting a focused history and physical examination tailored to elucidate the underlying cause of lymphadenopathy and hepatosplenomegaly, incorporating relevant diagnostic tests such as blood tests, imaging studies, and biopsy when indicated. • Elaborate general management principles for lymphadenopathy and hepatosplenomegaly, appreciating the need for targeted treatment based on the underlying diagnosis and the	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

	importance of monitoring for potential complications. • Enhance communication skills to effectively convey findings, diagnostic plans, and management strategies to patients and their families, fostering an environment of empathy and understanding.	

Rotation to Pathology Laboratory

Pediatrics **First MBBS 2024**		
Sessions	**Learning Objectives** **At the end of the session ,students will be able to**	**Teaching Strategy**
I • Identification of Slides of Spherocytosis • Microcytosis • Leukocytosis • Lymph node • Bone Marrow	• Visually identify and differentiate between spherocytosis (characterized by spherical red blood cells), microcytosis (presence of smaller than normal red blood cells), and leukocytosis (increased white blood cell count) on blood smear slides. • understand of the clinical implications and underlying conditions associated with spherocytosis, such as hereditary spherocytosis, microcytosis, often seen in iron deficiency anemia or thalassemia, and leukocytosis, which can indicate infection, inflammation, or leukemic neoplasia. • Describe basics of bone marrow examination, including the indication for this procedure, the types of cells expected to be found under normal conditions, and how to recognize abnormalities that may indicate hematologic diseases. • Develop foundational skills in using a microscope for the examination of hematologic slides, including adjusting magnification, focusing, and slide preparation techniques. • Practice critical thinking and diagnostic reasoning by interpreting slide findings in the context of clinical presentations, understanding how these laboratory results contribute to the diagnosis and management of hematological disorders. • Enhance communication skills to discuss laboratory findings and their clinical relevance effectively, preparing students for future patient interactions and interdisciplinary collaboration. • Appreciate for the precision and importance of laboratory work in the diagnosis and monitoring of patients, emphasizing the role of detailed observation and meticulous record-keeping.	Hand on in skill lab •Duration 2 hrs •Conducted by senior faculty member of surgical unit

Cardiovascular System Module

There will be 3 days of clinical rotations.

Rotation To Cardiology Department

Cardiology CVS Module First MBBS 2024		
Sessions	**Learning Objectives** **At the end of the session, students will be able to**	**Teaching Strategy**
I See cases of Heart Failure and Dyspnea Raised JVP/Oedema	• describe the basic pathophysiological mechanisms leading to heart failure, including systolic and diastolic dysfunction, and understand how these mechanisms can lead to the development of dyspnea. • Identify the Common Signs and Symptoms of Heart Failure and Dyspnea: • Conduct a focused patient history and physical examination for a patient presenting with dyspnea, emphasizing the importance of these skills in differentiating heart failure from other causes of dyspnea. • Appreciate the Multidisciplinary Approach to Managing Patients with Heart Failure: • Identify the clinical features of edema, differentiate between types of edema (e.g., peripheral vs. pulmonary), and understand the common causes including but not limited to cardiac, renal, and hepatic pathologies. • Enlist causes of raised JVP .	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit
II Clinical Examination of Precordium Normal Heart Sounds Additional heart sounds	• . To understand and describe the anatomical boundaries and landmarks of the precordium, emphasizing the significance of each area in relation to underlying cardiac structures.. • To develop proficiency in performing a systematic and thorough cardiac examination, including inspection, palpation, and auscultation of the precordium. • Identify normal heart sounds and murmurs, differentiating between systolic and diastolic murmurs, and correlating physical findings with potential cardiac pathologies. • To enhance clinical reasoning and diagnostic skills through the interpretation of physical examination findings, enabling the early identification of common cardiac conditions.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

III See Cases of Coronary Heart Disease	• Observe and understand the clinical presentation of coronary artery disease (CAD), including the recognition of typical and atypical symptoms such as chest pain, shortness of breath, and fatigue. • Gain exposure to the diagnostic evaluation and management strategies for patients with coronary artery disease, observing how medical history, physical examination, and diagnostic tests (e.g., ECG, echocardiography, stress tests) are integrated to establish a diagnosis and formulate a treatment plan. • Develop an appreciation for the importance of patient education and counseling in the management of coronary artery disease.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

Rotation to Radiology Department

Radiology **CVS Module** **First MBBS 2024**		
Sessions	**Learning Objectives** **At the end of the session students will be able to**	**Teaching Strategy**
I X-Ray chest	• .Appreciate fundamentals of chest X-ray interpretation, including the identification of normal anatomy such as the heart, lungs, diaphragm, and rib cage. • Develop skills in systematically analyzing chest X-rays, focusing on the assessment of lung fields, heart size and shape, and the presence of any abnormal shadows or lesions. • Understand the clinical context in which chest X-rays are utilized, including indications for ordering a chest X-ray, interpreting its findings in conjunction with patient symptoms and history, and appreciating the importance of follow-up investigations or referrals when abnormal findings are detected.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit
II Cardiomegaly	• Understand the definition, causes, and pathophysiology of cardiomegaly, emphasizing the importance of recognizing the condition as an indicator of underlying cardiac diseases such as hypertensive heart disease, dilated cardiomyopathy, and valvular disorders. • Develop the ability to identify signs of cardiomegaly on physical examination and diagnostic imaging, particularly focusing on chest X-ray interpretation. • Appreciate the clinical implications of cardiomegaly, including its impact on patient symptoms, prognosis, and management strategies.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

III Radiological signs of heart failure	• Appreciate the key radiological signs of heart failure on chest X-rays, including cardiomegaly, pulmonary congestion, and pleural effusions. • Understand the progression of these signs, and correlating them with the underlying pathophysiological changes in the heart and lungs. • Develop the ability to systematically evaluate a chest X-ray for evidence of heart failure, focusing on the assessment of heart size, lung field abnormalities, and the presence of Kerley B lines, interstitial edema, and alveolar edema. • Appreciate the role of radiological imaging in the diagnosis, management, and monitoring of heart failure, understanding how chest X-rays complement other diagnostic modalities such as echocardiography and cardiac MRI.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

Rotation to Pediatric Department

Pediatrics **CVS Module** **First MBBS 2024**		
Sessions	**Learning Objectives** **At the end of the session ,students will be able to**	**Teaching Strategy**
I See cases of congenital heart diseases	• Observe and understand the diverse clinical presentations of congenital heart diseases (CHD), including common conditions such as ventricular septal defect (VSD), atrial septal defect (ASD), patent ductus arteriosus (PDA), and Tetralogy of Fallot. This includes recognizing the signs and symptoms that may suggest a CHD, such as cyanosis, heart murmurs, and failure to thrive in infants and children. • Understand diagnostic evaluation of congenital heart diseases, observing how clinical findings are integrated with diagnostic tools such as echocardiography, chest X-rays, and cardiac catheterization to establish a diagnosis. • Gain insight into the management and treatment options for congenital heart diseases, including surgical and non-surgical interventions.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgical unit
	• Observe and understand the clinical presentation and unique challenges of diagnosing heart failure in pediatric patients, including recognizing the signs and symptoms that may differ from adults, such as poor feeding, failure to thrive,	Bedside teaching

II Pediatric case of Heart Failure	excessive sweating, and rapid breathing.. • Understand the etiology and pathophysiology of heart failure in pediatric cases, emphasizing the role of congenital heart defects, cardiomyopathies, and acquired heart diseases. • Appreciate the multidisciplinary approach in the management of pediatric heart failure, including the integration of clinical evaluations, diagnostic imaging, pharmacological treatments, and when necessary, surgical interventions.	•Duration 1.5 hrs •Conducted by senior faculty member of surgical unit

Respiratory Module

Class will be divided in three batches
There will be 3 days of clinical rotations

Medicine **Respiratory Module** **First MBBS 2024**		
Sessions	**Learning Objectives** **At the end of the session ,students will be able to**	**Teaching Strategy**
I Dyspnea Observe/see patients	• Understand the clinical presentation of dyspnea, particularly in the context of heart failure, including how to differentiate it from respiratory causes based on patient history, physical examination, and key clinical findings. • Describe pathophysiological mechanisms leading to dyspnea in heart failure, such as reduced cardiac output and pulmonary congestion. • Engage in the discussion of case studies involving patients with dyspnea due to heart failure, aiming to integrate clinical knowledge with practical skills in diagnosing and managing such cases. This will include exploring the role of diagnostic tools such as chest X-rays, echocardiograms, and BNP levels in confirming heart failure and assessing its impact on patient care and treatment strategies.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of medical unit
II Cyanosis & see Asthma case COPD cases	• Identify and differentiate between central and peripheral cyanosis as clinical signs, understanding their pathophysiology and implications in the context of cardiovascular and respiratory diseases, including heart failure. • Discuss the clinical presentation, diagnostic approach, and management strategies for patients with Chronic Obstructive Pulmonary Disease (COPD) and asthma, particularly focusing on how these conditions can complicate or coexist with heart failure.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of Medical

	• Critically analyze case studies of patients presenting with cyanosis, COPD, and asthma in the setting of heart failure, emphasizing the importance of a comprehensive clinical evaluation, the use of appropriate diagnostic tests (e.g., spirometry, chest X-rays, arterial blood gases	unit
III Tuberculosis cases with fibrosis of lungs	• Understand the clinical manifestations and radiographic features of tuberculosis and pulmonary fibrosis, especially when occurring in conjunction with heart failure. • Discuss the pathophysiological mechanisms by which tuberculosis and pulmonary fibrosis can affect cardiac function, leading to or worsening existing heart failure.	

Rotation To Surgery

Surgery Respiratory Module First MBBS 2024		
Sessions	**Learning Objectives At the end of the session ,students will be able to**	**Teaching Strategy**
I See cases of Flail chest & Pneumothorax	• Observe and identify the clinical signs and symptoms of flail chest and pneumothorax, including the unique presentation of paradoxical chest movement in flail chest and the sudden onset of sharp, unilateral chest pain and dyspnea in pneumothorax. • Understand the pathophysiology behind flail chest and pneumothorax, focusing on the mechanisms of injury, the impact on respiratory mechanics, and the potential complications such as respiratory failure and tension pneumothorax. • Engage with the diagnostic and management strategies for flail chest and pneumothorax, including the appropriate use of imaging studies like chest X-rays and CT scans for accurate diagnosis, and the understanding of both conservative and surgical treatment options.	Bedside teaching •Duration 2 hrs •Conducted by senior faculty member of surgery unit
II Chest intubation	• Enlist the indications and contraindications for chest tube intubation, focusing on the recognition of conditions that necessitate this intervention such as pneumothorax, hemothorax, and pleural effusion. • Discuss the procedural steps, techniques, and equipment used in chest tube insertion, including site selection, aseptic technique, and the confirmation of correct tube placement. • Describe the multidisciplinary approach to the care of patients requiring chest tube intubation, highlighting the roles of different healthcare professionals in ensuring successful outcomes.	Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of surgery unit

Rotation to Radiology

Radiology Respiratory Module First MBBS 2024		
Sessions	**Learning Objectives** **At the end of the session ,students will be able to**	**Teaching Strategy**
I Radiology of chest	• Describe the basic principles of chest radiology, including the understanding of radiographic anatomy and the interpretation of normal chest X-ray findings. • Develop skills in systematically analyzing chest radiographs, focusing on identifying and interpreting common abnormalities such as lung infiltrates, pleural effusions, pneumothorax, and signs of heart failure. • Appreciate the clinical relevance and limitations of chest radiology in diagnosing and managing thoracic diseases.	• SGD • Duration 2 hrs • Conducted by senior faculty member of Radiology Department
II Chest X-ray at different level with reference to Anatomy and Pathologies	• To deepen understanding of the detailed anatomy of the chest as visualized on X-ray, including the recognition of anatomical structures such as the trachea, bronchi, lungs, heart, great vessels, bones (ribs, clavicles, scapulae, and spine), and diaphragm. This objective aims to enable students to correlate specific areas on the X-ray with their anatomical counterparts, enhancing their ability to pinpoint the location of pathological findings. • Develop the skill to identify and differentiate between normal anatomical variations and pathological changes on chest X-rays. • Explore the integration of chest X-ray findings with clinical data for comprehensive patient assessment, emphasizing the importance of a systematic approach to the interpretation of radiographic images in the context of patient history and physical examination findings.	•Bedside teaching •Duration 1.5 hrs •Conducted by senior faculty member of Radiology Department

ECE Log Book

Student's Profile

Paste Photograph
(2x2 Size)

Name:_____ Roll No._____

Batch:_____

Class:_____

Session:_____

Contact Detail: ----------

Phone:_____ Mobile:_____

Email:_____

Hostelite/Dayscholar:_____

Parents / Guardian Contact #(Mobile)_____ Landline_____

Postal Address:_____ Guardian Email:_____

_____

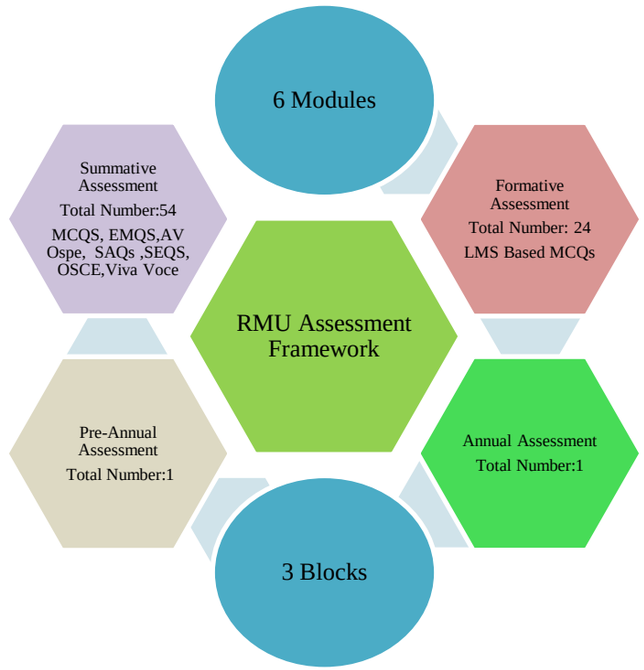
Proforma For Early Clinical Exposure for First Year MBBS

Roll Number: _____

Sr. No	Date	Time	Module	Batch	Topic of the Session	Subject	Unit	Name & Sign of Teacher

Section-XII

Assessment



Assessment

Assessment is the systematic basis for making inferences about the learning and development of students. It is the process of defining, selecting, designing, collecting, analyzing, interpreting, and using information to increase students' learning and development.

Assessment Policy

Scope

This policy is applicable to all the students of the MBBS program of RMU for all modes of teaching (on campus/online/any other) from the date of approval by the RMU Academic Council.

1. **Guiding principles**

- RMU has the responsibility to ensure to all the stakeholders that students have achieved the identified outcomes of the medical degree course.
- Assessment requires a variety of methods; no single method can completely ensure that the requisite competence level has been achieved. Hence each assessment instrument must be selected based on its utility index.
- Feedback, ensuring that the feedback loop is closed, should be provided to students following all assessments to ensure that students identify gaps in their learning and faculty can review future curricular and assessment content.
- The quality of the entire assessment including confidentiality of the assessment process must be ensured.
- The assessment process should be clear and transparent so that students know in advance the expectations (from students) and consequences of the assessment.
- Details of the conduct of examinations are available in the Examination policy document.

2. **Purposes of Assessment**.

- To ensure appropriate competence has been achieved.
- Feedback to students regarding their readiness and deficiencies
- Feedback to faculty to evaluate the effectiveness of the teaching program.

3. Forms of assessments

3.1 Formative Assessment

A formative assessment refers to a low-stakes assessment that does not normally contribute towards a student's final grade. Assessment for learning is carried out throughout modules and clerkships using various strategies (at the discretion of module coordinators and clerkship directors feedback. Weekly assessment of Large Group Interactive Session (LGIS) and Self-Directed Learning (SDL) Sessions will be conducted on LMS (learning management system). The LMS result will be shared by module coordinator and DME through vice chancellor on weekly basis

3.2 Summative Assessment

A summative assessment is performed at the end of a unit that allows a teacher to measure a student's understanding, typically against a standardized criterion. These Assessment includes End of Module Assessment (EMA), End of Block Assessment (EBA), Pre- Annual Assessment (PAA) and Annual Professional Assessment (APA). Each Assessment comprises of theory component and a practical component.

3.2.1 Components of Assessment

- Cognitive competence is tested in the theory component using the following tool of assessment
  - USMLE/ PLAB Type / Multiple Choice Questions (MCQs)
  - USMLE/ PLAB Type / Extended Match Questions (EMQ)
  - Short Answer Questions (SAQs)
  - Short Essay Questions (SEQs)
- Competence in psychomotor and affect domains is tested in practical component using the following tools of assessment
  - Audio Visual OSPE (AVOSPE): This comprises of stations using PowerPoint slides with images animations and videos
  - Laboratory OSPE (Lab OSPE): This comprises of stations focused on practical (hands on performance) components from core subject areas
  - Integrated OSPE (I OSPE): This comprises of stations, from each core subject, emphasizing horizontal and vertical integration
  - Objective Structured Clinical Examinations (OSCE): This comprises of stations, dedicated to Early Clinical Exposure (ECE), Simulated Patients (SP), models, ALPHA and clinical component of core subjects
  - Objective Structured Viva Examinations (OSVE): This comprises of table viva for each core subject. Students will be evaluated by internal and external examiner using a structured marking rubric, with each viva

3.2.2 End of Module Assessment (EMA)

- End of module assessments will be conducted at the end of each module.
- The module teams will be responsible for the assessment plan including assessment strategies, timings, and other essentials

3.2.3 End of Block Assessment (EBA)

- End of block assessments will be conducted at the end of each block.
- The block teams will be responsible for the assessment plan including assessment strategies, timings, and other essentials
- 80% attendance in each subject will be mandatory
- Student must pass in all LMS, mid module assessments to appear in EBA
- There will be no remedial classes for attendance compensation
- There will be no remedial of assessment in case of poor academic performance

Table of Specification (TOS) For 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 Assessmen tof 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
	Biochemistry	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

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			

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

3.2.4 Continuous Internal Assessment (CIA)

Continuous Internal Assessment means the assessment based on tests and assignments given to the students during an academic period.

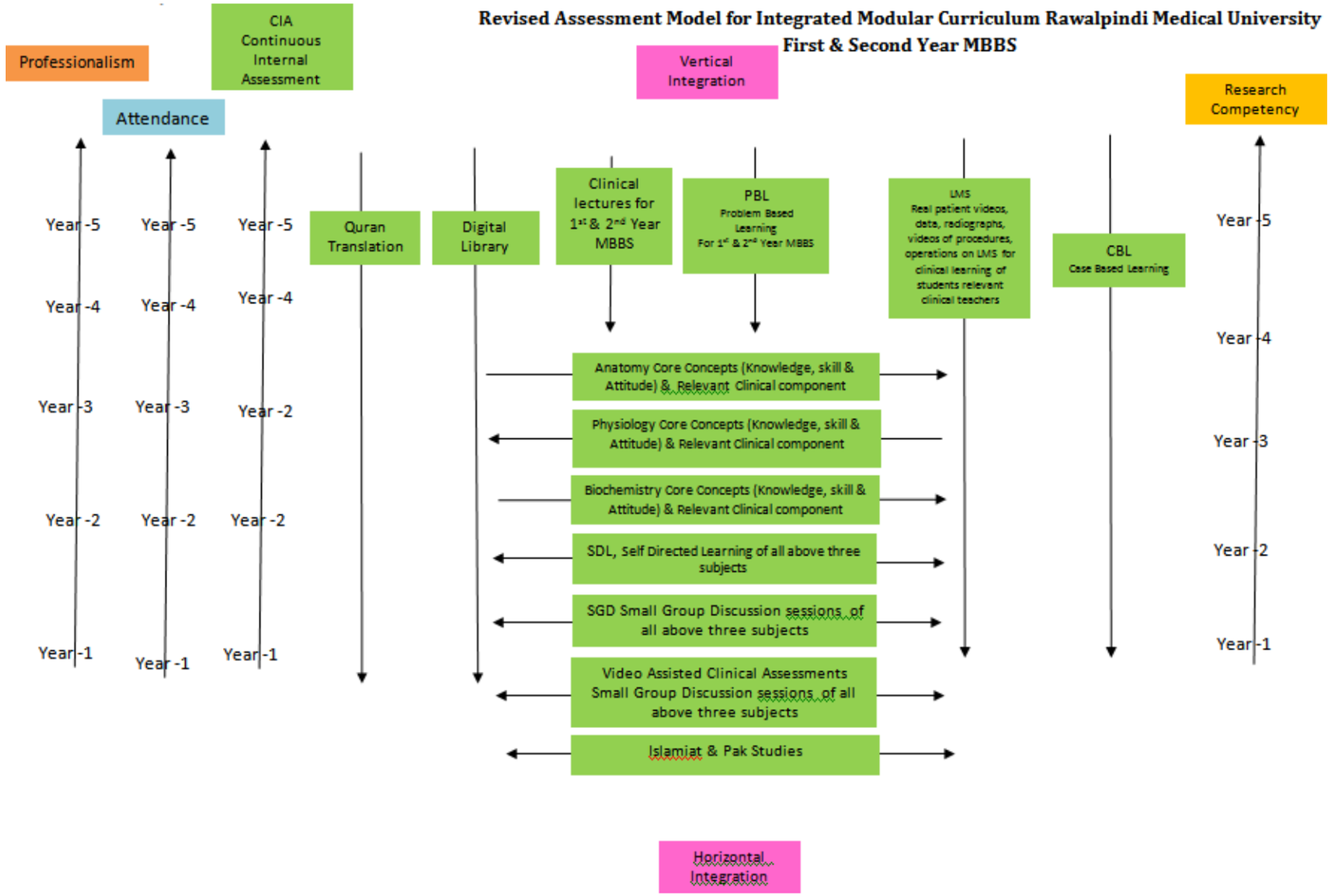
Break up of internal assessment is as follows:

Blocks	Subjects	Total marks	Module 1	Module 2	Total marks
Block 1 90 Marks	Anatomy	30 marks	15 marks	15 marks	90 Marks
	Physiology	30 marks	15 marks	15 marks	
	Biochemistry	30 marks	15 marks	15 marks	
Block 2 90 Marks	Anatomy	30 marks	15 marks	15 marks	90 Marks
	Physiology	30 marks	15 marks	15 marks	
	Biochemistry	30 marks	15 marks	15 marks	
Block 3 90 Marks	Anatomy	30 marks	15 marks	15 marks	90 Marks
	Physiology	30 marks	15 marks	15 marks	
	Biochemistry	30 marks	15 marks	15 marks	
				Total marks	270 Marks

Once internal assessment is compiled it CANNOT be altered under ANY circumstance unless a clerical/ human error is detected. He will repeat classes and skills

There will be no change in calculated internal assessment scores for supplementary University examination.

I. Diagrammatic Presentation of Various Components of Clinically Oriented Integrated Modular Curriculum of Rawalpindi Medical University



Reference: The Integrated & Clinically Oriented Assessment Model For Under Graduates Rawalpindi Medical University "Mumtahin""ممتحن"(The **Examiner)**

No. of Assessments of Physiology for First Year MBBS (Block- I):

Block	Sr. #	Module – 1 Foundation Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block – I	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	30 Minutes	1 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	Weekly LMS based Assessment (MCQs based)	Formative	30 Minutes				
	Total			**3 Hours & 05 Minutes**			**3 Assessments**	
	Sr. #	**Module – 2 MSK-I Module Components**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	60 Minutes	2 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	2 Weekly LMS based Assessment (MCQs based)	Formative	2 x 30 Minutes				
	Total			**3 Hours & 35 Minutes**			**4 Assessments**	
	Sr. #	**Block – I Assessment**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	Objectively Structured Practical Examination (OSPE)	Summative	5 Hours	5 Hours & 30 minutes			2 Summative
	2	LMS Based Block Assessment (MCQs based)	Summative	30 Minutes				
		Total		**5 Hours & 30 Minutes**			**2 Assessments**	

No. of Assessments of Physiology for First Year MBBS (Block- II):

Block	Sr. #	Module – 3 MSK-II Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block – II	1	End Module Examinations (SEQs, SAQs, EMQs, MCQs Av OSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	30 Minutes	1 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	Weekly LMS based Assessment (MCQs based)	Formative	30 Minutes				
	Total			**3 Hours & 05 Minutes**			**3 Assessments**	
	Sr. #	**Module – 4 Blood & Immunity Module Components**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	60 Minutes	2 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	2 Weekly LMS based Assessment (MCQs based)	Formative	2 x 30 Minutes				
	Total			**3 Hours & 35 Minutes**			**4 Assessments**	
	Sr. #	**Block – II Assessment**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	Objectively Structured Practical Examination (OSPE)	Summative	5 Hours	5 Hours & 30 minutes			2 Summative
	2	LMS Based Block Assessment (MCQs based)	Summative	30 Minutes				
		Total		**5 Hours & 30 Minutes**			**2 Assessments**	

No. of Assessments of Physiology for First Year MBBS (Block- III):

Block	Sr. #	Module – 5 CVS Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block – II	1	End Module Examinations (SEQs, SAQs, EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	30 Minutes	1 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	Weekly LMS based Assessment (MCQs based)	Formative	30 Minutes				
	Total			**3 Hours & 05 Minutes**			**3 Assessments**	
	Sr. #	**Module – 6 Respiration Module Components**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	End Module Examinations (SEQs, SAQs, EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	60 Minutes	2 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	2 Weekly LMS based Assessment (MCQs based)	Formative	2 x 30 Minutes				
	Total			**3 Hours & 35 Minutes**			**4 Assessments**	
	Sr. #	**Block – III Assessment**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	Objectively Structured Practical Examination (OSPE)	Summative	5 Hours	5 Hours & 30 minutes			2 Summative
	2	LMS Based Block Assessment (MCQs based)	Summative	30 Minutes				
		Total		**5 Hours & 30 Minutes**			**2 Assessments**	

Total Time of Physiology Assessments for First Year MBBS:

Module	Summative Assessment Time	Formative Assessment Time	Total Assessments Time
Foundation Module	2 Hours & 35 minutes	30 Minutes	**3 Hours & 05 Minutes**
MSK-I Module	2 Hours & 35 minutes	60 Minutes	**3 Hours & 35 Minutes**
Block -I	**5 Hours & 30 Minutes**		**5 Hours & 30 Minutes**
MSK-II Module	2 Hours & 35 minutes	30 Minutes	**3 Hours & 05 Minutes**
Blood & Immunity Module	2 Hours & 35 minutes	60 Minutes	**3 Hours & 35 Minutes**
Block -II	**5 Hours & 30 Minutes**		**5 Hours & 30 Minutes**
CVS Module	2 Hours & 35 minutes	30 Minutes	**3 Hours & 05 Minutes**
Respiration Module	2 Hours & 35 minutes	60 Minutes	**3 Hours & 35 Minutes**
Block -III	**5 Hours & 30 Minutes**		**5 Hours & 30 Minutes**
Pre Annual Examination		……	7 Hours & 45 Minutes
First Professional		……	3 Hours & 45 Minutes
Grand Total	**31 Hours & 30 Minutes**	**4 hours and 30 minutes**	**48 Hours**

Total Teaching Hours vs Total Assessment Hours

	Grand Total Teaching Hours 225 hours:	Grand Total Assessment Hours 48 Hours
Ratio of Teaching Hours to Assessments Hours	**9:2**	

No. of Assessments of Anatomy for First Year MBBS (Block- I):

Block	Sr. #	Module – 1 Foundation Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block – I	1	End Module Examinations (SEQs, SAQs, EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	30 Minutes	1 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	Weekly LMS based Assessment (MCQs based)	Formative	30 Minutes				
	Total			**3 Hours & 05 Minutes**			**3 Assessments**	
	Sr. #	**Module – 2 MSK-I Module Components**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	60 Minutes	2 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	2 Weekly LMS based Assessment (MCQs based)	Formative	2 x 30 Minutes				
	Total			**3 Hours & 35 Minutes**			**4 Assessments**	
	Sr. #	**Block – I Assessment**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	Objectively Structured Practical Examination (OSPE)	Summative	5 Hours	5 Hours & 30 minutes			2 Summative
	2	LMS Based Block Assessment (MCQs based)	Summative	30 Minutes				
		Total		**5 Hours & 30 Minutes**			**2 Assessments**	

No. of Assessments of Anatomy for First Year MBBS (Block- II):

Block	Sr. #	Module – 3 MSK-II Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block – II	1	End Module Examinations (SEQs, SAQs, EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	30 Minutes	1 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	Weekly LMS based Assessment (MCQs based)	Formative	30 Minutes				
	Total			**3 Hours & 05 Minutes**			**3 Assessments**	
	Sr. #	**Module – 4 Blood & Immunity Module Components**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	60 Minutes	2 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	2 Weekly LMS based Assessment (MCQs based)	Formative	2 x 30 Minutes				
	Total			**3 Hours & 35 Minutes**			**4 Assessments**	
	Sr. #	**Block – II Assessment**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	Objectively Structured Practical Examination (OSPE)	Summative	5 Hours	5 Hours & 30 minutes			2 Summative
	2	LMS Based Block Assessment (MCQs based)	Summative	30 Minutes				
		Total		**5 Hours & 30 Minutes**			**2 Assessments**	

No. of Assessments of Anatomy for First Year MBBS (Block- III):

Block	Sr. #	Module – 5 CVS Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block – II	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	30 Minutes	1 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	Weekly LMS based Assessment (MCQs based)	Formative	30 Minutes				
	Total			**3 Hours & 05 Minutes**			**3 Assessments**	
	Sr. #	**Module – 6 Respiration Module Components**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	60 Minutes	2 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	2 Weekly LMS based Assessment (MCQs based)	Formative	2 x 30 Minutes				
	Total			**3 Hours & 35 Minutes**			**4 Assessments**	
	Sr. #	**Block – III Assessment**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	Objectively Structured Practical Examination (OSPE)	Summative	5 Hours	5 Hours & 30 minutes			2 Summative
	2	LMS Based Block Assessment (MCQs based)	Summative	30 Minutes				
		Total		**5 Hours & 30 Minutes**			**2 Assessments**	

Total Time of Anatomy Assessments for First Year MBBS:

Module	Summative Assessment Time	Formative Assessment Time	Total Assessments Time
Foundation Module	2 Hours & 35 minutes	30 Minutes	**3 Hours & 05 Minutes**
MSK-I Module	2 Hours & 35 minutes	60 Minutes	**3 Hours & 35 Minutes**
Block -I	**5 Hours & 30 Minutes**		**5 Hours & 30 Minutes**
MSK-II Module	2 Hours & 35 minutes	30 Minutes	**3 Hours & 05 Minutes**
Blood & Immunity Module	2 Hours & 35 minutes	60 Minutes	**3 Hours & 35 Minutes**
Block -II	**5 Hours & 30 Minutes**		**5 Hours & 30 Minutes**
CVS Module	2 Hours & 35 minutes	30 Minutes	**3 Hours & 05 Minutes**
Respiration Module	2 Hours & 35 minutes	60 Minutes	**3 Hours & 35 Minutes**
Block -III	**5 Hours & 30 Minutes**		**5 Hours & 30 Minutes**
Pre-Annual Examination		……	7 Hours & 45 Minutes
First Professional		……	3 Hours & 45 Minutes
Grand Total	**31 Hours & 30 Minutes**	**4 hours and 30 minutes**	**48 Hours**

Total Teaching Hours vs Total Assessment Hours

	Grand Total Teaching Hours 250 Hours:	Grand Total Assessment Hours **48 Hours**
Ratio of Teaching Hours to Assessments Hours	**5:1**	

No. of Assessments of Biochemistry for First Year MBBS (Block- I):

Block	Sr. #	Module – 1 Foundation Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block – I	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	30 Minutes	1 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	Weekly LMS based Assessment (MCQs based)	Formative	30 Minutes				
	Total			**3 Hours & 05 Minutes**			**3 Assessments**	
	Sr. #	**Module – 2 MSK-I Module Components**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	60 Minutes	2 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	2 Weekly LMS based Assessment (MCQs based)	Formative	2 x 30 Minutes				
	Total			**3 Hours & 35 Minutes**			**4 Assessments**	
	Sr. #	**Block – I Assessment**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	Objectively Structured Practical Examination (OSPE)	Summative	5 Hours	5 Hours & 30 minutes			2 Summative
	2	LMS Based Block Assessment (MCQs based)	Summative	30 Minutes				
		Total		**5 Hours & 30 Minutes**			**2 Assessments**	

No. of Assessments of Biochemistry for First Year MBBS (Block- II):

Block	Sr. #	Module – 3 MSK-II Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block – II	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	30 Minutes	1 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	Weekly LMS based Assessment (MCQs based)	Formative	30 Minutes				
	Total			**3 Hours & 05 Minutes**			**3 Assessments**	
	Sr. #	**Module – 4 Blood & Immunity Module Components**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	60 Minutes	2 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	2 Weekly LMS based Assessment (MCQs based)	Formative	2 x 30 Minutes				
	Total			**3 Hours & 35 Minutes**			**4 Assessments**	
	Sr. #	**Block – II Assessment**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	Objectively Structured Practical Examination (OSPE)	Summative	5 Hours	5 Hours & 30 minutes			2 Summative
	2	LMS Based Block Assessment (MCQs based)	Summative	30 Minutes				
		Total		**5 Hours & 30 Minutes**			**2 Assessments**	

No. of Assessments of Biochemistry for First Year MBBS (Block- III):

Block	Sr. #	Module – 5 CVS Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block – II	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	30 Minutes	1 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	Weekly LMS based Assessment (MCQs based)	Formative	30 Minutes				
	Total			**3 Hours & 05 Minutes**			**3 Assessments**	
	Sr. #	**Module – 6 Respiration Module Components**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	End Module Examinations (SEQs,SAQs,EMQs, MCQs AvOSPE Based)	Summative	2 Hours 25 minutes	2 Hours & 35 minutes	60 Minutes	2 Formative	2 Summative
	2	Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	3	2 Weekly LMS based Assessment (MCQs based)	Formative	2 x 30 Minutes				
	Total			**3 Hours & 35 Minutes**			**4 Assessments**	
	Sr. #	**Block – III Assessment**	**Type of Assessments**	**Total Assessments Time**			**No. of Assessments**	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
	1	Objectively Structured Practical Examination (OSPE)	Summative	5 Hours	5 Hours & 30 minutes			2 Summative
	2	LMS Based Block Assessment (MCQs based)	Summative	30 Minutes				
		Total		**5 Hours & 30 Minutes**			**2 Assessments**	

Total Time of Biochemistry Assessments for First Year MBBS:

Module	Summative Assessment Time	Formative Assessment Time	Total Assessments Time
Foundation Module	2 Hours & 35 minutes	30 Minutes	3 Hours & 05 Minutes
MSK-I Module	2 Hours & 35 minutes	60 Minutes	3 Hours & 35 Minutes
Block -I	5 Hours & 30 Minutes		5 Hours & 30 Minutes
MSK-II Module	2 Hours & 35 minutes	30 Minutes	3 Hours & 05 Minutes
Blood & Immunity Module	2 Hours & 35 minutes	60 Minutes	3 Hours & 35 Minutes
Block -II	5 Hours & 30 Minutes		5 Hours & 30 Minutes
CVS Module	2 Hours & 35 minutes	30 Minutes	3 Hours & 05 Minutes
Respiration Module	2 Hours & 35 minutes	60 Minutes	3 Hours & 35 Minutes
Block -III	5 Hours & 30 Minutes		5 Hours & 30 Minutes
Pre Annual Examination		……	7 Hours & 45 Minutes
First Professional		……	3 Hours & 45 Minutes
Grand Total	**31 Hours & 30 Minutes**	**4 hours and 30 minutes**	**48 Hours**

Total Teaching Hours vs Total Assessment Hours

Ratio of Teaching Hours to Assessments Hours	Grand Total Teaching Hours 125 Hours:	Grand Total Assessment Hours 48 Hours
	5:2	

No. of Assessments of Clinical Component (Vertical and Horizontal Integration) for First Year MBBS (Block- I):

Block	Sr. #	Module – 1 Foundation Module Components	Type of Assessments	Total Assessments Time		No. of Assessments
				Assessment Time	Formative Assessment Time	
Block – I	1	Mid Module Examination (MCQs Based)	Formative	15 Minutes	45 Minutes	2 Formative
	2	End Module Examination (MCQs Based)	Formative	30 Minutes		
	Total			**45 Minutes**		**2 Assessments**
	Sr. #	**Module – 2 MSK-I Module Components**	**Type of Assessments**	**Total Assessments Time**		**No. of Assessments**
				Assessment Time	Formative Assessment Time	
	1	Mid Module Examination (MCQs Based)	Formative	15 Minutes	45 Minutes	2 Formative
	2	End Module Examination (MCQs Based)	Formative	30 Minutes		
	Total			**45 Minutes**		**2 Assessments**

No. of Assessments of Clinical Component (Vertical and Horizontal Integration) for First Year MBBS (Block- II):

Block	Sr. #	Module – 3 MSK-II Module Components	Type of Assessments	Total Assessments Time		No. of Assessments
				Assessment Time	Formative Assessment Time	
Block – I	1	Mid Module Examination (MCQs Based)	Formative	15 Minutes	45 Minutes	2 Formative
	2	End Module Examination (MCQs Based)	Formative	30 Minutes		
	Total			**45 Minutes**		**2 Assessments**
	Sr. #	**Module – 4 Blood & Immunity Module Components**	**Type of Assessments**	**Total Assessments Time**		**No. of Assessments**
				Assessment Time	Formative Assessment Time	
	1	Mid Module Examination (MCQs Based)	Formative	15 Minutes	45 Minutes	2 Formative
	2	End Module Examination (MCQs Based)	Formative	30 Minutes		
	Total			**45 Minutes**		**2 Assessments**

No. of Assessments of Clinical Component (Vertical and Horizontal Integration) for First Year MBBS (Block- III):

Block	Sr. #	Module – 5 CVS Module Components	Type of Assessments	Total Assessments Time		No. of Assessments
				Assessment Time	Formative Assessment Time	
Block – I	1	Mid Module Examination (MCQs Based)	Formative	15 Minutes	45 Minutes	2 Formative
	2	End Module Examination (MCQs Based)	Formative	30 Minutes		
	Total			**45 Minutes**		**2 Assessments**
	Sr. #	**Module – 6 Respiration Module Components**	**Type of Assessments**	**Total Assessments Time**		**No. of Assessments**
				Assessment Time	Formative Assessment Time	
	1	Mid Module Examination (MCQs Based)	Formative	15 Minutes	45 Minutes	2 Formative
	2	End Module Examination (MCQs Based)	Formative	30 Minutes		
	Total			**45 Minutes**		**2 Assessments**

Total Time of Clinical Component (Vertical and Horizontal Integration) Assessments for First Year MBBS:

Module	**Formative Assessment Time**	**Total Assessments Time**
Foundation Module	45 Minutes	45 Minutes
MSK-I Module	45 Minutes	45 Minutes
Block -I		
MSK-II Module	45 Minutes	45 Minutes
Blood & Immunity Module	45 Minutes	45 Minutes
Block -II		
CVS Module	45 Minutes	45 Minutes
Respiration Module	45 Minutes	45 Minutes
Block -III		
Pre-Annual Examination	……	35 Minutes
First Professional	……	60 Minutes
Grand Total	**4 hours and 30 minutes**	**6 hours and 5 minutes**

Total Teaching Hours vs Total Assessment Hours

	Grand Total Teaching Hours 97 Hours:	Grand Total Assessment Hours 6 Hours
Ratio of Teaching Hours to Assessments Hours	**19:1**	

3.2.4 Pre- Annual Assessment (PAA)

- It is mandatory to appear in all EBA to appear in PAA
- Transcript / good character certificate from head of departments will be needed to appear in pre-annual assessment.

Proposed Table of Specifications for 1st Pre-Annual Examination 2024

- Total Marks: 845

Total marks =800 Marks			
Subjects		% Weightage of subjects	Marks distribution as per weightage
	Anatomy	28%	240 Marks
	Physiology	28%	240 Marks
	Biochemistry	28%	240 Marks
	Integrated Subjects Community Medicine & Public Health/Research Behavioural Sciences Pathology Pharmacology Radiology Family Medicine Surgery Medicine Gynae & Obs Orthopedics Pediatrics Surgery Opthalmology Otorhinolaryngology	14 %	115 Marks
	Early Clinical Exposure (ECE)	1%	5 Marks
	ALPHA(Artificial Intelligence, Leadership, Professionalism, Humanities & Arts) GEC (General Education Cluster)	1%	5 Marks
	Total Marks		845 Marks

Notes:

- The total marks for final Annual Assessment (Professional examination) are 900 as per UHS
- The total marks for Pre-Annual Assessment are 800 as OSVE is not being used as assessment tool.
- As per analysis of Module/Block results throughout the academic year, the passing percentage of students is generally higher in OSVE than in other assessment tools. For comprehensive assessment this tool will not be used in Pre- Annual Assessment.as per decision of assessment committee OSVE is not included.

A - Blockwise Distribution of Marks

Total Marks	BLOCK I Marks	BLOCK II Marks	BLOCK III Marks	Total Marks
845 Marks	285 Marks	285 Marks	275 Marks	845 Marks

B - Subject wise marks breakup in Blocks

Subjects	Block I	Block II	Block III	Total Marks
Anatomy	80 Marks	80 Marks	80 Marks	240 Marks (28%)
Physiology	80 Marks	80 Marks	80 Marks	240 Marks (28%)
Biochemistry	80 Marks	80 Marks	80 Marks	240 Marks (28%)
Integrated Subjects	45 Marks	45 Marks	35 Marks	125 Marks (16%)

C - Subject wise Break up of Marks for First year MBBS - Block -I

Block	Subjects	Theory (Knowledge)	Practical (Skill/attitude)	Total marks	Total marks (Core subjects + Integrated Subjects)
Block I	Anatomy	50	30	80 marks	240+ 45 = 285 marks
	Physiology	50	30	80 marks	
	Biochemistry	50	30	80 marks	
	Total			240 marks	
(Core subjects + Integrated Subjects)	Integrated Subjects			45 Marks	
	Community Medicine /Research	6 Marks			
	Behavioural Sciences	3 Marks			
	Pathology	2 Marks			
	Pharmacology	3 Marks			

285 Marks	Radiology	2 Marks			
	Gynae & Obs	4 Marks			
	Medicine	2 Marks			
	Family Medicine	2 Marks			
	Paediatrics	4 Marks			
	Surgery	2 Marks			
	ECE		5 Marks		
	ALPHA and GEC		5 Marks		
Total marks		240+ 45 = 285 marks			

D - Subject wise Break up of Marks for First year MBBS - Block -II

Block	**Subjects**	**Theory (Knowledge)**	**Practical (Skill/attitude)**	**Total marks**	**Total marks (Core subjects + Integrated Subjects)**
Block II (Core subjects + Integrated Subjects) 285 Marks	Anatomy	50	30	80 marks	240+ 45 = 285 marks
	Physiology	50	30	80 marks	
	Biochemistry	50	30	80 marks	
	Total			240 marks	
	Integrated Subjects			45 Marks	
	Community Medicine /Research	4 Marks			
	Family Medicine	3 Marks			
	Orthopedics	3 Marks			
	Radiology	3 Marks			
	Medicine	3 Marks			
	Gynae & Obs	3 Marks			
	Behavioural Sciences	4 Marks			
	Pathology	2 Marks			
	ECE		5 Marks		

	ALPHA and GEC		5 Marks		
Total marks		240+ 45 = 285 marks			

E - Subject wise Break up of Marks for First year MBBS - Block -III

Block	**Subjects**	**Theory (Knowledge)**	**Practical (Skill/attitude)**	**Total marks**	**Total marks (Core subjects + Integrated Subjects)**
Block III Total marks (Core subjects + Integrated Subjects) 275 Marks	Anatomy	50	30	80 marks	240+35 = 275 marks
	Physiology	50	30	80 marks	
	Biochemistry	50	30	80 marks	
	Total			240 marks	
	Integrated Subjects			35 Marks	
	Community Medicine	2 Marks			
	Behavioural Sciences	2Marks			
	Medicine	3 Marks			
	Family medicine	3 Marks			
	Gynae & Obs	2 Marks			
	Radiology	2 Marks			
	Pediatrics	2 Marks			
	Otorhinolaryngology	3 Marks			
	Opthalmology	2 Marks			
	Pathology	2Marks			
	Pharmacology	2 Marks			
	ECE		5 Marks		
	ALPHA and GEC		5 Marks		
Total marks		240+35 = 275 marks			
GRAND TOTAL MARKS		800			

F - Modular distribution of Marks for Module 1(Foundation Module) & Module 2(MSK-I Module) - Block -I

Block -I Theory Component (Knowledge)

Subjects	MCQs			EMQ			SAQ			SEQ			Total marks
	Module -1	Module-2	Marks	Module -1	Module-2	Marks	Module -1	Module-2	Marks	Module -1	Module-2	Marks	
Anatomy	13	12	25	-	01	5	01	01	10	0.5	0.5	10	50
Physiology	12	13	25		01	5	01	01	10		01	10	50
Biochemistry	15	10	25	-	01	5	01	01	10	01	-	10	50
Vertically & Spirally Integrated Subjects			35	-		-	-		-	-		-	35
Total	**110**		**110**	**3**		**15**	**6**		**30**	**3**		**30**	**185**

Block -I Practical Component (Skill & Attitude)

Subjects	Lab OSPE			Iospe			OSCE			Total stations	Total marks
	Number of Stations of Module -1	Number of Stations of Module -2	Marks	Number of Stations of Module -1	Number of Stations of Module -2	Marks	Number of Stations of Module -1	Number of Stations of Module -2	Marks		
Anatomy	01	02	15	01		5	01	01	10	6	30
Physiology	01	02	15		01	5	01	01	10	6	30
Biochemistry	01	02	15	-	01	5	01	01	10	6	30
ECE	-		-	-		-		01	5	1	5
ALPHA-Research	-		-	-		-		01	5	1	5
Total	9		45	3		15	8		40	20	100

G- Modular distribution of Marks for Module 3 (MSK-II Module) & Module 4(Blood & Immunity module) - Block -II

Block -II Theory Component (Knowledge)

Subjects	MCQs			EMQ			SAQ			SEQ			Total marks
	Module -1	Module-2	Marks	Module -1	Module-2	Marks	Module -1	Module-2	Marks	Module -1	Module-2	Marks	
Anatomy	12	13	25		01	5	01	01	10	0.5	0.5	10	50
Physiology	12	13	25		01	5	01	01	10		01	10	50
Biochemistry	10	15	25		01	5	01	01	10		01	10	50
Vertically & Spirally Integrated Subjects			35	-		-	-		-	-		-	35
Total	110		110	3		15	6		30	3		30	185

Block -II Practical Component (Skill & Attitude)

Subjects	LabOSPE			Iospe			OSCE			Total stations	Total marks
	Number of Stations of Module -1	Number of Stations of Module -2	Marks	Number of Stations of Module -1	Number of Stations of Module -2	Marks	Number of Stations of Module -1	Number of Stations of Module -2	Marks		
Anatomy	02	01	15	-	01	5	01	01	10	6	30
Physiology	01	02	15		01	5	01	01	10	6	30
Biochemistry	01	02	15	01	-	5	01	01	10	6	30
ECE	-		-	-		-		01	5	1	5
ALPHA-Research	-		-	-		-		01	5	1	5
Total	9		45	3		15	8		40	20	100

H - Modular distribution of Marks for Module 5 (CVS Module) &Module 6 (Respiration module) - Block -III

Block -III Theory Component (Knowledge)

Subjects	MCQs			EMQ			SAQ			SEQ			Total marks
	Module -1	Module-2	Marks	Module -1	Module-2	Marks	Module -1	Module-2	Marks	Module -1	Module-2	Marks	
Anatomy	13	12	25	01	-	5	01	01	10	0.5	0.5	10	50
Physiology	13	12	25	01		5	01	01	10	01		10	50
Biochemistry	13	12	25	01	-	5	01	01	10	01	-	10	50
Vertically & Spirally Integrated Subjects			25	-		-	-		-	-		-	25
Total	100		100	3		15	6		30	3		30	175

Block -III Practical Component (Skill & Attitude)

Subjects	LabOSPE			I OSPE			OSCE			Total stations	Total marks
	Number of Stations of Module -1	Number of Stations of Module -2	Marks	Number of Stations of Module -1	Number of Stations of Module -2	Marks	Number of Stations of Module -1	Number of Stations of Module -2	Marks		
Anatomy	02	01	15	-	01	5	01	01	10	6	30
Physiology	02	01	15	01	-	5	01	01	10	6	30
Biochemistry	02	01	15	-	01	5	01	01	10	6	30
ECE	-		-	-		-		01	5	1	5
ALPHA-Research	-		-	-		-		01	5	1	5
Total	9		45	3		15	8		40	20	100

Calculation for Pre-Annual Assessment Implementation for First Year MBBS 2024

Block -I	Theory component (Knowledge)				Practical component (Skill & Attitude)			Total time required for Block – I pre annual assessment is 8 hrs and 25 minutes
	MCQs	SAQs	SEQs	EMQs	Lab OSPE	I OSPE	OSCE	
Total number of questions	110	6	3	3	9	3	8	
Time required for each component	110 x 1 min	6 x 10 min	3 x 10 min	3 x 5 min	9 x2.5 min	3 x 2.5 min	8 x 2.5 min	
	110 mins	60 mins	30 mins	25 mins	22.5 mins	7.5 mins	20 mins	
Total time	110+60+30+25 = 225 mins (4hrs and 25 mins)				22.5+7.5+20 = 50 mins/ round of 20 students 4 hrs			
					If the OSPE is conducted simultaneously at 4 venues: In 50 minutes, 20 students can complete the OSPE at each venue, totaling 80 students across all venues. With 5 rounds at 4 venues, the entire class can complete the OSPE within 4 hours.			

Block -II	Theory component (Knowledge)				Practical component (Skill & Attitude)			Total time required for Block – II pre annual assessment is 8 hrs and 25 minutes
	MCQs	SAQs	SEQs	EMQs	Lab OSPE	I OSPE	OSCE	
Total number of questions	110	6	3	3	9	3	8	
Time required for each component	110 x 1 min	6 x 10 min	3 x 10 min	3 x 5 min	9 x2.5 min	3 x 2.5 min	8 x 2.5 min	
	110 mins	60 mins	30 mins	25 mins	22.5 mins	7.5 mins	20 mins	
Total time	110+60+30+25 = 225 mins (4hrs and 25 mins)				22.5+7.5+20 = 50 mins/ round of 20 students 4 hrs			
					If the OSPE is conducted simultaneously at 4 venues: In 50 minutes, 20 students can complete the OSPE at each venue, totaling 80 students across all venues. With 5 rounds at 4 venues, the entire class can complete the OSPE within 4 hours.			

Block -III	Theory component (Knowledge)				Practical component (Skill & Attitude)			Total time required for Block – III pre annual assessment is 8 hrs and 15 minutes
	MCQs	SAQs	SEQs	EMQs	Lab OSPE	I OSPE	OSCE	
Total number of questions	100	6	3	3	9	3	8	
Time required for each component	100 x 1 min	6 x 10 min	3 x 10 min	3 x 5 min	9 x2.5 min	3 x 2.5 min	8 x 2.5 min	
	100 mins	60 mins	30 mins	25 mins	22.5 mins	7.5 mins	20 mins	
Total time	100+60+30+25 = 225 mins (4hrs and 15 mins)				22.5+7.5+20 = 50 mins/ round of 20 students 4 hrs			
					If the OSPE is conducted simultaneously at 4 venues: In 50 minutes, 20 students can complete the OSPE at each venue, totaling 80 students across all venues. With 5 rounds at 4 venues, the entire class can complete the OSPE within 4 hours.			

3.2.5 Annual Professional Assessment (APA)

- Minimum 50% score in pre-annual assessment is required to appear in annual professional examination.
- Annual professional exam weightage will be 70%
- Continuous internal assessment weightage will be 30%
- 60% marks will be needed to pass annual professional examination.
- Written and practical /OSPE/OSCE should be passed separately.

Regulations

- Final Annual Assessment shall be open to any student who:
  - Has been enrolled/registered and completed one academic year preceding the concerned Final Annual Assessment in Rawalpindi Medical University.
  - Has his/her name submitted to the Controller of Examinations for assessment purposes by the Principal of the College and meets all prerequisites for the assessment.
  - Has his/her internal assessment marks for all Blocks submitted to the Controller of Examinations by the Principal of the College along with the admission form.
  - Produces good character certificate the following certificates duly verified by the Principal:
- Candidates not meeting the above requirements shall not be allowed to appear in the Final Annual Assessment but may sit for the supplementary examination if they fulfill all remaining requirements and stay enrolled as regular students up to the next examination.
- To pass the Final Annual Assessment, students must achieve at least 50% in both the Written and Oral/Practical/Clinical assessments, as well as a 50% aggregate score simultaneously.
- Candidates scoring 85% or above in any paper will be awarded a "distinction" in that Block, provided they achieve at least 80% in the Written component. Candidates must pass all papers in the Final Annual Assessment concurrently to receive any distinctions.
- A candidate who fails one or more papers in the Final Annual Assessment may temporarily join the next professional class until the supplementary examination but will not be promoted permanently without passing all papers.
- Students taking the supplementary examination for the first time due to an absence in the annual examination, if failing any paper, will be retained in their current class.
- Any student failing to clear the First or Second Final Annual Assessment MBBS within four attempts will be ineligible to continue or reapply for MBBS or BDS admission.
- Examination applications must be submitted to the Controller of Examination via the College Principal, with the required fee and documentation.

- College must submit question papers, internal assessment marks, and attendance records for each block to the Examinations Department of Rawalpindi Medical University.
- Revised internal assessments are only permissible for detained students. Continuous assessment records must be maintained by college departments.
- Examination fees are to be paid through the Principal, using a bank draft, pay order, or crossed cheque made out to the Treasurer, Rawalpindi Medical University.
- One annual and one supplementary examination for First and Second Final Annual Assessment MBBS are allowed per academic session. Under exceptional circumstances, such as national emergencies, a special examination may be arranged with the Syndicate and Board of Governors' approval.

Reference: UHS INTEGRATED CURRICULUM VERSION 2

Statutes:

- **Scheduling:** The First Professional MBBS will be held at the end of First year whereas the Second Professional MBBS shall be held at the end of Second year.
- **Subjects:** Every candidate is required to appear in the following subjects in each Block

a. **Core subjects-** Integrated Anatomy, Integrated Physiology, Integrated Biochemistry

b. **Vertically integrated Subjects-** Community Medicine C Public Health,

Behavioral Sciences, Pathology, Pharmacology, associated Clinical Subjects

c. **Spirally Integrated subjects-** General Education Cluster (GEC),ALPHA (Artificial Intelligence, Leadership, Professionalism, Humanities and Arts), Early Clinical Exposure (ECE) and Research.

- **Assessments:** There will be three papers in First Annual Professional Examination and four papers in the Second Annual professional Examination.

Paper	First year MBBS	Second year MBBS
Paper-1	Block -I	Block -I
Paper-2	Block- II	Block- II
Paper-3	Block-III	Block-III
Paper-4	-------	GEC (Islamic Studies C Pakistan Studies)

a. **First Professional Examination Total Marks = G00***

i. Block I Assessment Total Marks = 300

ii. Block II Assessment Total Marks = 300

iii. Block III Assessment Total Marks = 300

b. **Second Professional Examination- 1000 Marks***

i. Block I Assessment Total Marks = 300

ii. Block II Assessment Total Marks = 300

iii. Block III Assessment Total Marks = 300

iv. GEC Assessment (Islamic Studies C Pakistan Studies)Total Marks = 100

***Marks Adopted from University of Health Sciences (UHS)
Reference: **https://www.uhs.edu.pk/downloads/2k23mbbscurriculum.pdf**

- **Continuous Internal Assessment (CIA):**

Continuous Internal Assessment shall carry total marks = 270 (30% of the total allocated marks= 900) for first and second year MBBS .CIA for each block is 90 marks and this score will be equally distributed to the written Assessment (45marks) and practical assessment(45 marks).

- **Block Assessment Components**: the components of Block Assessment shall be as follows:
  a. **One theory Paper (K)** having two sections

i. **Section:1** One best type Multiple choice questions of 75 Marks (1 mark for each MCQ) and time allocated will be 90 Minutes. The integration ratio in MCQs will be 70% core content, 10% horizontal integration, and 20% vertical integration .There will be no negative marking

ii. **Section:2** will have Structured Essay Questions of 5 marks each and time allocated for 1 SEQ will be 10 minutes**.**

First year MBBS	**Number of MCQs**	**Number of SEQs**
Block -I	75	6
Block -II	75	6
Block -III	75	6
Second Year MBBS	**Number of MCQs**	**Number of SEQs**
Block -I	70	7
Block -II	75	6
Block -III	80	5

b. **Practical Component (Skill and Attitude):** The assessment will include an Objective Structured Practical Examination (OSPE) with a total of 15 stations, time allocated for each station will be 4 minutes.

i. **Laboratory OSPE (Lab OSPE):** This section will consist of stations focused on practical (hands on performance) components from core subject areas, each station carries 5 marks.

ii. **Integrated OSPE (I OSPE):** This section will include stations, from each core subject, emphasizing horizontal and vertical integration, each station carries 5 marks

i. **Objective Structured Clinical Examinations (OSCE):** This section comprises of stations, dedicated to Early Clinical Exposure (ECE) , Simulated Patients (SP), models, ALPHA and clinical component of core subjects each station carries 5 marks.

ii. **Objective Structured Viva Examinations (OSVE):** This section will consist of table viva for each core subject. Students will be evaluated by internal and external examiner using a structured marking rubric, with each viva carries15 marks**.**

First year MBBS	**Number of LabOSPE Stations**	**Number of iOSPE Stations**	**Number of OSCE Stations**	**Number of table VIVA**
Block -I	5	3	4	3
Block -II	5	3	4	3
Block -III	4	3	5	3
Second Year MBBS	**Number of LabOSPE Stations**	**Number of iOSPE Stations**	**Number of OSCE Stations**	**Number of table VIVA**
Block -I	4	3	5	3
Block -II	5	3	4	3
Block -III	5	3	4	3

- **Annual Examination Eligibility Criteria:** Eligibility to appear in Annual Professional will be as per RMU Assessment Policy approved by the Academic Council and Syndicate.
- **Passing Criteria:** A student will be declared pass in a block assessment if he/she scores 50% and above marks in each block assessment component (Theory and Practical) and

50% and above marks in each Core Subject(Anatomy, Physiology C Biochemistry).

- **Supplementary Examination Criteria:** The student who fails in any component of a block assessment will have to appear in the supplementary examination of the entire block.

Table of Abbreviation

CIA	Continuous Internal Assessment
I-OSPE	Integrated OSPE
LabOSPE	Laboratory Objective Structured Practical Examination
OSCE	Objective Structured Clinical Examinations
OSVE	Objective Structured Viva Examinations
ECE	Early Clinical Exposure
ALPHA	(Artificial Intelligence, Leadership, Professionalism, Humanities C Arts
GEC	General Education Cluster
K	Knowledge

Annual Assessment Plan of First Year MBBS 2024 (Batch 51)

- Total First Professional Marks: 900
- Continuous Internal Assessment (30%) =270 Marks
- Annual Marks: (70%) =630 Marks

A: Original Distribution of CIA (Continuous Internal Assessment) Marks (270 Marks)

Blocks	Subjects	Total marks	Module 1	Module 2	Total marks
Block 1 90 Marks	Anatomy	30 marks	15 marks	15 marks	90 Marks
	Physiology	30 marks	15 marks	15 marks	
	Biochemistry	30 marks	15 marks	15 marks	
Block 2 90 Marks	Anatomy	30 marks	15 marks	15 marks	90 Marks
	Physiology	30 marks	15 marks	15 marks	
	Biochemistry	30 marks	15 marks	15 marks	
Block 3 90 Marks	Anatomy	30 marks	15 marks	15 marks	90 Marks
	Physiology	30 marks	15 marks	15 marks	
	Biochemistry	30 marks	15 marks	15 marks	
				Total marks	**270 Marks**

B: Extrapolated marks to be calculated from Summative assessments throughout the Academic Year 2024

Blocks	Modules	Anatomy	Physiology	Biochemistry	Total
Block 1 1470 Marks	Module 1	200	200	200	600
	Module 2	200	200	200	600
	Block Exam	90	90	90	270
	Total	**490**	**490**	**490**	**1470**
Block 2 1470 Marks	Module 1	200	200	200	600
	Module 2	200	200	200	600
	Block Exam	90	90	90	270
	Total	**490**	**490**	**490**	**1470**
Block 3 1470 Marks	Module 1	200	200	200	600
	Module 2	200	200	200	600
	Block Exam	90	90	90	270
	Total	**490**	**490**	**490**	**1470**
Total Marks		**1470**	**1470**	**1470**	**4410**

Note:

- Total Operational marks =4410 converted to 270 marks and per block 1470 marks will be converted to 90 marks for Annual professional marks calculation.
- The CIA should be submitted to Examination cell in round off values.
- Evidence of CIA Marks along with papers should be retained in the department that can be reproduced on request by examination cell if required.

Reference: https://www.uhs.edu.pk/downloads/2k23mbbscurriculumv20.pdf

Annual First professional Examinations 2024

- Total First Professional Marks: 900
- Continuous Internal Assessment (30%) =270 Marks
- Annual Marks: (70%) =630 Marks

A: First Professional Examination (70%)

A: First Professional Examination (70%) Total marks = 630 Marks		
Subjects	**% Weightage of subjects**	**Marks distribution as per weightage**
Anatomy	35%	218 Marks
Physiology	30%	192 Marks
Biochemistry	23%	137 Marks
Integrated Subjects • Community Medicine C Public Health/Research • Behavioural Sciences • Pathology • Pharmacology • Radiology • Family Medicine • Surgery • Medicine • Gynae C Obs • Orthopedics • Pediatrics • Surgery • Opthalmology • Otorhinolaryngology	11%	73 Marks
• Early Clinical Exposure • ALPHA and General Education Cluster (GEC)	2%	10 Marks
Total Marks		**630 Marks**

B: Blockwise Distribution of Marks

Total Annual Professional Marks (70%)	BLOCK 1 Marks	BLOCK 2 Marks	BLOCK 3 Marks	Total Marks
630 Marks	210 Marks	210 Marks	210 Marks	630 Marks

- Reference: https://www.uhs.edu.pk/downloads/2k23mbbscurriculumv20.pdf

C: Subject Wise Marks Breakup In Blocks

Subjects	Block 1	Block 2	Block 3	Total Marks
Anatomy	85 Marks	78 Marks	55 Marks	218 Marks (35%)
Physiology	45 Marks	64 Marks	83 Marks	192 Marks (30%)
Biochemistry	53 Marks	39 Marks	45 Marks	137 Marks (23%)
Integrated Subjects	27 Marks	29 Marks	27 Marks	83 Marks (13%)

D: Subject Wise Distribution of Marks for First Year MBBS

Block	Subjects	Theory	Practical	Total marks	Total marks Core Subject + Integrated Subjects
Block 1 210 Marks	Anatomy	45 marks	40 marks	85 marks	183+27 = 210 marks
	Physiology	20 marks	25 marks	45 marks	
	Biochemistry	23 marks	30 marks	53 marks	
	Total	88	95	**183 marks**	
	Integrated Subjects			27 Marks	
	• Community Medicine /Research	4 Marks			
	• Behavioural Sciences	2 Marks			
	• Pathology	2 Marks			
	• Pharmacology	3 Marks			
	• Radiology	1 Marks			
	• Gynae C Obs	1 Marks			
	• Medicine	1 Marks			
	• Family Medicine	1 Marks			
	• Paediatrics	1 Marks			
	• Surgery	1 Marks			
	• ECE		5 Marks		
	• ALPHA and GEC		5 Marks		
Total marks		**183+27 = 210 marks**			

Block	Subjects	Theory	Practical	Total marks	Total marks Core Subject + Integrated Subjects
Block 2	Anatomy	38 marks	40 marks	78 marks	181+29 = 210 marks
	Physiology	34 marks	30 marks	64 marks	
	Biochemistry	14 marks	25 marks	39 marks	
	Total	86	95	**181 Marks**	
	Integrated Subjects				
	• Community Medicine /Research	4 Marks			

210 Marks	• Family Medicine	1 Marks		**29 Marks**	
	• Orthopedics	2 Marks			
	• Radiology	2 Marks			
	• Medicine	3 Marks			
	• Gynae C Obs	1 Marks			
	• Behavioural Sciences	4 Marks			
	• Pathology	2 Marks			
	• ECE		5 Marks		
	• ALPHA and GEC		5 Marks		
Total marks		**181+29 = 210 marks**			

Block	**Subjects**	**Theory**	**Practical**	**Total marks**	**Total marks Core Subject + Integrated Subjects**
Block 3 **210 Marks**	Anatomy	25 marks	30 marks	55 marks	**183+27 = 210 marks**
	Physiology	48 marks	35 marks	83 marks	
	Biochemistry	15 marks	30 marks	45 marks	
	Total	88	95	**183 marks**	
	Integrated Subjects			**27 Marks**	
	• Community Medicine	3 Marks			
	• Behavioural Sciences	2 Marks			
	• Medicine	2 Marks			
	• Family medicine	1 Marks			
	• Gynae C Obs	1 Marks			
	• Radiology	1 Marks			
	• Pediatrics	1 Marks			
	• Otorhinolaryngology	1 Marks			
	• Opthalmology	1 Marks			
	• Pathology	2 Marks			
	• Pharmacology	2 Marks			
	• ECE		5 Marks		
	• ALPHA and GEC		5 Marks		
Total marks		**183+27 = 210 marks**			
GRAND TOTAL MARKS		**630 Marks**			

E: Block Wise Distribution Of Marks For First Year MBBS (Batch 51) (Annual Professional Marks + CIA)

Subject	Theory			Practical			Total Marks
	Component	**No of Items**	**Marks**	**Component**	**No of Items**	**Marks**	
Block 1 **(Foundation s MSK-1)** **Total Annual marks=210**	Section I- MCQ Section II- SEQ 6	75	75 30	LabOSPE iOSPE OSCE OSVE	5 3 4 3	25 15 20 45	210
CIA = 90 Marks	Continuous Internal Assessment (30%)		45	Continuous Internal Assessment (30%)		45	90
Total Annual marks+ **CIA =210+90= 300**	**Total Marks**		**150**	**Total Marks**		**150**	**300**
Block 2 **(MSK-2 Blood and Immunity** **Total Annual** **marks=210**	Section I- MCQ Section II- SEQ	75 6	75 30	LabOSPE iOSPE OSCE OSVE	5 3 4 3	25 15 20 45	210
CIA = 90 Marks	Continuous Internal Assessment (30%)		45	Continuous Internal Assessment (30%)		45	90
Total Annual marks+ **CIA =210+90= 300**	**Total Marks**		**150**	**Total Marks**		**150**	**300**
Block 3 **(CVS Respiration)** **Total Annual** **marks=210**	Section I- MCQ Section II- SEQ	75 6	75 30	LabOSPE iOSPE OSCE OSVE	4 3 5 3	20 15 25 45	210
CIA = G0 Marks	Continuous Internal Assessment (30%)		45	Continuous Internal Assessment (30%)		45	90
Total Annual marks + **CIA =210+G0= 300**	**Total Marks**		**150**	**Total Marks**		**150**	300
						Grand Total Marks	**G00**

F: 1st Professional Examination 2024 (Batch 51)
Block 1 Assessment Breakup (Foundations MSK-1 Modules)

Themes	Discipline	Theory				Practical (OSPE)			OSVE	Marks	%	Total Marks per subject	
		No of MCQs (1 marks each)	No of SEQs (5 marks each)	Marks	%	No of Stations of LabOSPE (5 marks each)	No of Stations of iOSPE (5 marks each)	No of Stations of OSCE (5 marks each)	OSVE (15 Marks)			Marks	%
Cores Horizontally Integrated Subjects	Anatomy C Applied /Clinical	30	3	45	30	3	1	1	1	40	32	85	40
	Physiology C Applied/Clinical	10	2	20	26	1	1	-	1	25	29	45	21
	Biochemistry C Applied/clinical	18	1	23	26	1	1	1	1	30	29	53	25
Vertically Integrated Subjects	Community Medicine C Public Health/Research	4	-	3	4	-	-	-	-	-	-	4	14
	Behavioural Sciences	2	-	1	2	-	-	-	-	-	-	2	
	Pathology	2	-	2	2	-	-	-	-	-	-	2	
	Radiology	1		1								1	
	Gynae C Obs	1		1								1	
	Medicine	1		1								1	
	Family Medicine	1		1								1	
	Paediatrics	1		1								1	
	Surgery	1		1								1	
	Pharmacology	3	-	3	3	-	-		-	-	-	3	
Spirally Integrated Subjects	ECE	-	-	-		-	-	1	-	5	5	5	
	ALPHA and GEC	-	-	-		-	-	1	-	5	5	5	
Total		**75**	**6x5=30**	**105**	**100**	**5x5=25**	**3x5=15**	**4x5=20**	**3x15=45**	**105**	**100**	**210**	**100**
Total		**105**				**105**					**105+105=210**		

G: 1st Professional Examination 2024 (Batch 51)
Block 2 Assessment
MSK-2 s Blood/Immunity Modules

Theme	Subject	Theory			Practical			OSVE		Total Marks per subject	
		No of MCQs (1 marks each)	No of SEQs (5 marks each)	Marks	No of Stations of LabOSPE (5 marks each)	No of Stations of iOSPE (5 marks each)	No of Stations of OSCE (5 marks each)	OSVE (15 Marks)	Marks	Total Marks	%
Cores Horizontally Integrated Subjects	Anatomy C Applied /Clinical	23	3	38	3	1	1	1	40	78	37
	Physiology C Applied/Clinical	24	2	29	1	1	1	1	30	64	30
	Biochemistry C Applied/clinical	9	1	14	1	1	-	1	25	39	18
Vertically Integrated Subjects	Community Medicine C Public Health	4	-	4	-	-	-	-	-	4	15
	Behavioural Sciences	4	-	4	-	-	-	-	-	4	
	Pathology	2	-	2	-	-	-	-	-	2	
	Family Medicine	1								1	
	Orthopedics	2								2	
	Radiology	2								2	
	Medicine	3								3	
	Gynae C Obs	1								1	
Spirally Integrated Subjects	ECE	-	-	-	-	-	1	-	5	5	
	ALPHA and GEC	-	-	-	-	-	1	-	5	5	
Total		**75**	**6x5=30**	**105**	**5x5=25**	**3x5=15**	**4x5=20**	**3x15=45**	**105**	**210**	**100**
Total		**105**			**105**					**105+105=210**	

H: 1st Professional Examination 2024 (Batch 51)
Block 3 Assessment
CVS Respiratory Modules

Themes	Discipline	Theory			Practical			OSVE		Total Marks per subject	
		No of MCQs (1 marks each)	No of SEQs (5 marks each)	Marks	No of Stations of LabOSPE (5 marks each)	No of Stations of iOSPE (5 marks each)	No of Stations of OSCE (5 marks each)	OSVE (15 Marks)	Marks	Marks	%
Cores Horizontally Integrated Subjects	Anatomy C Applied /Clinical	15	2	25	1	1	1	1	30	55	26
	Physiology C Applied/Clinical	33	3	48	2	1	1	1	35	83	40
	Biochemistry C Applied/clinical	10	1	15	1	1	1	1	30	45	21
Vertically Integrated Subjects	Community Medicine C Public Health	2	-	2	-	-	-	-	-	2	13
	Behavioural Sciences	2	-	2	-	-	-	-	-	2	
	Pathology	2	-	2	-	-	-	-	-	2	
	Medicine	2		2						2	
	Family medicine	1		1						1	
	Gynae C Obs	1		1						1	
	Radiology	1		1						1	
	Pediatrics	1		1						1	
	Otorhinolaryngology	1		1						1	
	Opthalmology	1		1						1	
	Pathology	2		2						2	
	Pharmacology	1	-	1	-	-	-	-		1	
Spirally Integrated Subjects	ECE	-	-	-	-	-	1	-	5	5	
	ALPHA and GEC	-	-	-	-	-	1	-	5	5	
Total		**75**	**6x5=30**	**105**	**4x5=20**	**3x5=15**	**5x5=25**	**3x15=45**	**105**	**210**	**100**
Total		**105**			**105**					**105+105=210**	

Section-XIII

Digital Literacy
&
Learning Resources

Digital Services and Resources

A Data Center is the main central hub of digital services and resources of Rawalpindi Medical University.

Following are the digital resources to enhance the educational and research capabilities of students, researchers, and faculty.

1. Pakistan Education and Research Network (PERN)

Pakistan education and research network initiated by the Government of Pakistan under the administration of HEC. The main objective of PERN is to support and enhance the research and educational capabilities of public sector universities. PERN provides the following research and educational facilities.

- High-speed internet bandwidth.
- Intranet Bandwidth.
- Research Bandwidth Connectivity to the following research networks.

1. National Research and Education Network (NREN) Global research network.
2. Trans Eurasia Information Network (TEIN),
3. China Education and Research Network (CERNET)
4. GEANT is the pan-European data network for research
5. Canadian Network for the Advancement of Research, Industry, and Education CANARIE (Canada)

Users and Bandwidth Details	
Internet Bandwidth	**230 Mbps**
Main Campus	160 Mbps
New Teaching Block	70 Mbps
PERN Bandwidth	**120 Mbps**
Main Campus	100 Mbps
New Teaching Block	20 Mbps
PERN Users	**1938**
Students	1385
Faculty Members (RMU & Allied Hospitals)	360
Management & Staff	78
Technical	47
Smart Classroom Users (Main Campus and NTB)	68

Leveraging the strides in technological innovation, The Department of Information Technology has successfully rolled out a comprehensive Wi-Fi mesh network across its campus. This transformative step ensures seamless wireless connectivity both indoors and outdoors, significantly enhancing the digital experience for students, faculty, researchers, and staff members.

Embracing the cutting-edge wireless protocol 802.11n, this network empowers each Access Point to deliver an impressive bandwidth of up to 1000 Mbps to users.

In terms of infrastructure, the campus has been equipped with a total of 81 Access Points, strategically positioned across various locations including academic buildings, open spaces, and hostels. This comprehensive coverage ensures that users can seamlessly access the network regardless of their location on campus.

2. Official / Institutional E-mail System

- Migration of unlicensed mailboxes to licensed mailboxes without any loss of data.
- Enhance the capacity of data storage in mailboxes 1 GB to 1 TB cloud storage per user.
- Increase the number of email accounts from 200 to 5500 licensed accounts with the facility of OneDrive and Microsoft Teams.
- 5000 Microsoft A3 activated license for faculty students and researchers.

Features:

Outlook (Email)

Teams (Meeting, Research Collaboration, Research Group)

Forms (Survey, Quiz, Polls, Reviews)

Office Applications (Word, Excel, PowerPoint)

3. Software Licensing

Rawalpindi Medical University has an engagement with Microsoft through HEC for volume licensing for their faculty students and researchers which includes Turnitin, Windows Server, One Drive, MS Office 365, and MS Teams.

Turnitin:

Turnitin (stylized as Turnitin) is an Internet-based plagiarism detection service.

- Unlimited license for faculty
- 300 licenses for students
- Faculty and students should have RMU's official e-mail address.
- Instructor can create a class and add students to a class for research purposes.
- Uphold academic integrity.
- Superpower your assessment
- Foster original thinking

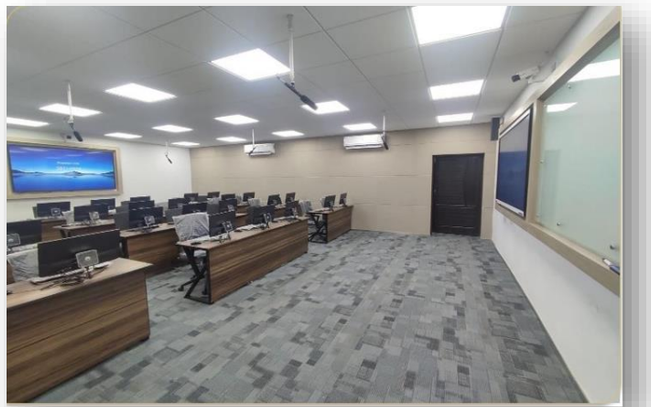
Link: https://turnitin.com/

4. Smart Classroom (Main Campus and NTB)

The establishment of Smart Classroom setup can play a pivotal role to enhance students teachers interaction through interactive online & distance learning, bridge the gap of good faculty, meet the shortage of faculty members at the universities/ campuses located at far-flung areas and ultimately uplifting the standard of education across the board.

Rawalpindi Medical University established smart classrooms at the main campus and its branch site at NTB.

Smart Classroom Main Campus RMU



Smart Classroom New Teaching Block (NTB) RMU

5. Campus Management System (CMS)

A Campus Management System (CMS) is in the implementation stage in the RMU. It will automate the different key processes of the university, from admission to examination.

Student Profiling and Registration

It includes student personal and educational information.

Sub Modules:

a) Digital Admission Form with supporting documents.
b) Verification by Student Section
c) Registration & Issuance of Registration Cards.
d) Timetable and Calendar View.
e) E-card printing

Faculty Profiling

It includes faculty personnel, educational, research, and all relevant information.

Sub Modules:

a) HR Section Verification
b) Dashboard
    i. My Profile View
    ii. My Academic Sessions View
c) Teacher's Attendance
d) Student's Attendance

Academic Module

It includes all academic activities of an integrated modular system.

The Department of Medical Education (DME) creates and manages the modules/Sessions/Batches etc.
Faculty and Students are directly engaged with their profiles, Sessions, Timetables, and Academic Calander.

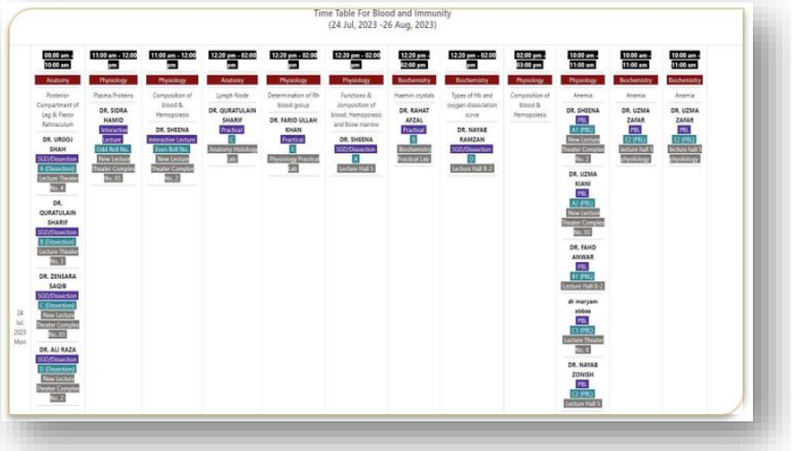
Sub Modules:

a) Configuration
- Campuses/ Hospital
- Departments
- Venues
- Batches
- Programs

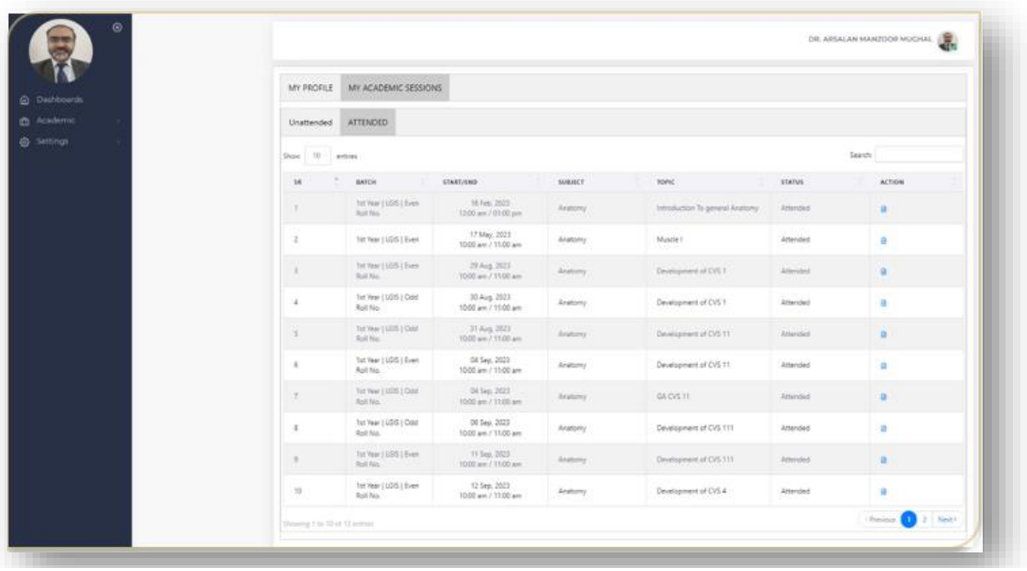
b) Academic
- Module
- Attendance
- Schedules
- Event

Calendar A few screenshots are attached below as a reference.

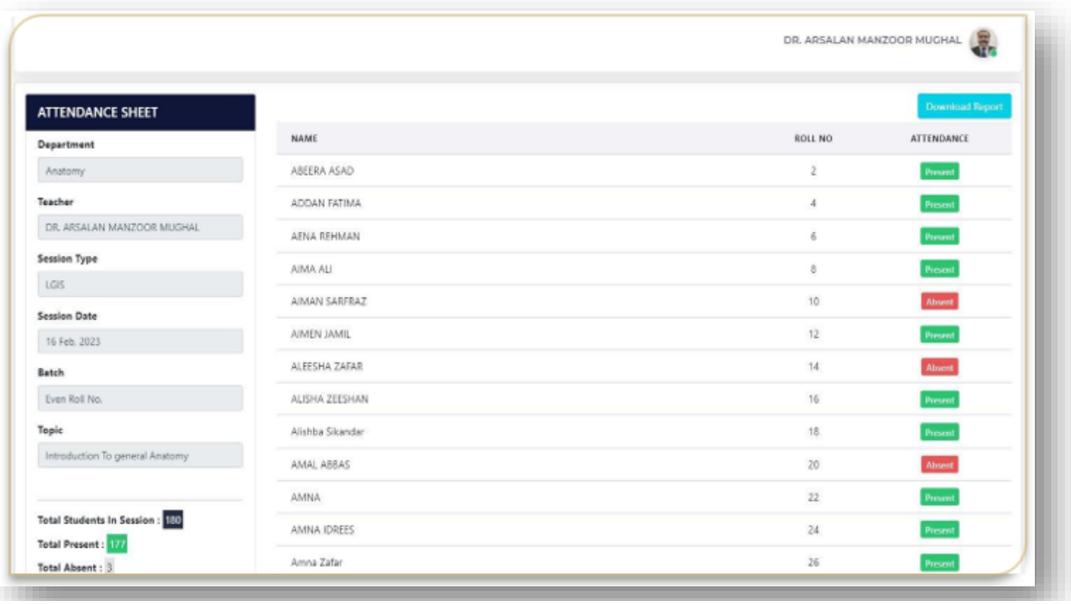
CMS Time Table



Teacher Attendance



Student Attendance



6. E-Log System for Postgraduate Residency Program

PGT Portal will provide users with faster and easier access to Logbook features
while offering value-added content to increase session duration and reduce bounce rate. From here, the system's detailed objectives could include the following:

7. Digital Library

Provide access to online international scholarly literature for research purposes. It also provides access to high quality general articles and e-books through PERN.

RMU is now offering the HEC Digital Library facility to the faculty and students, as an on-campus facility.

The Digital Library is a collection of electronic resources that provides direct/indirect access to a systematically organized collection of digital objects.

HEC National Digital Library (DL) is a program to provide access to international scholarly e-literature. Providing access to high-quality, peer-reviewed journals, databases, articles, and ebooks across a wide variety of disciplines to researchers within public and private universities in Pakistan and non-profit research and development organizations.

It provides 50,000 online full-text e-books in addition to more than 23,000 journals.

Institute For Operations Research And The Management Sciences (Informs)

Springerlink

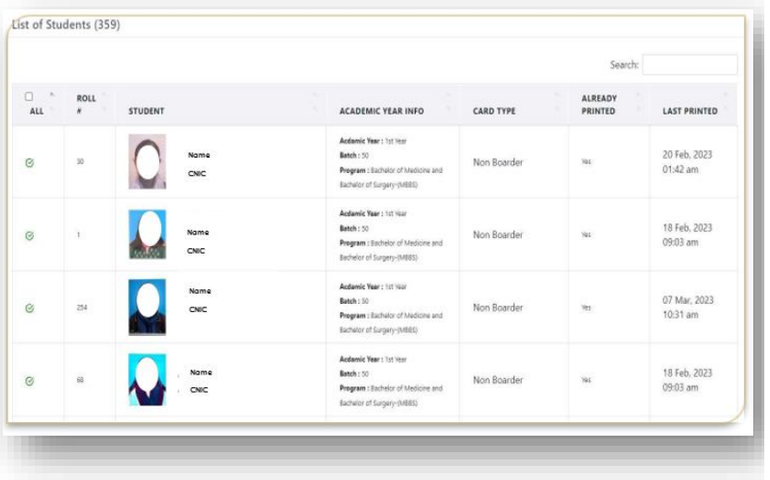
Taylor & Francis Journals

Wiley-Blackwell Journals

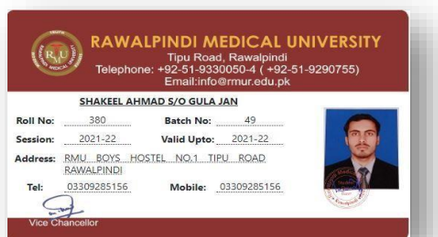
Wolters Kluwer Ovid Sp

Link: http://www.digitallibrary.edu.pk/rmc.html

Student Details



E-card Printing

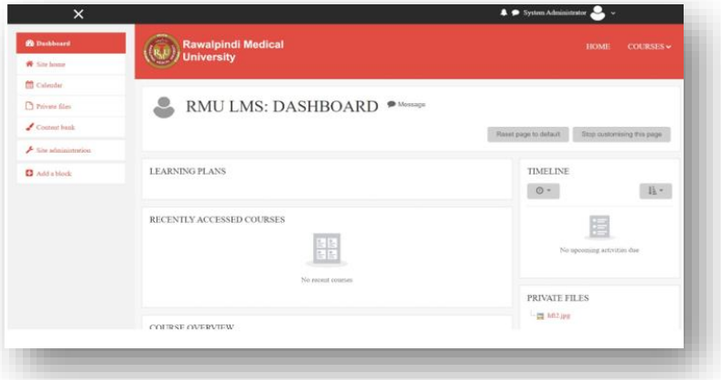


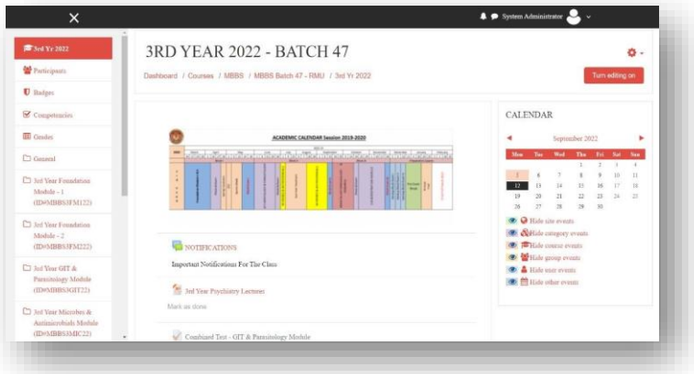
Digital Library

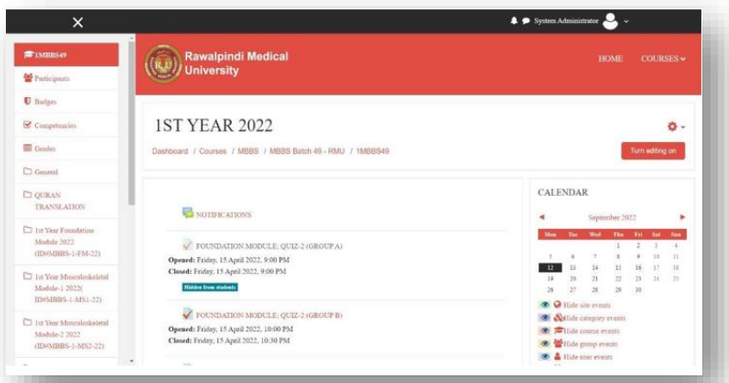
8. Content and Learning Management System (CLMS)

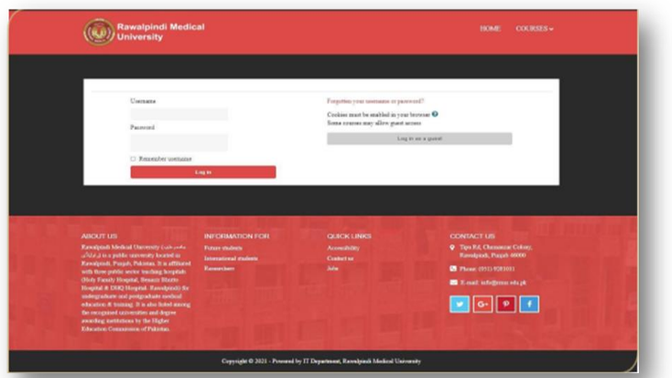
An online integrated software used for creating, delivering, tracking, scheduling, assessments, content uploading and reporting of educational courses. Link: https://clms.rmur.edu.pk/login/index.php

Users:	3830
Courses:	(Active 12)
Questions:	19542
Content Folders:	370
Books:	5
Attempted Quizzes and Results:	478
Files / Notes:	70
External Links:	25
Assignments:	35









Learning Resources

Subjects	Resources
Core Subjects & Horizontal Integration Subjects	
Anatomy	**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 http://www.anatomyzone.com 3D anatomy https://teachmeanatomy.info/ **Histology** B. Young J. W. Health Wheather's Functional Histology 6th edition. Medical Histology by Prof. Laiq Hussain 7th edition. https://www.udemy.com/course/histology/ **Embryology** Keith L. Moore. The Developing Human 11th edition. Langman's Medical Embryology 14th edition.
Physiology	**Textbooks** Textbook Of Medical Physiology by Guyton And Hall 14th edition. Ganong ' S Review of Medical Physiology 26th edition. **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** Lippincott IIIustrated Reviews: Biochemistry – Wolters Kluwer 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. 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** 1. Lippincot Illustrated Pharmacology 9th edition.

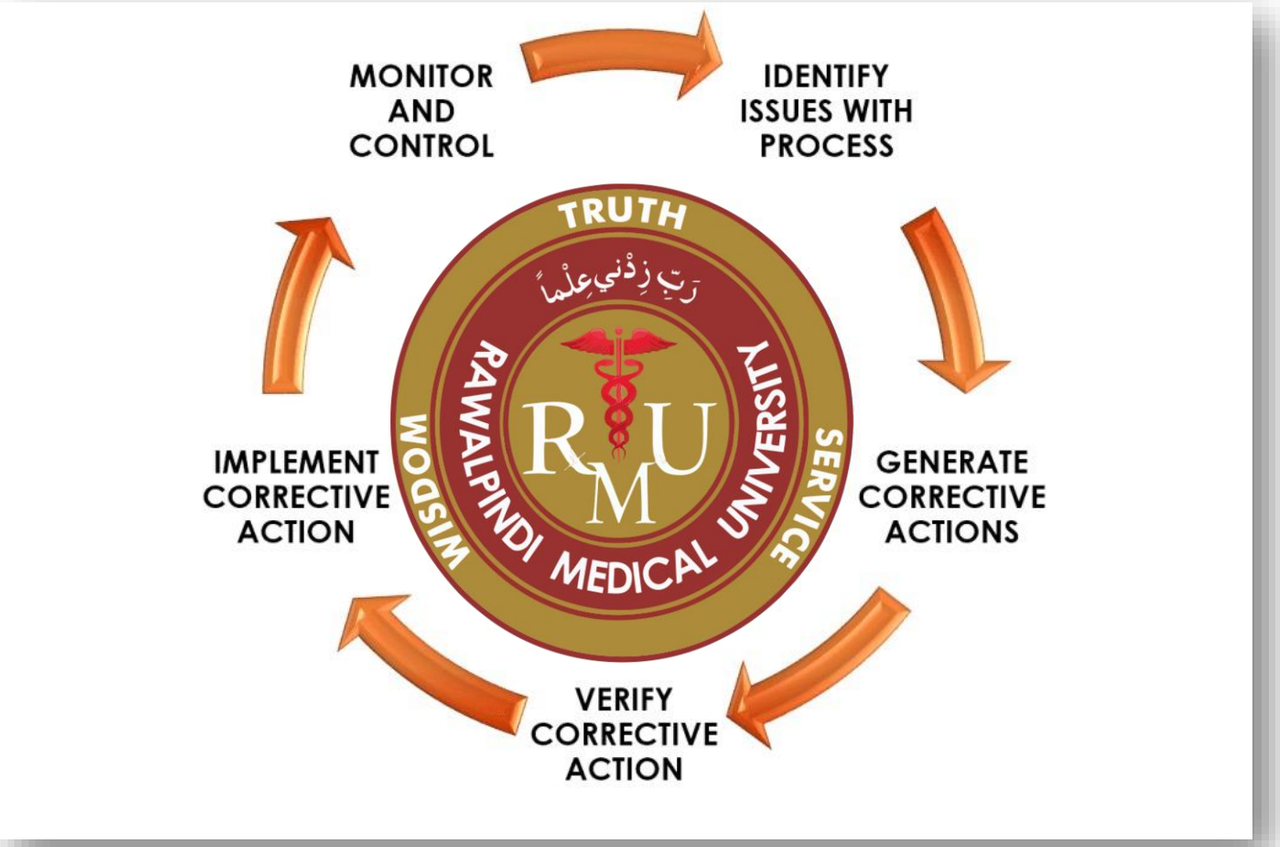
Spiral Integration Subjects & General Education Cluster Courses	
Bioethics	**Textbooks** 1. Textbook of Medical Ethics by Erich H. Loewy (Author)
Videography	The Five Cs of Cinematography by Joseph V. Mascelli Digital Video Production: A Comprehensive Guide by Anirban Das
Leadership	Leadership and the New Science by Margaret J. Wheatley A Treatise on Good Works by Martin Luther
Family Medicine	**Textbooks** Textbook of Family Medicine" by Robert E. Rakel and David P. Rakel Essentials of Family Medicine" by Philip D. Sloane, Lisa M. Slatt, and others Textbook of Family Medicine" by Ian R. McWhinney Family Medicine: Principles and Practice" by Robert B. Taylor
Islamiat & Pak Studies	Islamiyat Lazmi by Muhammad Khalil
Vertical Integration Subjects	
Medicine	**Textbooks** Harrison's Principles of Internal Medicine by J. Larry Jameson, Anthony S. Fauci, and others Davidson's Principles and Practice of Medicine by Stuart H. Ralston, Ian D. Penman, and others Kumar and Clark's Clinical Medicine by Parveen Kumar and Michael Clark Oxford Handbook of Clinical Medicine by Ian B. Wilkinson, Tim Raine, and others
Surgery	**Textbooks** 1. Bailey & Love's Short Practice of Surgery by Norman S. Williams, P. Ronan O'Connell, and Andrew W. McCaskie
Obsteterics & Gynecology	**Textbooks** Obstetrics by Ten Teachers Gynaecology by Ten Teachers
Peadiatrics	**Textbooks** 1. Nelson Textbook of Pediatrics" by Robert M. Kliegman, Joseph St. Geme, and others **2.** "Textbook of Pediatrics" by A. Parthasarathy
Digital Resources	
Up To Date	https://www.uptodate.com/contents/search
RMU Digital library	http://www.digitallibrary.edu.pk/rmc.html
International Resources	
USMLE	https://www.usmle.org/
Plab	https://www.gmc-uk.org/registration-and-licensing/join-the-register/plab
U World	https://www.uworld.com/
Kaplan	https://mykaplan.co.uk/

Section-XIV

Quality Assurance

&

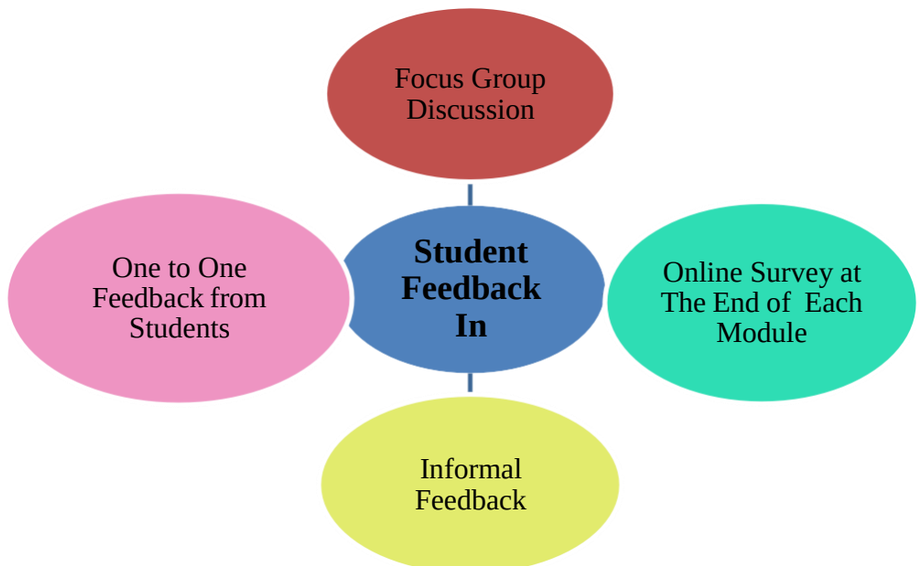
Quality Enhancement



Feedback and Evaluation

Rawalpindi Medical University is dedicated to advancing equality, diversity, and inclusion across all its activities, processes, and cultural practices, in line with its Public Sector Equality Duties. This commitment encompasses promoting equality and diversity for everyone, regardless of any protected characteristic, working pattern, family circumstance, socio-economic background, political belief, or any other irrelevant distinction. Where pertinent to the policy, decision-making panels will ensure a reasonable gender balance (with at least one man and one woman) and will actively consider the representation of other protected groups.

Principles Feedback from students is essential to inform the development of the University's programmes and to help shape all aspects of their current and future learning and broader experience. The University actively seeks and encourages students to share their views. Our approach aims to create openness, responsiveness and a sense of partnership.



How feedback is received

- **Informal Feedback**

Informal feedback is received by day-to-day dialogue between students and staff,

- **Formal Feedback**

Feedback is received from students in more formal settings. These include:

- **Central survey campaign**

The University regularly invites students to participate in anonymous surveys (Appendix 1).

The central surveys take place after every module, after every Block and at the end of the academic year. This schedule enables the University to work in conjunction with the students and help to improve the teaching, learning and assessment methodologies.

- **Focus Group Discussion**
- **One To One Feedback from Students**

Student Feedback Proforma for 2024

(to be conducted after every module completion)

Module Content & Organization

Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
The module objectives were informed.					
At the beginning of module study guide wasavailable.					
The module workload was manageable.					
The pace of the module was manageable.					
The module was well organized.					
Module started and ended on time.					
End of block feedback was taken					

Learning Environment and Teaching Methods

Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Lectures were delivered appropriately.					
Labs were conducted appropriately.					
Small group discussions were conducted appropriately					
Teaching sessions were as per schedule.					
CBLs were conducted appropriately					
Faculty was cooperative.					
Learning resources were communicated clearly					
SGDs were standardized between different batches					

Quality of Delivery

Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	StronglyDisagree
The module stimulated my interest.					
Ideas were presented clearly.					

Learning Resources

Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	StronglyDisagree
Learning Material was provided /recommended.					
Learning Resources were available in the library.					
Digital / Web Based resources wereavailable.					
Power points of lectures were available					

Student Contribution

Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	StronglyDisagree
I participated actively in the module.					
I believe I have made progress in thismodule.					

Assessments

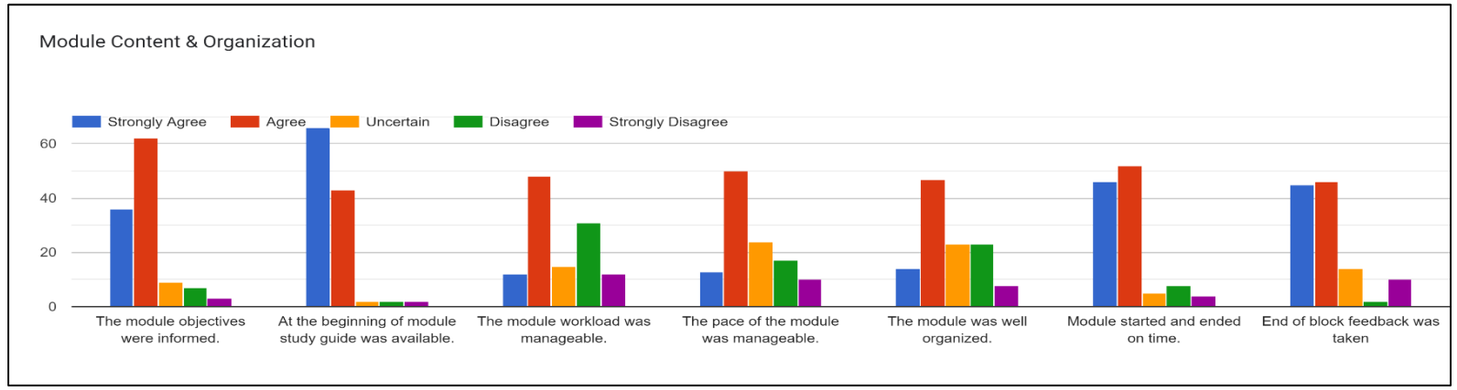
Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	StronglyDisagree
Class tests were conducted regularly.					
Class tests were helpful					
Test difficulty was appropriate.					
Written Assessment was as per Table ofSpecifications.					

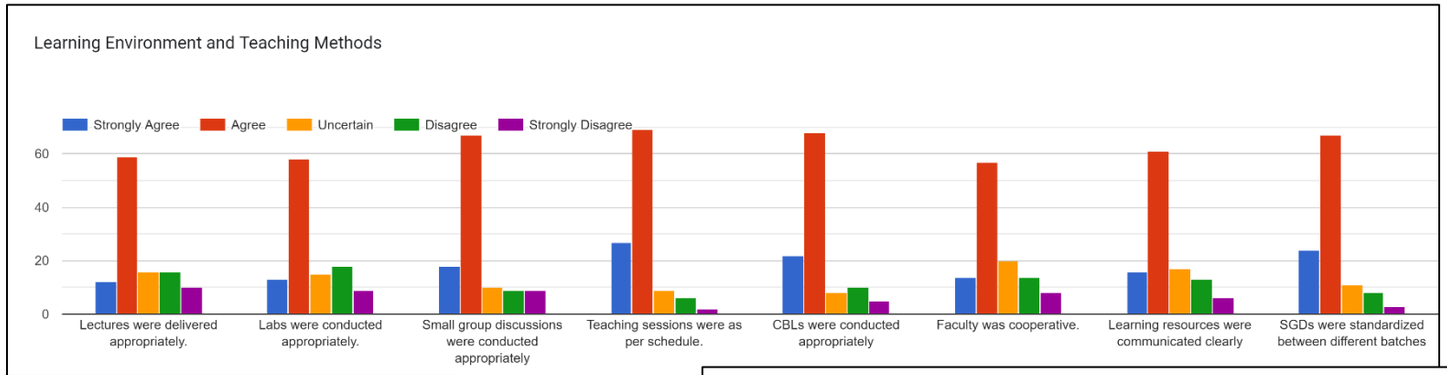
OSPE Exam was as per Table ofSpecification					
Table of Specification was shared					

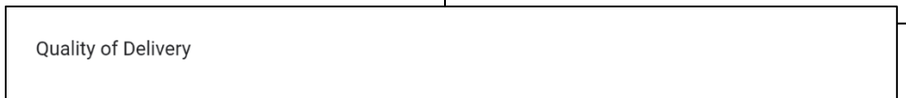
LMS and its working

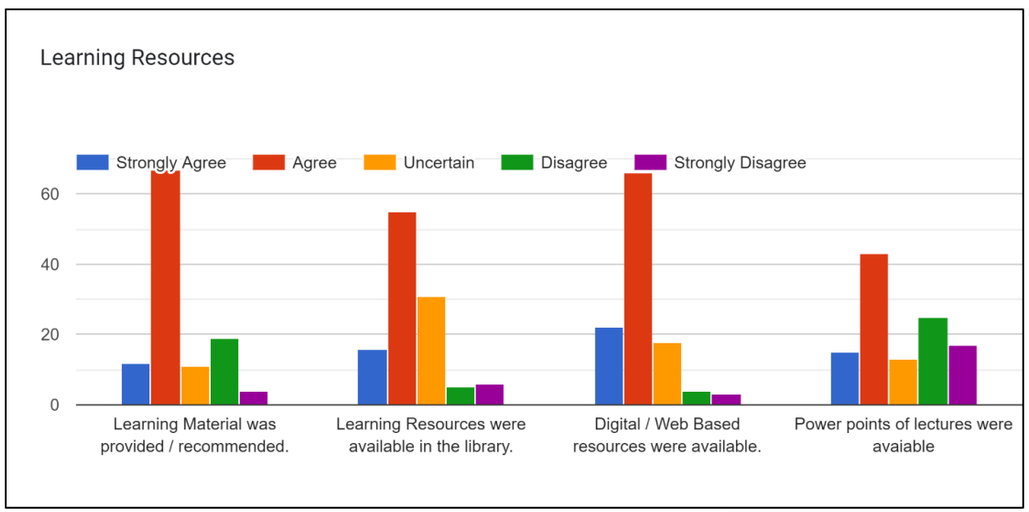
Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Easy Access to LMS					
Module Content was Available					

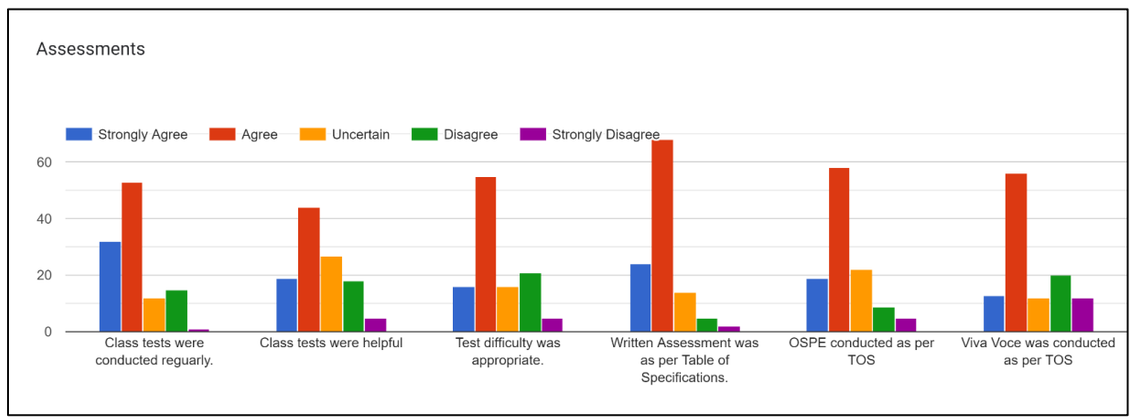
Student Feedback Report

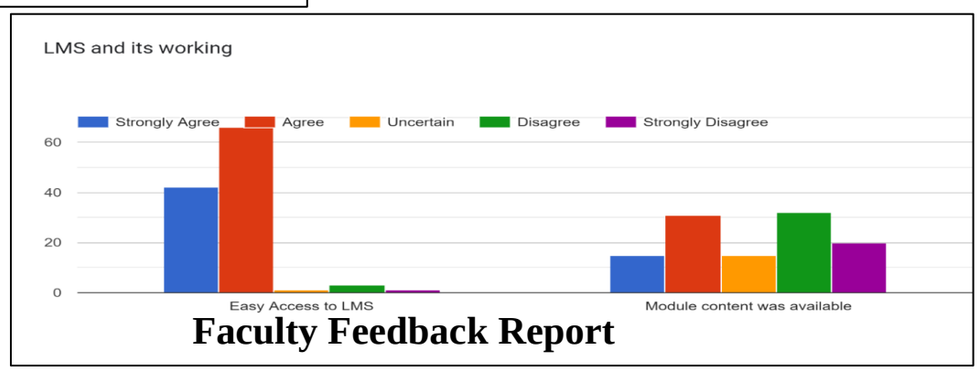








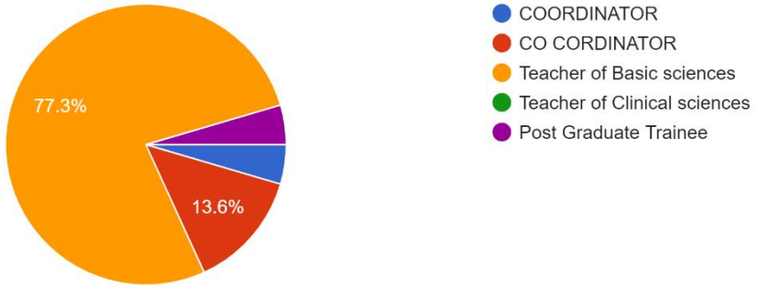




Faculty Feedback Report

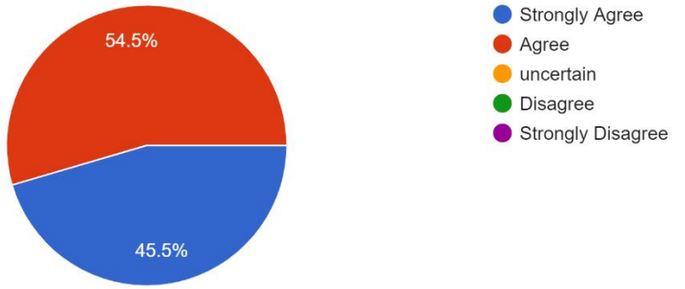
Role In Module

22 responses



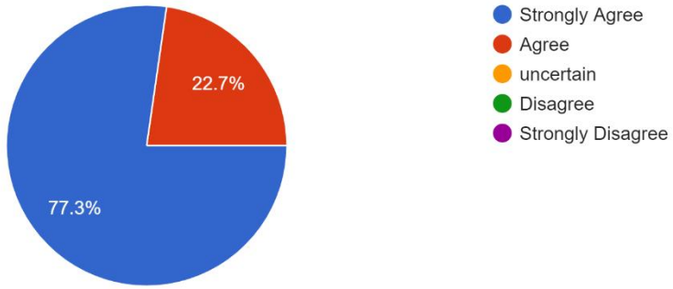
Timetable was timely conveyed to faculty

22 responses



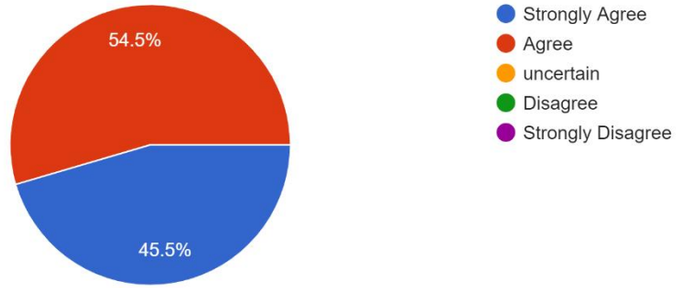
Study Guide was available

22 responses



All the module objectives were covered

22 responses



The module duration was appropriate

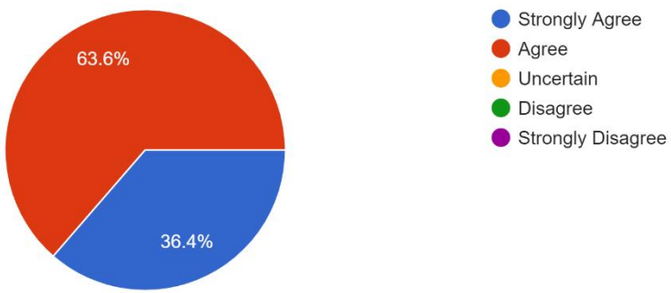
22 responses

The module started and ended on time

22 responses

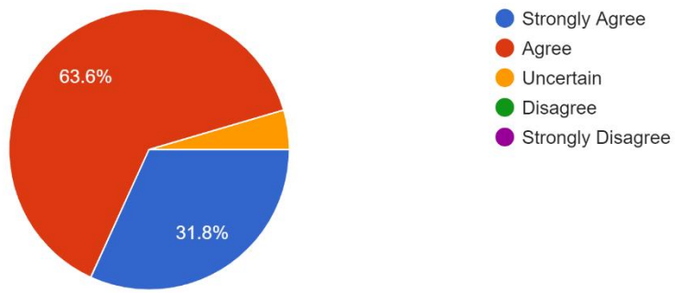
Teaching sessions were as per schedule

22 responses



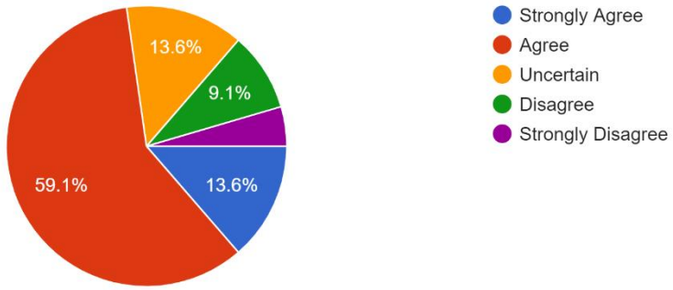
Faculty was cooperative

22 responses



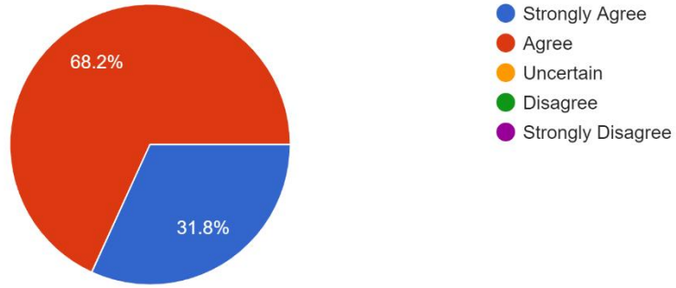
Workload was manageable

22 responses



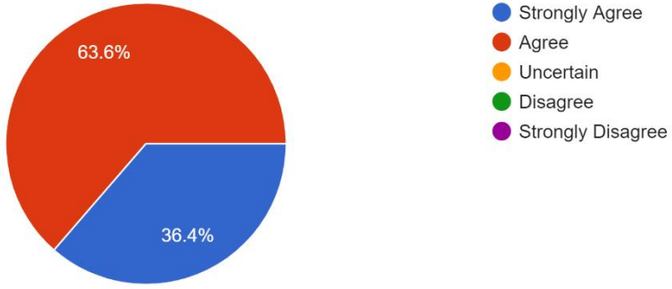
Lectures were conducted appropriately

22 responses



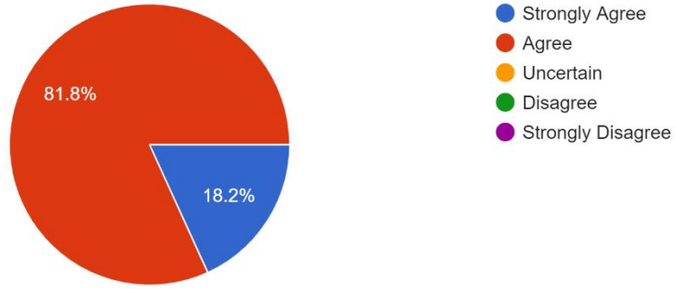
Practicals were conducted appropriately

22 responses



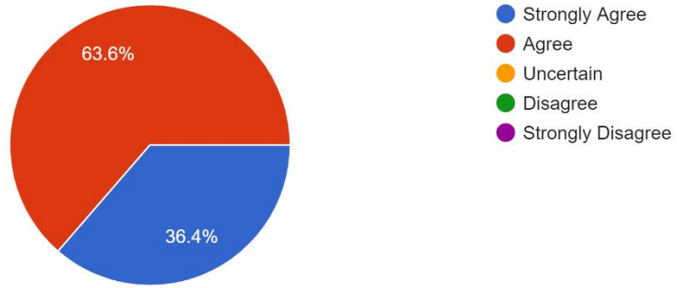
Small Group Discussion (including PBLs) were conducted appropriately

22 responses



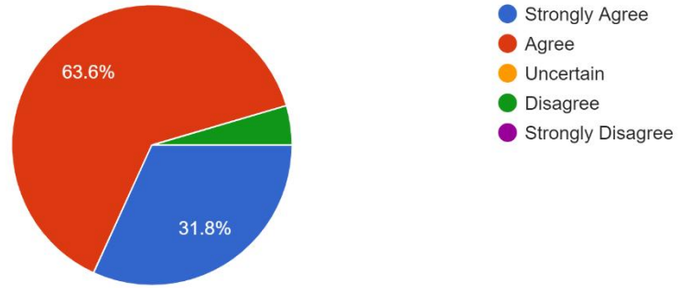
LMS & clinical evaluation were conducted regularly

22 responses



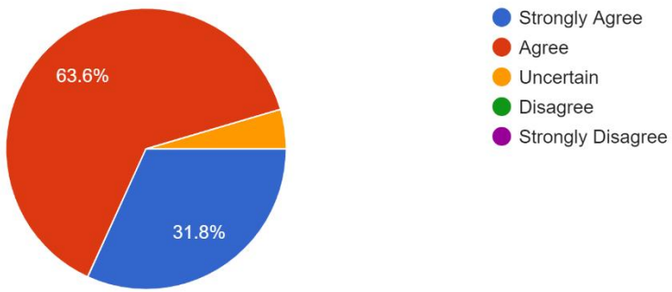
Module / Block exam was conducted as per schedule

22 responses



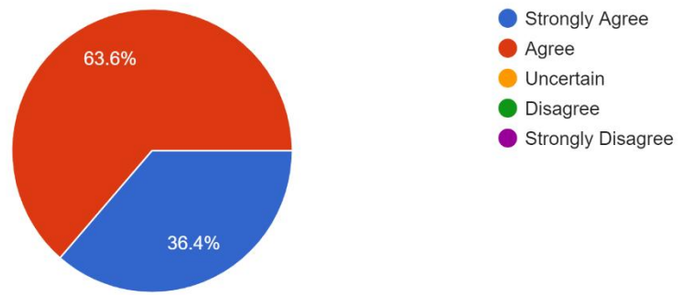
Written assessment was as per Table of Specifications

22 responses



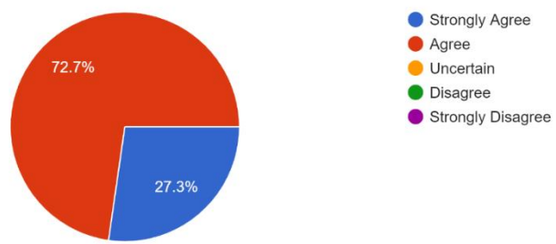
Practical assessment was as per Table of Specifications

22 responses



The TOS was well understood and conveyed to all faculty timely

22 responses



Swot Analysis of Curriculum

SOWT Analysis of Implementation of IMC

- **Strength**
  - We are leading all public sector medical colleges in implementation of integrated modular curriculum
  - We are fulfilling the requirement of World Federation for Medical Education
  - Our future doctor will be able to correlate and integrate basic and clinical knowledge in a better way with the competencies of 7 Star Doctor-acting as leader, manager, decision make, and communicator and care provider, decision maker, researcher and lifelong learner.
- **Opportunities**
  - We have completed the phase –I of implementation for 1st ,2nd and 3rd year and we are now able to implement it in 4th and final year
  - We can further refine our integrated curriculum of 1st and 2nd year MBBS in coming years and can better tackle its flaws.
  - Proper committees for feedback and evaluation are developed with collaboration from QEC& DME.
- **Weaknesses**
  - A change in system is always difficult to be accepted by stakeholders
  - Inflexible as compared to Conventional System.
  - The content of different subjects is sometimes jumbled up in various modules according to the requirement of that specific module which is difficult to be absorbed by the students.
- **Threats**
  - The Modular System can totally collapse back to Conventional System if not vigilantly and expertly handled.

Summary of Implementation Challenges of IMC

Deficiencies	Corrective Action/Solution
Integration is a difficult task (how & when to integrate)	Frequent meetings with faculty and students
100% Integration is NOT possible	Frequent meetings with faculty and students and do integration wherever possible, at present RMU is running the curriculum at 5th level of integration of Harden's Ladder.
Lack of consensus among teachers while preparing curriculum	Faculty development workshops & CHPE to change the mind set of whole faculty.
Dissatisfaction among subject specialists about time & information allotted to them in the module(s)	Content taken from subject specialist with their consensus & approval
Lack of adequate weightage given to subjects in evaluation	Subject based assessments added in the modules.
Fragmented learning of subjects with fragmented assessment (subject is taught in parts in different years of the MBBS course.	Frequent subject specialists meetings
Too many modules may result in complex timetables among the classes (each class of MBBS running their own modules)	

Recommendations

Mode of information transfer		
Increasing the human resources.		As per PMC criteria
Student centered teaching		Training of teachers
Use of flipped classroom technique to overcome anatomy excessive course.		As per PMC criteria Training of teachers the issue of
CBL & PBL		36 CBLs & 3 PBLs have been added
Learning And Teaching Environment		
Providing the resources conducive to learning & teaching.		
Spiral curriculum(anatomy to be incorporated in pathology and radiology lectures)		
Taking effective feedback from stake holders to improve & implement the changes.		Feedback taken at the end of each module from students
Assessment strategy:		
It is mandatory to pass in the individually rather than collectively.	subjects	

- **Future Horizon**

- We plan on taking the curriculum to excellence and improving the ladder of curriculum according to Harden's ladder of curriculum

Quality Enhancement Cell (QEC) Report
Integrated Modular Curriculum MBBS &
Department of Medical Education

Quality Enhancement Cell- RMU since its inception has been active in promoting its core function of bringing standardization to university's academic programs in line with the guidelines enunciated by the Higher Education Commission. In this regard, first thing on which QEC team focused was QEC guidelines. Team achieved that milestone in record time. Approved QEC guidelines of RMU were implemented in 2018. Quality Enhancement Cells serve as focal points for quality assurance in the institutions in order to improve and uphold the quality of higher education. Capacity building of academia in quality assurance is one of the key functions of Quality Assurance Agency (QAA), HEC and subsequently of QEC. Thus, QAA and QECs of the Universities work hand in hand to move in this direction of capacity building arrangements that include awareness campaigns, development of quality assurance policy instruments, training to learn the processes and procedures of quality assurance in higher education institutions and development of Manual to equip the practitioners of quality assurance.In recent years it has become an obligation that institutions of higher education demonstrate the effectiveness of their academic programs in providing high quality education that positively impacts students. Furthermore, most accrediting bodies and others concerned with quality assurance are requesting that institutions assess students learning outcomes as a means of improving academic programs. This has led the accrediting bodies to develop methods for assessing the quality of academic programs. So, whole conventional system was needed to be revamped. Rawalpindi Medical University has the honor of being the first public sector Medical University of Punjab which has introduced the modern modular system of medical education for the MBBS course. It was a big challenge for Department of Medical Education (DME) and Quality Enhancement Cell to maintain the quality and standards of all the teaching and training practices. Quality enhancement cell, RMU appreciate the untiring efforts of DME in this regard. DME team has worked day and night for the implementation of the integrated modular curriculum.

Following are the compliments and recommendations by the Quality Enhancement Cell, RMU:

Commendations:

1. Proper, well managed integrated modular curriculum is in place under the vibrant and energetic leadership of Vice Chancellor, Prof. Muhammad Umar and Department of Medical Education. This thing has also been acknowledged by different visits by accreditation bodies like Higher Education Commission (HEC) and Pakistan Medical & Dental Commission.
2. Proper curriculum committee is in place with appropriate representation of the students as members.
3. All stakeholders are on board and are on one page regarding implementation of the integrated modular curriculum.
4. Regular meetings have been done by the curriculum committee.
5. Feedback has been taken regularly with appropriate gap interval in between.
6. Proper record keeping has been done by the Department of Medical Education both in soft and hard form.
7. As far as the assessment is concerned, newly established Examination Department is doing commendable and admirable job.
8. Final results are indicating that both students and faculty has adapted well to integrated modular system and they are satisfied with the system.
9. Campus management system is working efficiently.
10. Standardized format of all teaching strategies has improved the quality of the deliverance of the subject matter.

Recommendations:

1. Communication and coordination among the departments can be made better. This will help in normalizing the pressure on the Department of Medical Education.
2. Department of Medical Education should be equipped with more human resource.
3. Faculty members should be provided with more opportunities for updating themselves with modern teaching methodologies. They should be encouraged to have certification or masters in medical education.
4. Departments and DME should ensure equal distribution of responsibilities among faculty members.
5. Steps should be taken in account for improving the ladder of the curriculum according to the Harden's ladder of curriculum.
6. Faculty should be encoouraged to participate actively in the Faculty Development Program of the university which is already working on a very good pace.
7. Subjects specialists are advised to have more frequent meetings with the aim of improving the quality of the content delivered to the students.
8. Student centered teaching should be encouraged more.
9. Any motivational lecture should be included in the time table for every class as it is very important for the students for personal growth and development.
10. The weightage of all clinical lectures should be increased in first and second year MBBS, as the attandance is on the lower side in clinical lectures of the above said years.

Dr. Rabbia Khalid
Assistant Director
Quality Enhancement Cell
Rawalpindi Medical University
Rawalpindi
Dated: 04-05-23