KING EDWARD MEDICAL UNIVERSITY, LAHORE

MBBS MODULAR INTEGRATED CURRICULUM

A Competency-Based Framework for Excellence in Medical Education

* Department of Medical Education (DME)

OFFICE OF THE REGISTRAR
KING EDWARD MEDICAL UNIVERSITY, LAHORE.
No. 532 /REG/KEMU/2026

Dated: 06-05- /2026

NOTIFICATION

This is with reference to the Academic Council meeting held on 02-05-2026, vide agenda item No. 02 "1st Year MBBS modular integrated curriculum" is hereby notified at King Edward Medical University, Lahore.

Prof. Abrar Ashraf Ali
Director Medical Education,
KEMU, Lahore

Prof. Tehreem Fatima
Dean Basic Medical Sciences
KEMU, Lahore.

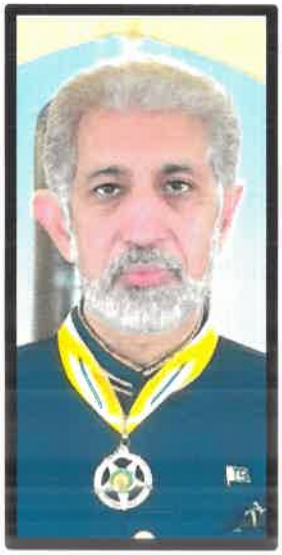
Prof. Syed Asghar Naqi
Registrar, KEMU, Lahore.

Prof. Muhammad Moin
Pro-Vice Chancellor /
Secretary Curriculum Committee,
KEMU, Lahore.

Prof. Mahmood Ayyaz
Vice Chancellor/
Chairman Curriculum Committee,
KEMU, Lahore.

A copy for information to the:-

- All the Deans, KEMU, Lahore.
- Controller of Examinations, KEMU, Lahore.
- Director QEC, KEMU, Lahore.
- Director ORIC, EKMU, Lahore.
- Treasurer, KEMU, Lahore.
- Resident Auditor, KEMU, Lahore.
- Assistant Registrar (MBBS), KEMU, Lahore.
- Superintendent Establishment, KEMU, Lahore.



Message from the Vice Chancellor, KEMU

Warmest congratulations to the Department of Medical Education and the Departments of Basic Sciences at King Edward Medical University on developing the first-year MBBS curriculum document. In a document splendidly compiled by Dr Faiza Abrar, what truly stands out is not just the manuscript itself, but the dedication, teamwork, and care that went into creating it.

The collaborative spirit and intellectual artistry has transformed what could have been a routine academic task into an inspiring blueprint for excellence. Behind every page lies thoughtful discussion, shared expertise, and a genuine commitment to giving students the best possible start as they take their first steps in medical journey.

This effort reflects a deep understanding that a strong foundation shapes confident, compassionate doctor. The way all departments have come together blending educational vision with scientific depth speaks volumes about their collective passion for teaching & learning.

It's works like this, often done quietly and diligently, that makes a lasting difference. Their contribution will be felt in every classroom, every lesson, and eventually, in every patient those students go on to care for.

Message from the Pro Vice Chancellor, KEMU

The transition from a traditional, discipline-based approach to an integrated modular curriculum represents a thoughtful and forward-looking reform. The introduction of this curriculum marks a significant transition from traditional teaching methods to a more integrated, student-centered approach. By fostering meaningful connections between basic and clinical sciences, and by promoting early clinical exposure, this framework aims to develop critical thinking, clinical reasoning, and professional competence from the very beginning of medical training.

At King Edward Medical University, we envision producing not only knowledgeable graduates but well-rounded physicians who embody the principles of the "seven-star doctor"—individuals who are skilled, ethical, compassionate, and capable of leadership in an increasingly complex healthcare environment. This curriculum has been thoughtfully designed to nurture these attributes through a structured, relevant, and forward-looking educational experience.

I commend the Department of Medical Education and the faculty of Basic Sciences for their dedication, collaboration, and academic leadership in developing this comprehensive curriculum. Their efforts reflect a shared vision to strengthen the foundation of medical education and to prepare our students for the challenges and opportunities of modern medicine.

I am confident that this curriculum will serve as a cornerstone for academic excellence at KEMU and will inspire our students to pursue lifelong learning, innovation, and service to humanity.

Message from the Registrar, KEMU

Curriculum is the basis for whatever happens in a medical university. It is a living document and needs continuous maintenance and updates as any living tree requires.

Integration of basic and clinical sciences forms the foundation of current medical teaching and training. Evidence has proven that it is a better option to prepare doctors for their profession.

This modular curriculum is such an effort from the KEMU Department of Medical Education and the Faculty of Basic Sciences.

I congratulate all involved in the development of this document and its implementation. The main stakeholders of this curriculum, the students, will find it engaging and worthwhile.

Godspeed to all of you.

Message from the Director DME, KEMU

The development of the first-year modular integrated curriculum at King Edward Medical University was driven by a comprehensive need assessment involving faculty consultations, student feedback, and alignment with national regulatory expectations. Rapid advancements in medical knowledge, evolving healthcare demands, and the shift toward competency-based education highlighted gaps in traditional teaching approaches. The need for early clinical exposure, horizontal and vertical integration, and student-centered learning became evident. This curriculum is designed to address these needs by fostering critical thinking, clinical relevance, and lifelong learning skills among our students.

The newly introduced modular integrated curriculum represents a significant step toward modernizing undergraduate medical education. It brings together basic and clinical sciences in a coherent and structured manner, ensuring meaningful learning experiences. Through integrated modules, interactive teaching strategies, and formative assessments, the curriculum promotes deeper understanding and application of knowledge. It is aligned with contemporary educational principles and aims to produce competent, ethical, and reflective practitioners prepared to meet the healthcare challenges of Pakistan.

I extend my sincere gratitude to the Vice Chancellor, Prof. Mahmood Ayaz; Pro Vice Chancellor, Prof. Muhammad Moin; the Registrar, Prof. Syed Asghar Naqi; and all Deans of the University. I am especially thankful to the Dean of Basic Sciences, Prof. Dr. Tehreem Fatima, and the faculty of Basic Sciences, with special mention of Prof. Muhammad Shoaib and Prof. Muhammad Shakeel, for their unwavering support and contributions. I also appreciate the efforts of Assistant Registrar (Student Section), Mr. Rashid Javaid, and Deputy Registrar, Mr. Fazal Bilal, for their coordination, as well as the IT Department for their digital support.

Special thanks are extended to the Additional Director, Medical Education, and Associate Professor of Biochemistry, Dr. Faiza Abrar; Associate Professor of Anatomy, Dr. Muhammad Qasim Muneer; Assistant Professor of Physiology, Dr. Sahar Naeem; and Acting Controller of Examinations, Dr. Zeeshan, for their exceptional efforts and commitment to the development and implementation of this curriculum.

Message from Dean Basic Sciences

As a proud Kemcolian, I am honored to introduce the foundational phase of medical education at this historic institution during a transformative era.

To meet the evolving demands of modern healthcare, our educational philosophy has transitioned to a Modular Integrated Medical Curriculum which is strictly aligned with the latest PM&DC National Standards & WFME guidelines.

This framework is designed to bridge the gap between theoretical knowledge and clinical reality. By moving beyond isolated, rote-learned disciplines, we have implemented a system of horizontal and vertical integration that allows for the exploration of the human body through cohesive, thematic modules. The core pillars of Anatomy, Histology, Physiology, and Biochemistry are seamlessly woven with Pathology and early clinical exposure, ensuring that our students understand the patient behind the science from their very first day.

A defining strength of our academic strategy is the "Good Medical Practices" program, delivered through the K-Core and K-Prism tracks. Supported by the multidisciplinary laboratories and early clinical rotations, these programs are developed to produce the "Seven-Star Doctor", a physician who is not only a clinician but also a leader, researcher, and lifelong learner.

By emphasizing professional attitudes and analytical skills from the outset, we ensure our graduates are fully prepared for the challenges in clinical clerkships and the complexities of the global healthcare landscape.

Our distinguished faculty and infrastructure are dedicated to this holistic growth. We take immense pride in witnessing our students' transition from the mastery of basic sciences to the complex, compassionate, and noble art of healing.

Message from Controller of Examinations

As Controller of Examinations, I am pleased to present the Modular Integrated Curriculum for the MBBS programme at King Edward Medical University. This curriculum represents a significant shift from traditional discipline-based teaching to a competency-based, outcome-driven educational framework aligned with national and international standards. It emphasizes horizontal and vertical integration, enabling students to correlate basic sciences with clinical practice from the very beginning of their training.

The structured modular approach promotes critical thinking, problem-solving, and self-directed learning, while ensuring continuity through spiral integration. The assessment system has been carefully designed to maintain transparency, reliability, and fairness, with a balanced focus on knowledge, skills, and professional attitudes. Continuous internal assessment, block examinations, and professional examinations collectively ensure comprehensive evaluation of student performance.

The integration of K-CORE and K-PRISM components further strengthens early clinical exposure, professionalism, and holistic development of future physicians. The Examination Department remains committed to upholding the highest standards of assessment, in alignment with PMDC and WFME guidelines.

I encourage students and faculty to actively engage with this curriculum and utilize it as a framework for achieving academic excellence and professional competence.

ACKNOWLEDGMENT

Prof. Mahmood Ayyaz, Vice Chancellor, King Edward Medical University, Lahore

Prof. Muhammad Moin, Pro-Vice Chancellor / Dean, Surgery & Allied Specialties, KEMU

Prof. Asghar Naqi, Registrar, KEMU

Prof. Tehreem Fatima, Dean, Basic Sciences, HOD Anatomy Department, KEMU

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Dr. Fariha Tariq, Chairperson, Department of Forensic Medicine, KEMU

Prof. Syed Razi Haider Zaidi, Chairperson, Department of Community Medicine, KEMU

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Dr. Maryam Rao, Associate Professor, Department of Physiology, KEMU

Dr. Seher Naeem, Assistant Professor, Department of Physiology, KEMU

Mr. Muhammad Rashid Javed, Assistant Registrar, KEMU

Dr. Hamza, Department of Biochemistry, KEMU

Mr. Malik Waseem Ahmed, Department of Medical Education, KEMU

Mr. Raza Ullah Sajid, Department of Biochemistry, KEMU

CONTENTS

VISION STATEMENT

The vision of King Edward Medical University is to be a renowned national and world-class academic institution, maintaining a leading role in medical education, innovative research, and the provision of international-standard healthcare services.

MISSION STATEMENT

King Edward Medical University will prepare health professionals in accordance with the highest professional standards to practice evidence-based medicine, maintain international quality of patient-centered care in the healthcare delivery system, and produce research scholars demonstrating excellence in knowledge, skills, and ethical values, empowered with community-oriented, self-directed learning and professional development.

INTRODUCTION

A medical curriculum is dynamic and responsive to society's evolving needs, promoting the continuous growth of its students. As the definition of health and disease shifts from a pure tradition to a multifaceted understanding involving social, psychological, and cultural factors, the curriculum must be regularly assessed and updated.

King Edward Medical University (KEMU) is committed to this evolution by implementing a modular integrated undergraduate curriculum designed to produce "seven-star doctors" who are skillful, knowledgeable, community leaders, and ethical professionals.

Core Objectives of Integration

The move toward an integrated modular approach is driven by the goal of fostering "clinical thinking" from day one. By adopting a vertical integration strategy, we place basic science learning directly within the context of clinical practice and behavioral sciences. This approach offers several key advantages:

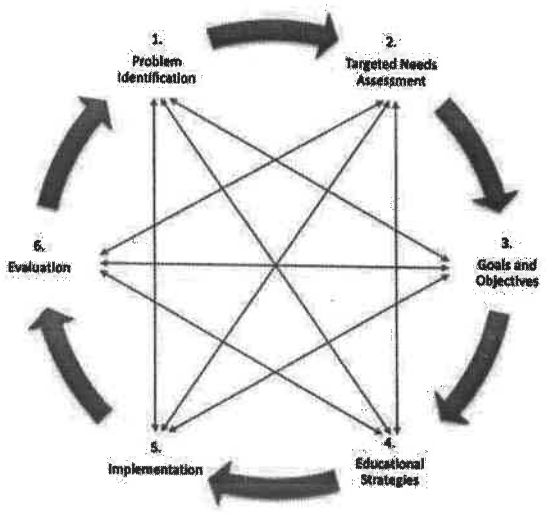
- **Clinical Relevance:** Students understand the practical application of theoretical knowledge early in their education.
- **Reduced Redundancy:** By streamlining content across different subjects, we eliminate unnecessary overlaps that can hamper conceptual development.
- **Enhanced Engagement:** A cohesive curriculum reduces learning reluctance by providing a clear, unified path toward professional competence.

Through this integrated framework, KEMU aims to provide a robust educational foundation that prepares graduates to navigate the complexities of modern healthcare with confidence and critical insight.

Need Assessment

The traditional "apprenticeship" model at KEMU relies on passive observation and unstructured mentorship. This is no longer viable in a high-stake, technology-driven healthcare environment. Modern medical education requires a transition from traditional teaching to outcomes-based learning. There was an urgent need for educators to evolve from content experts into facilitators of learning, educational leaders, and innovators.

Our curriculum development journey is grounded in Kern's cycle of curriculum development.



- **Shift to Competency-Based Medical Education (CBME):** Educators must move beyond grading knowledge to assess observable behaviors and Entrustable Professional Activities (EPAs). This requires sophisticated skills in feedback, coaching, and programmatic assessment.

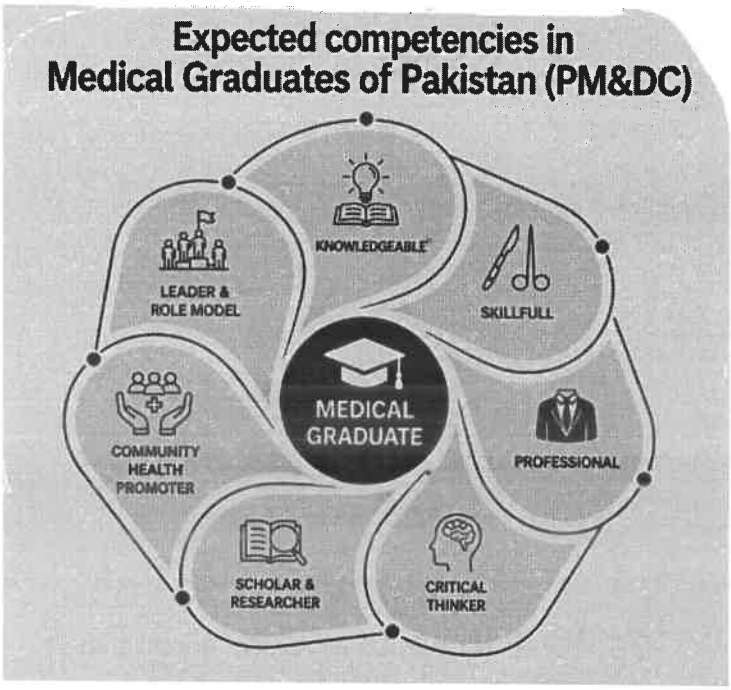
- **The Digital & AI Frontier:** The integration of Generative AI, personalized learning analytics, and digital literacy is no longer optional. Educators must bridge the gap between traditional pedagogy and technology-enhanced learning (TEL).

- **Safety Through Simulation:** With increasing pressure on patient safety, simulation-based training (SBT) has become the gold standard for procedural and interpersonal skills. There is a critical need for faculty trained in high-fidelity debriefing and scenario design.

- **Systemic Complexity & Governance:** Modern healthcare systems are intricate. Educators now require a firm grasp of educational leadership, policymaking, and quality assurance (QA) to meet international accreditation standards (e.g., WFME).

- **Evidence-Based Education:** There is an increasing demand for "the clinician as a scholar." Faculty must contribute to educational research to ensure teaching practices are grounded in evidence rather than tradition.

Expected Competencies in KEMU Graduates:



The expected generic competencies in a medical graduate are grouped under the umbrella of a seven-star doctor and are as follows:

1. **Knowledgeable**

   KEMU medical graduates will demonstrate accurate understanding, integration, and application of biomedical, clinical, behavioral, and social sciences to explain health and disease, interpret clinical information, and support safe clinical decision-making.

2. **Skillful**

   KEMU graduates will perform essential clinical, procedural, communication, and documentation skills competently, safely, and ethically, appropriate to their level of training.

3. **Professionalism**

   Medical graduates will demonstrate ethical practice, accountability, integrity, respect, empathy, and adherence to professional standards in all interactions with patients, peers, and society.

4. **Scholar & Researcher**

   The medical graduate will engage in lifelong learning, critically appraise medical literature, apply evidence-based medicine, and participate in basic research or quality improvement activities.

5. **Critical thinker**

KEMU graduates will analyze clinical problems logically, synthesize information from multiple sources, evaluate alternatives, and make justified clinical decisions, recognizing uncertainty and limitations.

6. **Leader & Role model**

   The medical graduates will demonstrate teamwork, leadership, effective communication, and responsible decision-making, while displaying professional behavior and contributing to improvement in the healthcare system.

7. **Community Health Promotor**

   KEMU medical graduates will identify community health needs, promote disease prevention and health education, address social determinants of health, and advocate for equitable and accessible healthcare.

Rationale for Adopting a Modular Integrated Curriculum

The Paradigm Shift from a traditional, discipline-based curriculum to a modular integrated curriculum at King Edward Medical University (KEMU) reflects the institution's commitment to aligning medical education with global standards, current best practices, and the health needs of the community it serves.

In the traditional model, subjects were taught in isolation with limited clinical relevance during the early years. Recognizing the need for a learner-centered, competency-driven, and clinically contextualized educational approach, KEMU has adopted a modular integrated framework that promotes horizontal and vertical integration across the basic, clinical, and behavioral sciences.

This transformation ensures that learning is structured around organ systems and clinical themes, allowing students to connect foundational concepts with clinical application from the very beginning. The modular design facilitates active learning, problem-solving, and critical thinking, moving away from rote memorization to understanding and synthesis.

The modular curriculum also supports spiral learning. The key concepts are revisited with increasing complexity across successive years, reinforcing retention and integration of knowledge. Early clinical exposure, skills training, and community engagement are embedded to prepare graduates who are competent, compassionate, and socially accountable physicians. The modular approach enables continuous assessment and feedback, fostering reflective practice and self-directed learning for lifelong professional development.

This curriculum aligns with the Pakistan Medical & Dental Council (PMDC/PMC) MBBS Curriculum Framework (2023), HEC 2023 guidelines, and international benchmarks, such as the World Federation of Medical Education (WFME) standards. Thus, ensuring that King Edward Medical University graduates meet both national and global expectations for medical practitioners.

Policy Justification

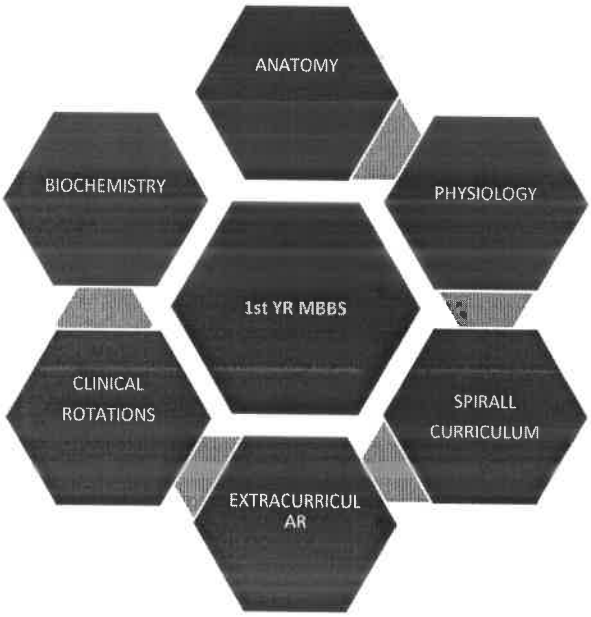
The modular, integrated MBBS curriculum at King Edward Medical University (KEMU) adopts a pragmatic, learner-centered, and competency-based approach that is fully aligned with the Pakistan Medical and Dental Council (PMDC) and World Federation for Medical Education (WFME) standards. It integrates active, case-based learning with structured skills training to ensure feasible implementation and patient safety. Emphasis on professionalism, reflective practice, and problem-centered learning supports the formation of professional identity, lifelong learning, and social accountability.

1st Year MBBS Curriculum

The 1st Year MBBS Curriculum (2025–26) at KEMU follows a modular, integrated, outcome-based approach designed to promote early horizontal integration of Anatomy, Physiology, and Biochemistry, incorporating vertical integration with clinical sciences and spiral themes ensuring progressive competence development.

The Modules will serve as an introduction to medical education, orienting students to human structure and function, the biochemical basis of life, sensitization towards community diseases, professional values, and learning strategies.

Teaching will be delivered through interactive lectures, small group discussions, case-based learning, self-directed learning, skill labs, and reflective practice.
Assessments will be aligned with learning outcomes and will employ multiple tools.



Programme Objectives

By the end of the 1st year students will be able to:

1. Explain the fundamentals of human structure, function, and diseases.
2. Exhibit integrated knowledge of Anatomy, Physiology, and Biochemistry to explain normal body functions and their deviations in disease.
3. Demonstrate professionalism, ethical conduct, and reflective practice in academic and clinical learning settings.
4. Employ effective learning strategies and demonstrate self-directed learning skills for continuous professional growth.
5. Apply foundational skills in research methodology, data interpretation, and evidence-based decision-making.
6. Recognize the relevance and implications of artificial intelligence, biomedical ethics, and Islamic perspectives in contemporary medical practice.

7. Collaborate effectively within teams, demonstrating empathy, respect, communication, and accountability.

Terms of References (TORs)

1. Total teaching, learning, and assessment hours are kept as per PMDC guidelines.
2. The time calculation for completion of the module/block is based on 34 hours per week of teaching.
3. The hours mentioned in each module/block are a mandatory minimum requirement.
4. The content and intended learning outcomes are mandatory to be taught at the required level.
5. The level of cognition will be kept at a higher level.
6. The same Table of Specifications (TOS) will be used for block and final prof assessment.
7. The Curriculum Implementation Committee will review the curriculum each year.
8. The Block Committee will conduct the block assessment.
9. The examination department will conduct the final professional examination.
10. The Department of Medical Education (DME) will provide overall oversight of the implementation of K-CORE and K-PRISM, ensuring alignment with institutional priorities and quality standards.

Spiral Course K- PRISM

These courses are designed to introduce students to essential themes in professional and personal development that will be revisited in increasing depth in subsequent years. The spiral will be monitored directly by the Department of Medical Education. However, the teaching sessions and mentoring process will be assigned to other disciplines. For example, Communication Skills can be taught by the Family Medicine faculty, and Research can be facilitated by Community Medicine & DME.

The Faculty of Medical Education will monitor the entire process & also engage in the teaching sessions, when and wherever required.

Spiral component for 1st year includes:

1. Learning and teaching in Medical Education
2. Skills Lab
3. Communication Skills for Medical Students
4. Islamic Studies and Ethics
5. Professionalism.
6. Foundations of Behavioral Sciences
7. Research Methodology and Medical Innovation (capstone project)
8. Healthy Lifestyle and Wellbeing in Medicine (community medicine)
9. Introduction to Artificial Intelligence
10. Documentation
11. IT skills
12. Leadership, management, and team building
13. Entrepreneurship
14. MSDS
15. Geriatrics

"Details in Annexure 1"

Clinical Rotations K- CORE

Introducing structured weekly clinical rotations for first-year MBBS students is a deliberate step toward fostering early professional identity formation and bridging the gap between basic sciences and clinical practice. A two-hour clerkship session each week provides students with meaningful, developmentally appropriate exposure to real clinical environments while aligning with the integrated/modular curriculum.

Early and regular clinical exposure enhances students' motivation, contextualizes foundational knowledge, and helps them understand the relevance of basic sciences in patient care. Short, focused clinical encounters promote observation, guided participation, and reflective learning, key components of adult learning theory. Weekly sessions also support the gradual development of essential professional behaviors, including communication, empathy, respect for patients, teamwork, and adherence to safety and infection-control practices.

K-CORE model engages students early in authentic clinical settings and will strengthen patient-centered attitudes, nurture clinical curiosity, and build confidence in navigating the hospital environment. This structured yet low-intensity exposure avoids cognitive overload while establishing the foundation for more advanced skills in subsequent years. Overall, weekly clinical clerkships ensure a smooth, scaffolded transition from the pre-clinical to the clinical phase, contributing to the development of competent, reflective, and patient-focused future physicians.

- ***"Schedule in Annexure 2"***
- ***Anatomy, Physiology, and Biochemistry LOs in Annexure 3***

Domains of Learning

1. Cognitive Domain

Learning strategies are designed to promote understanding, integration, and clinical reasoning through a pragmatic mix of guided and self-directed approaches, including lectures, case-based learning, peer-assisted learning, small-group discussions, tutorials, videos, clinicopathological conferences (CPCs), symposiums, assignments, and structured self-directed learning.

2. Psychomotor (Skills) Domain

Skill acquisition is facilitated through progressive, supervised, and hands-on learning experiences such as laboratory work, cadaveric dissection, skills laboratories, workshops, bedside teaching, ward rounds, community-based activities, operating theatre exposure, and emergency department rotations, ensuring competence, safety, and readiness for clinical practice.

3. Affective (Attitudinal) Domain

Professional attitudes and values are nurtured through experiential and reflective learning activities, including role modeling, role-playing, videos, workshops, mentorship, and extracurricular engagements, which foster professionalism, ethical practice, teamwork, empathy, and social responsibility.

Teaching Strategies

1. Large Group Interactive Sessions (LGIS)
2. Small Group Discussions (SGD)
3. Case-Based Learning (CBL)
4. Self-Directed Learning (SDL)
5. Videos/ workshops
6. Assignments
7. Skill Labs
8. Laboratory work / cadaveric dissection
9. Bedside learning

Percentage weightage of each Module / Block

Block	Module	Duration	% Total Year	Assessment weightage
Block 1	Foundation	5 weeks	15.15%	10
	Musculoskeletal	6 weeks	18.18%	20
Block 2	Cardiovascular	6 weeks	18.18%	20
	Respiratory	5 weeks	15.15%	10
Block 3	Blood and Immunity	6 weeks	18.18%	20
	Core Concepts	5 weeks	15.15%	10
Spiral Curriculum	All modules	2 hr/ week		10%

Internal Assessment

As per PM &DC criteria and university policy, it will be uniform across all disciplines/ years.

1. Purpose

This section outlines the policy governing the calculation, submission, and use of Internal Assessment (IA) scores for students enrolled in the Basic Sciences component of the MBBS program.

2. Responsibility for Calculation

- The Dean, Basic Sciences, and the coordinator shall be responsible for calculating the Internal Assessment based on the verified data submitted by the Block Management Committee.
- The finalized Internal Assessment record of each Block shall be formally shared with the Examination Department.

3. Frequency and Timeline

- Internal Assessment shall be calculated at the end of each Block assessment.
- Internal Assessment report must be submitted to the Examination Department no later than one month before the Final Professional Examination.

4. For Supplementary Examination

- The same Internal Assessment score shall be applicable for candidates appearing in the supplementary examination.
- No recalculation or modification will be undertaken for supplementary attempts.

5. Method of Calculation

- Internal Assessment shall be computed in accordance with the approved formula, by PM&DC as notified by the Office of the Dean, Basic Sciences.

	THEORY – 20 %	
1	Attendance in lectures > 95 % = 05 %, 90-94% = 04%	5 %
2	Block Exam (Written Component)	9 % (3% / BLOCK)
3	Continuous Assessment (MODULE TEST)	6 % (3% / MODULE)
	PRACTICAL – 20 %	
1	Attendance in practical > 95 % = 6%, 90-94% = 4%	6 %
2	Practical books	5 %
3	BLOCK Exam (OSPE / OSVE Component)	6 %
4	Logbook	3 %

Section 1 – Conduction of Blocks

1.1 – Block Assessments shall be conducted by the following departments of KEMU:

BLOCK 1 - Department of Anatomy,

BLOCK 2 - Department of Physiology,

BLOCK 3 - Department of Biochemistry.

1.2 – The subsequent sections outline the roles and responsibilities of the respective Block Management Committees.

Section 2 – Block Personnel / Committee

2.1 – The Block Management Committee will be headed by a "***Block Coordinator,***" who shall be an Associate Professor from the department responsible for conducting the respective block (e.g., Associate Professor of Anatomy for Block 1).

2.2 – The Committee shall include **one *Assistant Professor*** each from the remaining **two** Basic Sciences departments, nominated by their respective Chairpersons.

2.3 – **One Assistant Professor from each clinical discipline** shall serve as a "***Focal Person***" to coordinate clinical teaching and assessment with the Basic Sciences departments. These shall be nominated by their respective Chairpersons. The focal person shall be responsible for ensuring effective interdepartmental communication and for providing all necessary data to facilitate the smooth conduct of the Block Examination.

2.4 – One representative ("***Focal Person***") from the **Department of Medical Education** shall be nominated by the Chairperson to coordinate K-PRISM and K-CORE activities. The focal person shall be responsible for ensuring effective interdepartmental communication and for providing all necessary data to facilitate the smooth conduct of the Block Examination.

2.4 – One "***Attendance Clerk***" from each department shall be nominated by the respective Chairpersons.

2.5 – One "***Ancillary Clerk***" shall be appointed by the Chairperson of the department responsible for conducting the Block Examination.

Section 3 – Responsibilities of Block Management Committee

A. ASSESSMENT OF ELIGIBILITY

3.1 – The Block Management Committee, in consultation with respective Chairpersons, shall determine student eligibility for the Block Examination based on academic performance (module tests, portfolio, logbooks, etc.) and attendance percentage.

3.2 – Each Basic Sciences department shall submit student test records/obtained scores to the Block Coordinator at least 10 days before the commencement of the Block Examination.

3.3 – Each department shall provide a subject-wise "debar list" to the Block Coordinator at least 10 days before the examination.

3.4 – Attendance records (complete percentage data) shall be submitted by each department to the Block Coordinator within the same timeline.

3.5 – Each department shall submit Internal Assessment marks for the block, duly approved by their Chairpersons.

B. CONDUCTION OF BLOCK EXAM – THEORY

3.6 – The Block Examination shall be conducted by the department responsible for the respective block.

3.7 – Question paper development (MCQs and SEQs) shall be undertaken by subject specialists and submitted to the Block Coordinator at least 15 days before the examination. Submissions shall be made as sealed hard copies & password-protected soft copies. All questions shall be developed in accordance with the approved Table of Specifications (TOS).

3.8 – The Internal Assessment of the block shall be compiled by the members of the Block Management Committee. Pre-calculated Internal Assessment scores from each department shall be submitted by the respective committee members for compilation and review at the end of the academic year, at least one month before the professional examination.

3.9 – Printing and photocopying of examination papers shall be managed by the Block Management Committee through the Ancillary Clerk. The University shall provide necessary printing facilities.

3.10 – Confidentiality, secure storage, and transportation of examination papers shall be ensured by the department running the block.

3.11 – The examination venue shall be arranged by the Block Management Committee through proper channels, in accordance with university protocols, and finalized upon approval of relevant Chairpersons.

3.12 – All logistical arrangements at the venue, including seating, facilities, and cleanliness, shall be jointly managed by Basic Sciences departments through designated ancillary staff.

3.13 – Security personnel shall be provided by the University. The Block Management Committee shall assign duties, including the collection of mobile devices and prohibited materials. A minimum of two security personnel shall be present. Any issues shall be reported to the Block Coordinator.

3.14 – Upon completion of the examination, all materials shall be collected and returned to the department running the block under the supervision of the Block Coordinator.

3.15 – ***SEQ Paper marking*** shall be centralized and conducted in the department running the block, which shall provide appropriate facilities for the faculty from all departments.

3.16 – ***MCQ marking*** shall be carried out by ancillary staff under the supervision of the Ancillary Clerk.

3.17 – ***Result compilation*** – including module assessment and attendance - shall be conducted by the Block Coordinator and submitted (in both hard and soft copies) to the Examination Department, Registrar's Office, Department of Medical Education, Dean Basic Sciences, and relevant Chairpersons.

3.18 – Answer sheets for the Block Examination will be provided by the University Administration

C. CONDUCTION OF BLOCK EXAM – OSPE / OSVE

3.19 – Each department shall submit a detailed OSPE/OSVE plan, duly approved by the respective Chairperson, **at least 15 days before** the examination.

3.20 – Departments shall be responsible for setup, logistics, equipment safety, and dismantling of their respective OSPE stations. The Block Management Committee shall facilitate coordination only. The stations will be set up by the respective departments' faculty.

3.21 – OSPE scores for each subject shall be compiled and submitted to the Block Coordinator within 7 days of the examination.

3.22– A list of nominated "Invigilation Staff" and "Examiner Panel" for OSVE will be provided by each Basic Sciences to the Block Coordinator at least 10 days before the examination. A minimum of 8 invigilators (ancillary staff included) shall be contributed by each department as human resources for the block exam.

3.23 – OSVE scores shall be compiled and submitted within 7 days of the examination.

3.24– Consolidated OSPE/OSVE results shall be prepared by the Block Management Committee and submitted (hard and soft copies) to all relevant authorities by the Block Coordinator.

D. SMOOTH CONDUCTION OF CURRICULUM-BASED ACTIVITIES

3.25 – The Block Management Committee shall address and resolve issues affecting the smooth execution of the curriculum.

3.26 – The Committee shall ensure effective implementation of clinically integrated lectures, K-CORE rotations, logbook maintenance, K-PRISM sessions, and other co-curricular activities. Any discrepancies shall be reported to the Block Coordinator for onward communication through proper channels.

3.27 – Student attendance matters shall be managed in accordance with university policies. Any amendments shall be processed through proper institutional channels.

3.28 – Cases of student "misconduct" or "unfair means" shall be referred to the appropriate University authorities for disciplinary action.

3.29 – Attendance records for K-PRISM and K-CORE shall be provided by the Department of Medical Education to the Block Coordinator for integration into overall block attendance.

"Time Table & Proposed Academic Planner- Annexure 5"

ASSESSMENTS

Module Assessment Policy

- Departments shall conduct Module assessments
- Departments may utilize any appropriate assessment tool, as per academic guidelines.
- Total marks for module assessments shall remain standardized across all modules.

- No remedial assessment will be offered for a failed module assessment.

Block Assessment Policy

1. Block assessments shall be conducted at the end of each block by the respective Block Management Committees.
2. To appear in the Block Assessment, a student must have an overall 75% and a minimum of 60% attendance in each subject.
3. A student debarred from the block assessment due to a shortage of attendance will have to make up for the attendance afterwards (in vacation period)

Structure of Block Assessment

Written Component

- Total marks for the Block Assessment: 200
- Written component: 110 marks
- The written paper shall consist of four integrated sections:
    1. Anatomy
    2. Physiology
    3. Biochemistry
    4. Spiral Component
- Block Management Committee will provide TOS for assessment.

Distribution of Written Marks (110 marks):

1. 65 MCQs × 1 mark each = 65 marks
   18 MCQ each from Anatomy, Biochemistry, and Physiology
   11 MCQ from K-CORE and K-PRISM
2. 09 SEQs × 5 marks each = 45 marks
   03 SEQ each from Anatomy, Biochemistry, Physiology

Viva/Practical Component: 90 marks

1. 12 OSPE stations × 5 marks each = 60 marks
   03 OSPE stations, each from Anatomy, Biochemistry, and Physiology
   03 OSPE stations from K-CORE and K-PRISM
2. 03 OSVE stations × 10 marks each = 30 marks
   One station each from Anatomy, Biochemistry, and Physiology

Declaration of Results

Passing Criteria

- Each subject component of the written examination (Anatomy, Physiology, Biochemistry, Spiral) must be individually passed with a minimum score of 50%.

- Each subject component of OSPE must be passed individually with a minimum score of 50%.
- Written and OSPE components are independent, and both must be passed separately.

Remedial Policy

One single remedial will be taken before the Prof exam for each block assessment, which will be allowed only for students:

a. Having attendance of not less than 50%
b. Failed any block exam
c. Absent due to reasons such as sickness, accident, or close degree relative death, having valid proof /evidence for it.

Professional Examination Policy

The Professional Examination shall serve as the summative assessment for the Basic Sciences curriculum and will be conducted at the end of each academic year. All procedures should be administered under the supervision of the Examination Department.

1. A professional examination will be conducted at the end of each year.
2. The Examination Department will conduct a professional examination.

3. The Block Management Committee will provide the following deliverables to the Examination Department.
    a. A list of eligible students must be provided at least 4 weeks before commencement of the examination.
    b. List of Panel of examiners should be provided at the beginning of the year
    c. A Table of Specifications should be provided at the beginning of the academic year
4. Eligibility Criteria:
    a. Attendance required to appear in the Professional examination should be 75%, with 60% attendance in each subject. (Anatomy, Physiology, Biochemistry, Spiral Subjects)
    b. Should have passed all three block assessments. (Results should be attached with the application submitted to the examination department)
    c. Name should be included in the list of eligible students submitted by the block management committee.
    d. Evidence of fee submission.
5. Written part of Professional Examination:

    There will be a total of 04 papers in the professional examination as follows.
    - Paper 1 will cover the course content of Block 1
    - Paper 2 will cover the course content of Block 2
    - Paper 3 will cover the course content of Block 3
    - Islamic studies /Pakistan Studies
6. Total marks of the Professional examination will be 1000. Division of these marks will be as follows.

Paper	Subjects	Written Marks	Internal Assessment Theory	OSVE Marks	Internal Assessment Practical
PAPER 1	BLOCK 1	120	30	120	30
PAPER 2	BLOCK 2	120	30	120	30
PAPER 3	BLOCK 3	120	30	120	30
Islamic Studies		100			

Written components:

75 MCQs / 1 mark = 75 marks (1.5 hrs)

- 20 MCQ each from Anatomy, Biochemistry, and Physiology

- 15 MCQ from K-CORE and K-PRISM

09 SEQs / 5 marks = 45 marks (1.5 hrs)

- 03 SEQ each from Anatomy, Biochemistry and Physiology

Viva component:

- There will be three OSVEs of 120 marks.
- These 120 marks will be equally distributed among three papers, i.e., Anatomy, Physiology & Biochemistry.

7. Table of Specification (TOS) for professional examination:

Paper	Subject	Division of Marks	Theory paper Marks	No. of MCQs	No. of SEQs	Viva Marks (OSVE)
Paper 1/2/3	Anatomy	29 %	35	20	03	40+40+40
	Physiology	29 %	35	20	03	40+40+40
	Biochemistry	29 %	35	20	03	40+40+40
	Spiral Subjects	13 %	15	15	00	00
	Total	100 %	120	75	09	

Declaration of Results

- In each paper, each component of the written assessment (anatomy, physiology, biochemistry, and spiral subjects) needs to be individually passed to declare the written component as passed. Marks obtained 50% will be declared as a pass.

- Each component of OSVE (Anatomy, Physiology, Biochemistry) needs to be passed to declare OSVE as passed. Marks obtained 50% will be declared as a pass.
- Both Theory and OSVE components need to be separately passed.
- If a student fails in any component of the written, OSPE/OSVE assessments (Anatomy, Physiology, Biochemistry, Spiral subjects), the student will appear in a supplementary examination in both the written & OSPE components.
- Marks required for Islamic Studies/Ethics and Pak Studies will be 33. These marks will not contribute to the total marks of the professional examination and the determination of position.

Program Evaluation

Below is a comprehensive, ready-to-use Evaluation Program for the Modular Integrated MBBS Curriculum (KEMU) aligned with PMDC/WFME standards and fully integrated with the uploaded document structure. It includes:

- Multi-level evaluation framework
- Structured feedback proformas (students, faculty, coordinators)
- Reflection templates

- Attendance & results recording formats
- Program evaluation framework (document, process, outcomes)

1. OVERALL EVALUATION FRAMEWORK

Model Adopted: Modified Kirkpatrick + CIPP Model
(Recommended for CBME & integrated curricula)

Level	Domain	What is Evaluated	Tools
Level 1	Reaction	Satisfaction	Feedback forms
Level 2	Learning	Knowledge, skills, attitude	Tests, OSPE
Level 3	Behavior	Clinical application	Logbooks, workplace assessment
Level 4	Results	Impact on outcomes	Pass rates, competencies

CIPP Model Integration

Context → Need assessment relevance
Input → Curriculum design, resources
Process → Implementation quality
Product → Outcomes (students, institution, society)

2. FEEDBACK PROFORMAS

A. STUDENT FEEDBACK (Module/Block)

Section A: General Information

Module/Block Name: ____
Duration: ____
Student ID (optional): ____

Section B: Likert Scale (1–5)

Domain	Item
Content	Learning environment supportive were clear
Integration	Subjects were well integrated
Teaching sessions	Sessions were interactive
Clinical Relevance	Content linked to clinical practice
SDL	Self-directed learning was facilitated
Assessment	Fair and aligned with outcomes
Resources	Adequate learning resources provided
Environment	Learning environment supportive

Section C: Open-ended

1 Strengths of module: ____
2 Areas for improvement: ____
3 Suggestions: ____

B. FACULTY FEEDBACK PROFORMA

Section A

Department: __
Role: __

Section B (Likert 1–5)

Domain	Item
Curriculum Design	Objectives appropriate
Integration	Horizontal/vertical integration achieved
Feasibility	Time allocation adequate
Student Engagement	Participation satisfactory
Assessment	Valid and reliable
Support	Administrative support adequate

Section C

Challenges faced: __
Recommendations: __

C. BLOCK/MODULE COORDINATOR FEEDBACK

Section A
Block: __
Coordinator Name: __

Section B

Domain	Item
Planning	Schedule adhered
Coordination	Interdepartmental coordination effective
Assessment	Conduct smooth and transparent
Logistics	Resources adequate
K-CORE/K-PRISM	Integration effective

Section C

Key issues: __
Corrective actions: __

3. REFLECTION TEMPLATES

A. STUDENT REFLECTION (Gibbs Cycle)

1. Description:	What happened?
2. Feelings:	What did you feel?
3. Evaluation:	What was good/bad?
4. Analysis:	What did you learn?
5. Conclusion:	What could be improved?
6. Action Plan:	Future application

B. FACULTY REFLECTION

1 What worked well in teaching?
2 What challenges were encountered?
3 How did students respond?
4 What changes will you implement?

C. COORDINATOR REFLECTION

1 Was the block delivered as planned?
2 Were integration goals achieved?
3 What system gaps were identified?
4 Action plan for next cycle

4. ATTENDANCE TEMPLATES

A. STUDENT ATTENDANCE SHEET

Roll No	Name	Lecture %	Practical %	K-CORE	K-PRISM	Total %

Eligible (Y/N) —

B. DAILY SESSION ATTENDANCE

Date	Session	Faculty	Total Students	Present	Absent

—

5. RESULTS RECORDING TEMPLATES

A. MODULE RESULT SHEET

Roll No	Name	Test Marks	Assignment	SDL	Total	Pass/Fail

B. BLOCK RESULT SHEET

Roll No	Name	MCQs	SEQs	OSPE	OSVE	IA	Total	Result

C. INTERNAL ASSESSMENT RECORD

Component	Weightage	Marks Obtained
Attendance	5%	
Module Tests	6%	
Block Exam	9%	
Practical	20%	
Total IA	40%	

6. CURRICULUM EVALUATION FRAMEWORK

A. DOCUMENT EVALUATION

Domain	Indicator
Alignment	PMDC/WFME compliance
Objectives	SMART & competency-based
Integration	Horizontal & vertical
Assessment	Blueprinted & valid

B. IMPLEMENTATION EVALUATION

Domain	Indicator
Delivery	Sessions conducted as planned
Faculty	Preparedness & engagement
Students	Participation rate
Resources	Availability of labs, LMS

C. OUTCOME EVALUATION

- **Student Outcomes**

1 Pass rates
2 OSPE performance
3 Clinical competence
4 Professionalism

- **Program Outcomes**

1 Graduate competencies (7-star doctor)
2 Stakeholder satisfaction
3 Research output

7. DATA COLLECTION & QUALITY LOOP

Data Sources

1 Feedback forms
2 Exam results
3 Attendance
4 Logbooks
5 Reflections

Analysis

1 Quantitative → Mean scores, trends
2 Qualitative → Thematic analysis

Quality Improvement Cycle (Annual)

1. Data collection
2. Analysis
3. Report generation
4. Curriculum committee review
5. Action plan
6. Implementation

8. REPORTING FORMAT (ANNUAL PROGRAM EVALUATION REPORT)

1. Executive Summary
2. Methodology
3. Key Findings
4. Strengths
5. Gaps
6. Recommendations
7. Action Plan

9. KEY PERFORMANCE INDICATORS (KPIs)

1 ≥85% student satisfaction
2 ≥90% attendance
3 ≥80% pass rate
4 Improved OSPE scores year-wise
5 Faculty satisfaction ≥80%

10. GOVERNANCE STRUCTURE

1 DME → Oversight
2 Block Committee → Implementation
3 Curriculum Committee → Policy & revision
4 Examination Dept → Assessment integrity

ANNEXURES

Annexure 1

K-PRISM

(KEMU – Professionalism, Research, Islamic Studies, Society & Medicine)

LEARNING OBJECTIVES

Self- directed and life-long learning: (Directorate of Medical Education)

- Demonstrate self-directed learning skills by independently identifying personal learning needs, setting learning goals, and selecting appropriate learning strategies.
- Apply principles of adult learning theory to plan, implement, and evaluate their own learning throughout undergraduate and postgraduate medical education.
- Efficiently access, appraise, and utilize medical information from credible sources (textbooks, guidelines, journals, databases) to support clinical decision-making.
- Reflect critically on personal performance and feedback to identify strengths, address deficiencies, and formulate improvement plans.
- Demonstrate adaptability to evolving medical knowledge and technology, including digital learning platforms, simulation, and evidence-based practice tools.
- Engage in scholarly activities such as research, audits, poster presentations, and case discussions as part of continuous professional development.
- Exhibit professional responsibility for continuous learning as an ethical obligation to patients, society, and the medical profession.

Communication skills: (Chairperson Counselling)

- Describe the core principles of effective communication in healthcare, including clarity, empathy, respect, and active listening.
- Explain the importance of verbal, non-verbal, and paraverbal communication in patient interactions.
- Demonstrate basic skills in introducing oneself, initiating conversation, and building rapport during role-plays or early clinical exposure.
- Demonstrate appropriate professional communication with peers, seniors, patients, and support staff, including courtesy, boundaries, and respect.
- Recognize the value of confidentiality, privacy, and informed consent as communicated to patients and attendants.

Behavioral Sciences: (Chairman of the Psychiatry department)

- Describe the biopsychosocial model and its importance in understanding health, illness, and patient behavior.
- Identify key psychological processes (learning, memory, emotion, motivation, stress) and explain their relevance to patient interactions.
- Explain basic principles of developmental psychology, including normal cognitive and emotional development across the lifespan.

- Describe common maladaptive behaviors and stress responses seen in patients and caregivers.
- Explain the role of communication, empathy, and active listening in building therapeutic relationships.
- Recognize the impact of culture, family systems, socioeconomic factors, and stigma on health behaviors in Pakistan.
- Demonstrate emerging skills in self-awareness, emotional regulation, and reflective practice during early clinical exposures and group activities.

Professionalism: (Chairperson Professionalism and Ethics)

- Define professionalism and E Professionalism in medicine and identify its core components: integrity, accountability, altruism, respect, confidentiality, and social responsibility.
- Describe the expectations of a KEMU medical student in terms of behavior, appearance, communication, and teamwork.
- Differentiate between professional and unprofessional behaviors in academic, clinical, and online settings.
- Explain the importance of boundaries, punctuality, honesty in documentation, and respect for diversity.
- Demonstrate emerging professional attitudes during clinical orientation (K-CORE) activities, group work, and community interactions.

Ethics: (Chairperson Professionalism and Ethics)

- Describe the four pillars of biomedical ethics: autonomy, beneficence, non-maleficence, and justice.
- Explain the concept of informed consent and assent in culturally sensitive contexts.
- Recognize ethical challenges commonly faced in early clinical encounters (privacy, dignity, confidentiality).
- Apply basic ethical reasoning to simple case vignettes.
- Identify the role of institutional ethics committees and the need for ethical vigilance in medical practice.

Research Literacy: (Chairperson Research Methodology)

- Define research, evidence-based medicine, and the scientific method in the context of healthcare.
- Describe types of medical research (qualitative, quantitative, observational vs. interventional).
- Identify the components of a research article: abstract, introduction, methods, results, discussion.
- Explain basic principles of sampling, variables, bias, and data integrity.
- Demonstrate foundational skills in searching scientific literature, using keywords, and evaluating sources for credibility.

Scientific Inquiry & Research Methods (DME)

- Describe basic research methodology.
- Formulate research questions and hypotheses based on clinical observations and literature

review.

- Apply ethical principles and regulatory guidelines in research, design and conduct.
- Collect, analyze, and interpret research data using appropriate statistical methods.
- Prepare and present research findings in written and oral formats suitable for academic and

professional audiences.

Public Health: (HOD Community Medicine)

- Describe the role of a doctor within the healthcare system of Pakistan, including primary, secondary, and tertiary care structures.
- Explain concepts of public health, prevention levels, health promotion, and determinants of health.
- Identify major community health issues in Pakistan (maternal health, nutrition, sanitation, vaccination, ageing population).
- Demonstrate awareness of cultural, social, and economic factors that shape patient behavior and health outcomes.
- Participate respectfully in community-based visits and describe observations through reflective writing.

Geriatrics: (Dean Medicine and Allied)

- Describe the demographic trends of ageing and their implications for healthcare systems.
- Recognize the physical, psychological, and social changes associated with normal ageing.
- Identify common geriatric syndromes (falls, frailty, polypharmacy, cognitive decline) at a conceptual level.
- Demonstrate sensitivity to the vulnerabilities of older adults during clinical exposure or simulated activities.

Artificial intelligence: (Director AI School)

- Define artificial intelligence, machine learning, and data-driven decision support in the context of healthcare.
- Describe common applications of AI in medicine, such as medical imaging, diagnostics, risk prediction, triage, and administrative workflows.
- Understand the importance of ethical oversight in digital healthcare.
- Identify the role of the doctor in an AI-enabled healthcare environment, including human oversight, clinical judgement, and patient communication.
- Recognize basic principles of digital professionalism, including confidentiality, data privacy, and responsible technology use.

MSDS and Documentation: lectures and in clinical rotation (Chairperson Student Clerkship and Electives)

- Explain the Minimum Service Delivery Standards (MSDS)
- Discuss why they exist as part of quality and safety frameworks in healthcare systems (patients have a right to minimum safe, effective services).
- Describe how MSDS contributes to clinical governance, accountability, and continuous quality improvement in health institutions such as hospitals, labs, and clinics (standards, indicators, documentation requirements).
- Demonstrate accurate, legible, and ethical documentation of clinical interactions, including patient history, examination findings, and management plans, reflecting the foundations of safe patient care.

- Outline how good clinical documentation supports patient safety, continuity of care, risk management, and legal/ethical protection for patients and practitioners throughout medical practice.
- Prepare and maintain required healthcare records and MSDS-related documentation (e.g., service delivery checklists, quality indicators) during clinical postings and simulated settings, demonstrating professionalism, accuracy, and attention to quality standards

Leadership, management and team building: (Chairperson Leadership and Team building)

- Explain the basic principles of leadership, management, and teamwork in healthcare settings.
- Identify the roles of a physician as a leader, manager, and team member in clinical and community health environments.
- Demonstrate effective interpersonal and professional communication skills necessary for collaboration within multidisciplinary health teams.
- Illustrate how ethical values, integrity, and professionalism guide decisions in leadership and team interactions.
- Describe the structure and function of health delivery systems and how effective leadership and management support quality patient care.
- Apply strategies for building, motivating, and maintaining effective healthcare teams in simulated activities and early clinical exposures.
- Engage in group problem-solving activities, showing the ability to negotiate, share responsibilities, and resolve conflicts.
- Evaluate one's own strengths, weaknesses, and learning needs as an emerging leader and team participant.
- Demonstrate basic planning, organizing, prioritizing, and resource management skills in small group tasks and projects.
- Integrate leadership and teamwork principles that support patient safety, quality improvement, and accountability in clinical and community settings.

Entrepreneurship and startups: (Director ORIC)

- Explain the basic principles of entrepreneurship and the startup ecosystem, including key terms like value proposition, innovation, and business models in healthcare contexts.

- Recognize unmet clinical, public health, or system-level needs through observation and early clinical exposure and formulate potential problem statements that could be addressed through innovative solutions.
- Demonstrate creative thinking and problem-solving skills by generating and evaluating ideas for health-related products, services, or processes that could improve patient care or health delivery.
- Collaborate within multidisciplinary student teams to discuss, develop, and present early concepts of health-focused entrepreneurial ideas, showing the ability to share roles and integrate diverse perspectives.
- Discuss the basic stages of launching a health-related startup (idea generation, validation, planning, pitching) and recognize the importance of ethics, patient safety, sustainability, and social impact in entrepreneurial efforts.

Role of Genetics and Bio Bank in Disease Prevention, Diagnosis, and Targeted Treatment

- Define core genetics concepts (gene, genome, variant, SNP, CNV) and summarize the central dogma to contextualize how DNA variation can affect phenotype and disease.
- Describe the basic principles and workflows of gene sequencing methods, contrasting Sanger sequencing with next-generation sequencing (NGS) in terms of purpose, scale, output, and typical use-cases.
- Outline the key steps from sample to result (collection, DNA extraction, library preparation, sequencing, alignment, variant calling) and recognize common data formats (e.g., chromatograms, FASTQ/VCF) at a foundational level.
- Explain what a biobank is and its role in health research and care, including consent models, sample/data governance, privacy safeguards, linkage to clinical records, and how biobanks enable population studies.
- Discuss how genetics informs disease prevention, including family history assessment, carrier screening, newborn screening, and the basic idea of polygenic risk scores—highlighting benefits, limitations, and equity considerations.
- Describe the use of genetics in diagnosis and clinical decision-making, including indications for genetic testing in Mendelian disorders, principles of variant classification (intro to benign/pathogenic/VOUS), pharmacogenetics basics, and criteria for referral to genetic counseling.
- Illustrate the concept of targeted therapy and precision medicine with common examples (e.g., HER2 in breast cancer, EGFR in lung cancer, BCR-ABL in CML, CFTR modulators), and articulate key ethical, legal, and social issues (incidental findings, informed consent, data sharing, and genetic discrimination).

ANNEXURE 2

K - CORE

KEMU – Clinical Orientation and Readiness Education

Orientation to Clinical Environment & Professionalism (All Departments)

1. Identify roles/responsibilities of a medical student in clinical areas.
2. Identify major ward/OPD areas and members of the healthcare team.
3. Demonstrate professional appearance, punctuality, and respectful behavior.
4. Discuss basic principles of patient dignity, confidentiality, and informed verbal consent.

Infection Prevention & Hand Hygiene (Skill Lab)

1. Discuss why hand hygiene prevents healthcare-associated infections. (Surgery and Allied ward)

2. Demonstrate the WHO 6–7 step hand-washing technique and appropriate use of alcohol hand-rub.
3. State indications for gloves, masks, and basic PPE, (Surgery and Allied)
4. Perform glove donning/doffing safely. (Surgery and allied)
5. Describe safe handling of sharps and steps to take in case of accidental exposure (Surgery and Allied)

Bedside Communication & Basic History Taking

(All Departments with their context to Emergency, Trauma, and Detailed history Rapport building, biodata, and presenting complaints

1. Introduce self and obtain consent for a focused history. (Rapport building)
2. Take a 3–5 minute presenting complaint history using open and closed questions.
3. Demonstrate active listening, eye contact, and cultural and language diversity.

Vital Signs I: Pulse & Respiratory Rate

(All departments with context to their specialty)

1. Measure and record pulse rate (rate, rhythm, volume) accurately.
2. Measure and record the respiratory rate correctly and note the pattern.
3. Recognize abnormal values and indicate when to escalate to a supervisor.

Vital Signs II: Blood Pressure & Temperature

(All departments with context to their specialty)

1. Demonstrate correct BP measurement (manual sphygmomanometer): cuff selection, placement, and Korotkoff sounds.
2. Measure and interpret oral/axillary temperature.
3. Record and report abnormal findings appropriately.

General Physical Examination & Basic Observations

(All departments with context to their specialty)

1. Perform a structured general physical exam (head → toes) on an adult patient or simulated model.
2. Recognize and describe signs: pallor, cyanosis, jaundice, edema, dehydration.
3. Document findings in a concise bedside note.

Respiratory System

(All departments with context to their specialty)

1.Inspect, palpate, percuss (basic), and auscultate chest fields correctly.

2.Identify common abnormal sounds (wheeze, crepitus) using simulation/audio. (Skill lab/Clinical setting)

3.Present respiratory findings orally and in writing.

Cardiovascular System

(All departments with context to their specialty)

1. Locate and palpate central and peripheral pulses and measure capillary refill.
2. Perform basic precordial inspection, palpation, and auscultation (identify S1/S2).

Safe Patient Handling, Mobility & Basic Bed Care

(All departments with context to their specialty and specifically the Emergency Department)

1.Demonstrate safe patient transfer techniques (bed and chair) in simulation.

2.Perform a respectfully assisted dressing while preserving patient dignity.

3.Explain pressure ulcer prevention basics and mobility advice.

Basic Patient Interaction: communication skills (Psychiatry Department)

1. Demonstrate respectful verbal and non-verbal communication with patients and attendants under supervision.

Biomedical Waste Awareness (General Surgery and Medicine Department)

1. Identify color-coded waste disposal containers
2. Discuss the importance of proper biomedical waste management.

Imaging Anatomy (Radiology)

1. Describe the basic principles of X-ray, CT scan, and MRI imaging
2. Recognize normal planes of imaging (axial, coronal, sagittal) on CT and MRI.
3. Identify normal anatomical structures on standard X-ray views, including the chest, abdomen, and limbs.
4. Demonstrate X-ray reading stepwise approach for chest X-ray (ABCDE)
5. Explain basic ultrasound concepts, including echogenicity and probe orientation
6. Identify major organs: liver, gall bladder, kidneys, and spleen
7. Identify major organs and structures on a normal CT scan and MRI
8. Brain, Head, Thorax, and Abdomen
9. Correlate radiological images with cadaveric and prosection anatomy

Orthopedics

1. Identify Normal Bony Anatomy Relevant to Fractures and the use of different muscles involved in the movement of limbs
2. Recognize and Classify Common Fracture Types
3. Differentiate and classify fractures (simple, compound, transverse, oblique, spiral, comminuted, greenstick, epiphyseal) using anatomical principles and basic X-ray images.
4. Explain the Anatomical Basis of Fracture Patterns
5. Correlate Neurovascular Anatomy with Fracture Complications
6. Identify major neurovascular structures related to common fracture sites (e.g., surgical neck of humerus, supracondylar humerus, neck of femur) and predict possible complications based on anatomical relationships.
7. Outline the stages of fracture healing (hematoma formation, inflammatory phase, soft callus, hard callus, remodeling) and relate each stage to underlying histological and vascular anatomy.
8. Interpret Basic Radiological Features of Fractures
9. Recognize normal and abnormal radiographic anatomy of bones and identify key features of fractures such as fracture line, displacement, angulation, and callus formation.
10. Integrate Structure with Clinical Function

CLINICAL ROTATIONS 1st Year MBBS 2026

	Medical Unit	Surgical Unit	Radiology	Orthopedic	Psychiatry	Artificial Intelligence	Skills Lab	Accident & Emergency	Pediatrics
February	Batch 1	Batch 2	Batch3	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9
March	Batch 2	Batch 3	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Batch 1
April	Batch 3	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Batch 1	Batch 2
May	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Batch 1	Batch 2	Batch 3
June	Batch 5	Batch 6	Batch 7	Batch 8	Batch 9	Batch 1	Batch 2	Batch 3	Batch 4
July	Batch 6	Batch 7	Batch 8	Batch 9	Batch 1	Batch 2	Batch 3	Batch 4	Batch 5
August	Batch 7	Batch 8	Batch 9	Batch 1	Batch 2	Batch 3	Batch 4	Batch 5	Batch 6
September	Batch 8	Batch 9	Batch 1	Batch 2	Batch 3	Batch 4	Batch 5	Batch 6	Batch 7
October	Batch 9	Batch 1	Batch 2	Batch 3	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8

Implementation

K-PRISM: Friday 1 hour. lecture 11:00 – 12:00 am

Saturday 1 hour. lecture 08:00 -09:00 am

The Islamic studies lecture will be in the K-PRISM lecture every saturday, 08-09 am till completion of the syllabus.

K-CORE: 1.5-hour rotation to clinical departments in small groups.

Saturday 09 – 10:30 am

In lieu to the government instructions for online classes on Friday and Saturday.

K-CORE rotation will be held every Wednesday, 10:00 – 11: 30 am, till further notice.

Assessment of Spiral Components

- Spiral components will have 3% independent weightage in the internal assessment of each Block. This will include attendance, behavior, and performance during these sessions.
- This component will not be assessed in the module test.
- However, it will also have weightage in the Block assessment, written as well as the practical part.
- The written paper will include MCQ, and the practical components will include OSPE stations as per TOS.
- The attendance criteria of this component are as per university policy and stated in the study guide.
- (To appear in the Block assessment, a student must have an overall 75% and a minimum of 60% attendance in each subject)

Passing Criteria in Block assessment:

- Each subject component of the written examination (Anatomy, Physiology, Biochemistry, Spiral) must be individually passed with a minimum score of 50%.

- Each subject component of OSPE must be passed individually with a minimum score of 50%.
- Written and OSPE components are independent, and both must be passed separately.

ANNEXURE 3

ANATOMY

FOUNDATION MODULE (5 weeks)
ANATOMY CURRICULUM

Topic	CODE	Learning Objectives	Number of Hours	Integrated Lectures
General Anatomy: Introduction to Human Body & Language of Anatomy	**A-F-001**	• Describe the anatomical position as the standard reference. • Explain anatomical planes and axes in relation to movement and imaging. • Use standard anatomical terminology accurately. • Identify common body positions and their basic clinical relevance. • Describe fundamental body movements at major joints. • Outline the structural organization of the body and its divisions. • Explain the general body plan and integration of organ systems. • Recognize the clinical relevance of anatomy in surface landmarks, variation, and procedural safety. • Interpret basic X-ray, CT, and MRI using anatomical planes and terminology.	**02**	**Radiology:** Imaging Planes & Surface Anatomy
General Anatomy: Skin & Subcutaneous Tissue	**A-F-002**	• Describe the structural layers of skin and their key features. • Identify skin appendages and their anatomical organization. • Differentiate thick and thin skin structurally. • Describe subcutaneous tissue and its regional variation. • Describe deep fascia and its structural modifications. • Explain fascial relationships in the spread of infection or fluid. • Outline dermatomes and cutaneous nerve distribution. • Explain the anatomical basis and classification of burns	**01**	
General Anatomy Osteology	**A-F-003**	• Classify bones by shape, development, and region. • Describe the gross structure of a typical long bone. • Describe the basic microscopic organization of bone. • Outline bone development and ossification centers. • Describe the vascular and neural supply of bone. • Explain the functional morphology of bones. • Describe the anatomical basis of common fractures.	**03**	**Orthopedics**

		• Recognize basic clinical applications of bone anatomy.		
General Anatomy Chondrology	**A-F-004**	• Identify the structural features of cartilage, including chondrocytes, lacunae, and extracellular matrix. • Classify types of cartilage (hyaline, elastic, fibrocartilage) and describe their distinguishing anatomical characteristics. • Describe the distribution and functional significance of hyaline cartilage in the body. • Describe the distribution and functional significance of elastic cartilage in the body. • Describe the distribution and functional significance of fibrocartilage in the body. • Explain the vascular and nutritional characteristics of cartilage, including reliance on diffusion. • Differentiate the three types of cartilage based on gross appearance, texture, and anatomical context. • Relate the structural features of cartilage to clinical relevance, including degenerative changes and limited healing capacity.	**01**	
General Anatomy Arthrology	**A-F-005**	• Classify joints structurally and identify examples. • Describe the basic components of synovial joints. • Outline key features of fibrous and cartilaginous joints. • Explain the vascular, neural, and lymphatic supply of joints. • Describe factors contributing to joint stability. • Explain joint movements in relation to synovial joint types. • Describe basic biomechanical principles of joint movement. • Relate joint structure to common clinical correlations.	**02**	**Orthopedics**
General Embryology: Gametogenesis and Chromosomal Theory of Inheritance	**A-F-006**	• Molecular regulation and Signaling pathways – Gene transcription, Genomic imprinting, regulators of gene expression, induction and organ formation, Cell-signaling, SHH master gene, Planar cell polarity, NOTCH pathway • Interpret normal and altered patterns of cell division. • Describe spermatogenesis and its stages of maturation. • Describe oogenesis, including meiotic stages and polar body formation. • Explain the structure and chromosomal constitution of mature gametes. • Describe normal meiotic chromosomal behavior. • Explain the chromosomal basis of inheritance and karyotype. • Identify common numerical and structural chromosomal abnormalities – Down's. Edward's, Patau's, Klinefelter, Turner, triple X, cri-du-chat, microdeletions, Angelman, Prader-Willi, Miller-Dieker, 22q11, Fragile X Syndromes. • Outline embryologically relevant mechanisms producing abnormal gametes. • Relate chromosomal and gamete abnormalities to basic clinical implications.	**03**	
General Embryology:	**A-F-007**	• Outline key ovarian and menstrual cycle events relevant to fertilization. • Describe ovum and sperm transport through the female genital tract. • Explain the process of fertilization. • Describe stages of early embryonic development. • Explain the role of trophoblast and inner cell mass. • Describe implantation and early placental development.	**03**	

From Ovarian Cycle to Implantation		• Identify the embryological basis of abnormal implantation. • Outline embryological principles of contraception and assisted fertilization. • Describe and prescribe Contraceptive Methods to couples and resolve cases of Infertility		**OBGYN**
General Embryology: The Week of "Twos"	**A-F-008**	• Describe formation of the bilaminar embryonic disc. • Explain trophoblastic differentiation. • Describe development of the amniotic cavity and amnion. • Describe formation and modification of the yolk sac. • Explain formation of extraembryonic mesoderm and chorionic cavity. • Outline establishment of uteroplacental circulation. • Describe formation and significance of the early chorion. • Recognize the basis of the "Week of Twos". • Abnormal implantation, Ectopic Pregnancy, Hydatidiform Mole	**02**	
General Histology: Cytoskeleton, Cell Surface Modification & Nucleus	**A-F-009**	• Describe components and organization of the cytoskeleton. • Outline nuclear structure and chromatin types. • Describe cell surface specializations and their microscopic features. • Explain the histological basis of primary ciliary dyskinesia. • Describe histological features of cell injury and cell death. • Enumerate the cell surface modifications • Describe the histologic appearance (TEM) of each Apical Modification; Cilia, Microvilli, Stereocilia etc. • Discuss the functional correlations of modifications with their structure • Immotile Cilia Syndrome (Kartagener's Syndrome) • Clinically correlate the cell surface modifications with their syndromes • Draw and label ALL cell surface modifications	**02**	**Pathology**
General Histology: Epithelium	**A-F-010**	• Classify covering epithelium by layers and cell shape. • Describe major epithelial types. • Describe the basement membrane ultrastructure. • Explain the organization of glandular epithelium. • Classify exocrine glands by structure and pathway. • Describe mechanisms of epithelial secretion. • Identify major epithelial cell junctions. • Relate epithelial structure to histological function.	**04**	
Gross Anatomy of Upper Limb Introduction to Gross Anatomy of Upper Limb	**A-F-011**	• Identify regions and compartments of the upper limb. • Describe key surface landmarks of the upper limb. • Outline the osteological framework of the upper limb. • Describe compartmental organization of the upper limb. • Identify major muscle groups and their actions. • Describe primary joint movements of the upper limb. • Outline major nerves and vessels of the upper limb. • Recognize relevant surface-to-deep anatomical relationships.	**01**	

Gross Anatomy of Upper Limb Clavicle	**A-F-012**	• Identify the clavicle and determine its side and orientation. • Describe the anatomical features of the clavicle. • Identify major muscular and ligamentous attachments. • Outline clavicular ossification and its intramembranous origin. • Describe the articulations of the clavicle. • Explain the clinical significance of clavicular fractures. • Recognize the functional role of the clavicle in upper-limb positioning.	**02**	**Orthopedics**
Gross Anatomy of Upper Limb Pectoral Region	**A-F-013**	• Identify boundaries and surface landmarks of the pectoral region. • Describe pectoral muscles and their attachments, nerve supply, and actions. • Outline fasciae of the pectoral region. • Describe major neurovascular structures of the pectoral region. • Identify axillary lymph nodes related to the pectoral region. • Recognize key surface-to-deep dissection relationships. • Explain clinical correlations of the pectoral region.	**02**	
Gross Anatomy of Upper Limb Breast	**A-F-014**	• Identify the location, extent, and surface landmarks of the breast. • Describe anatomical layers and relations of the breast. • Outline the structure of the mammary gland. • Describe the arterial supply of the breast. • Describe venous drainage of the breast. • Identify the nerve supply of the breast. • Outline lymphatic drainage of the breast. • Explain key clinical correlations of breast anatomy.	**02**	**Surgery**
Gross Anatomy of Upper Limb Scapula	**A-F-015**	• Identify the scapula and determine its side and orientation. • Describe major anatomical features of the scapula. • Outline muscle attachments of the scapula. • Describe scapular articulations and functional joints. • Summarize the ossification pattern of the scapula. • Explain key clinical correlations of the scapula. • Recognize the role of the scapula in shoulder girdle movements.	**02**	**Orthopedics**
Gross Anatomy of Upper Limb Axilla	**A-F-016**	• Identify the boundaries, apex, base, and walls of the axilla. • Describe the axillary fascia and sheath. • Identify major contents of the axilla. • Describe the axillary artery and its branches. • Outline formation and drainage of the axillary vein. • Identify axillary lymph node groups and drainage pathways. • Recognize key surface-to-deep relationships in the axilla. • Explain clinical correlations of axillary anatomy.	**02**	**Surgery**
Gross Anatomy of Upper Limb	**A-F-017**	• Describe formation and components of the brachial plexus. • Distinguish supraclavicular and infraclavicular parts and branches. • Outline muscular and cutaneous distribution of major terminal nerves.	**04**	

Brachial Plexus		• Identify key anatomical relations of the brachial plexus. • Describe segmental innervation of the upper limb. • Recognize the anatomical basis of brachial plexus injuries. • Explain the nerve basis of scapular winging. • Relate anatomical variations of the plexus to clinical significance.		**Neurology**
Gross Anatomy of Upper Limb Scapular Region	**A-F-018**	• Identify boundaries and surface landmarks of the scapular region. • Describe muscles of the scapular region and their actions. • Outline intermuscular spaces and transmitted structures. • Describe key neurovascular structures of the region. • Explain the scapular anastomosis and its significance. • Relate regional anatomy to scapular movements. • Describe common clinical correlations of the scapular region. • Recognize relevant surface-to-deep dissection relationships.	**02**	
Gross Anatomy of Upper Limb Joints of Pectoral girdle	**A-F-019**	• Describe the articular surfaces and joint types of the sternoclavicular and acromioclavicular joints. • Identify major ligaments stabilizing the pectoral girdle joints. • Describe capsular, disc, and synovial features of these joints. • Outline joint movements contributing to shoulder girdle mobility. • Describe the neurovascular supply of the pectoral girdle joints. • Explain the mechanics and coordination of scapular movements. • Recognize key clinical correlations of pectoral girdle joints. • Identify relevant surface and dissection landmarks.	**02**	**Orthopedics**
HISTOLOGY PRACTICALS				
Practical	**CODE**	**Learning Objectives**	**Hours**	**Integration**
Staining & Artefacts	**A-F-020**	• Describe the purpose of common stains (especially H&E) and recognize how key tissue components appear. • Understand and recall the commonly used stains in histology laboratory and their special purposes. • Identify common artefacts (folds, tears, bubbles, shrinkage) and understand how they arise. • Distinguish true tissue features from artefacts and record observations with simple labeled drawings.	**02**	
Simple Epithelium	**A-F-021**	• Identify simple squamous, cuboidal, and columnar epithelium on prepared slides under low/high power. • Recognize key structural features (cell shape, nucleus position, polarity). • Correlate structural features with basic functions (diffusion, absorption, secretion). • Distinguish simple epithelium from stratified types in routine microscopy. • Record observations through clear, labeled microscopic drawings.	**02**	
Stratified Epithelium	**A-F-022**	• Identify major types of stratified epithelium (keratinized, non-keratinized, transitional) on prepared slides.		

		• Recognize key features such as multiple cell layers, surface cell morphology, and presence/absence of keratin. • Correlate structural differences with protective and barrier functions. • Distinguish stratified epithelium from simple epithelium during routine microscopy. • Record findings using accurate, labeled microscopic drawings.	**02**	
Glandular Epithelium	**A-F-023**	• Identify exocrine and endocrine glands and recognize basic glandular arrangements (acinar, tubular, cords). • Distinguish serous, mucous, and mixed secretory cells on prepared slides. • Recognize ducts and classify them as simple or compound. • Correlate structural features with modes of secretion and basic glandular functions. • Record observations with clear, labeled microscopic drawings.	**02**	

MUSCULOSKELETAL MODULE (6 weeks)
ANATOMY CURRICULUM

Topic	CODE	Learning Objectives	Number of Sessions	Integrated Lectures
General Anatomy Myology	**A-MSK-001**	• Classify muscle tissue types. • Describe gross and microscopic structure of skeletal muscle. • Relate muscle architecture to mechanical function. • Outline structural features of smooth and cardiac muscle. • Describe muscle attachments and actions. • Explain muscle innervation and motor units. • Identify vascular supply of muscles. • Recognize muscular connective tissue elements. • Correlate muscle anatomy with selected clinical conditions.	**02**	
General Histology Connective Tissue	**A-MSK-002**	• Describe the general composition of connective tissue. • Classify connective tissue types. • Identify major connective tissue fibers histologically. • Describe resident and wandering connective tissue cells. • Explain the structural role of ground substance. • Describe microscopic differences between loose and dense connective tissue. • Identify specialized connective tissues. • Relate connective tissue structure to selected clinical correlations.	**04**	
General Histology Adipose Tissue	**A-MSK-003**	• Classify adipose tissue types. • Describe histological features of white adipose tissue. • Describe histological features of brown adipose tissue. • Outline developmental and regional distribution of adipose tissue. • Explain histogenesis of adipocytes.	**01**	

		• Identify the connective tissue framework of adipose tissue. • Relate adipose structure to functional roles. • Recognize key clinical correlations of adipose tissue.		**Pathology**
General Histology Cartilage	**A-MSK-004**	• Describe the microscopic structure of cartilage. • Identify ultrastructural features of cartilage matrix. • Classify cartilage types histologically. • Describe the perichondrium and its role. • Explain mechanisms of cartilage growth. • Describe the limited repair capacity of cartilage. • Compare cartilage and bone microscopically. • Recognize key clinical correlations of cartilage.	**03**	
General Histology Bone	**A-MSK-005**	• Describe the microscopic structure of bone tissue. • Identify major bone cells and their features. • Distinguish compact and spongy bone histologically. • Describe the Haversian system of bone. • Explain intramembranous and endochondral ossification. • Describe the microscopic organization of the growth plate. • Outline vascular pathways of bone. • Correlate bone histology with selected clinical conditions.	**03**	**Pathology**
General Histology Muscle Tissue	**A-MSK-006**	• Describe the microscopic and ultrastructural organization of muscle tissues. • Identify histological features of skeletal muscle. • Identify ultrastructural features of cardiac muscle. • Describe histological features of smooth muscle. • Compare connective tissue coverings of muscle. • Explain regenerative capacities of muscle tissues. • Recognize histopathological bases of selected muscle disorders. • Correlate muscle microstructure with functional differences.	**03**	**Pathology**
General Embryology: 3rd Week of Development	**A-MSK-007**	• Describe gastrulation and formation of the primitive streak. • Explain formation of the three germ layers and their early derivatives. • Describe formation and role of the notochord. • Outline differentiation of intraembryonic mesoderm and early outcomes. • Describe somite formation and axial segmentation. • Explain early cardiovascular development. • Describe trophoblastic modifications and chorionic villi formation. • Outline early placental development and the allantois. • Laterality defects – Situs invertus, situs ambiguus, heterotaxy, Kartagener's Syndrome, X-linked heterotaxy, role of neurotransmitter 5-HT	**03**	
General Embryology	**A-MSK-008**	• Describe the timeline and significance of the embryonic period. • Explain neurulation and neural crest derivatives. • Outline germ-layer differentiation into major organ primordia.	**02**	

"The Embryonic Period"		• Describe somite formation and differentiation. • Explain formation and partitioning of the intraembryonic coelom. • Describe embryonic folding and its effects on body form and gut formation. • Outline early development of the umbilical cord. • Identify key external features and methods of embryonic age estimation. • Correlate embryonic development with vulnerability to teratogens and congenital anomalies. • Neural Tube defects, Capillary Hemangiomas, Endodermal congenital malformations		**OBGYN**
General Embryology "The Fetal Period"	**A-MSK-009**	• Describe the timeline and defining features of the fetal period. • Outline patterns of fetal growth and body proportions. • Describe maturation of major organ systems during the fetal period. • Identify external features used for fetal age estimation. • Describe structural organization of fetal membranes, placenta, and umbilical cord. • Outline anatomical features of fetal circulation and major shunts. • Recognize clinical relevance of fetal development. • Correlate fetal structural development with gestational milestones. • Erythroblastosis fetalis, Fetal Hydrops, The Placental barrier, Umbilical cord abnormalities, Amniotic bands, Amniotic Fluid abnormalities • Fetal membranes in twins – Dizygotic twins, monozygotic twins, twinning abnormalities • Parturition – Preterm Birth	**02**	**OBGYN**
General Embryology "Birth Defects & Prenatal Diagnosis"	**A-MSK-010**	• Classify congenital anomalies by origin. • Describe mechanisms underlying congenital anomalies. • Identify major genetic causes of birth defects. • Describe important environmental teratogens and critical periods – principles of teratology (Infectious agents, Physical agents, Chemical agents, Hormones & Maternal Disease) • Explain the concept of critical periods in development. • Outline principles of prenatal screening. • Describe basic methods of prenatal diagnosis – USG, Amniocentesis, CVS, PUBS, Maternal serum screening and Non-invasive Prenatal Screening • Fetal Therapy – Fetal Transfusion, Fetal Medical Treatment, Fetal Surgery, Stem Cell Transplantation and Gene Therapy • Identify key preventive strategies for congenital anomalies.	**02**	**OBGYN**
Special Embryology Development of Muscular System	**A - MSK – 010 a**	• Describe the embryological origin of skeletal, cardiac, and smooth muscle tissues from mesodermal derivatives. • Explain differentiation of paraxial mesoderm into somites and formation of myotomes. • Describe subdivision of myotomes into epaxial and hypaxial components and their derivatives. • Outline molecular and cellular mechanisms involved in myogenesis, including myoblast proliferation, alignment, and fusion into myotubes. • Explain migration of hypaxial muscle precursor cells into limb buds and body wall.	**02**	

		• Describe development of limb musculature in relation to dorsal and ventral muscle masses. • Outline development of smooth muscle from splanchnic mesoderm and its distribution in viscera and vessels. • Describe embryological development of cardiac muscle and its early functional significance. • Correlate developmental processes of the muscular system with selected congenital anomalies – Poland sequence, Prune belly Syndrome, Muscular Dystrophy (Duchene & Becker)		**Pediatrics**
Gross Anatomy of Upper Limb Arm	**A-MSK-011**	• Identify boundaries, compartments, and surface landmarks of the arm and shoulder. • Describe muscles of the anterior compartment of the arm. • Describe muscles of the posterior compartment of the arm. • Outline major vessels of the arm and their branches. • Describe nerves of the arm and their key relations. • Explain the structure and stabilizing factors of the shoulder joint. • Describe the anatomical basis of shoulder abduction. • Recognize key surface-to-deep dissection relationships. • Correlate arm and shoulder anatomy with common clinical conditions.	**04**	**Orthopedics**
Gross Anatomy of Upper Limb Forearm	**A-MSK-012**	• Identify the bones of the forearm and their major features. • Describe the elbow and radioulnar joints. • Describe muscles of the anterior compartment of the forearm. • Describe muscles of the posterior compartment of the forearm. • Explain the anatomical basis of pronation and supination. • Outline major vessels of the forearm. • Describe nerves of the forearm and their key relations. • Demonstrate important surface anatomy landmarks of the forearm and elbow. • Identify common clinical correlations of forearm anatomy.	**06**	**Neurology**
Gross Anatomy of Upper Limb Hand	**A-MSK-013**	• Identify the bones of the hand and their articulations. • Describe major joints of the hand and their movements. • Outline intrinsic muscles of the hand and their actions. • Describe fasciae and compartments of the hand. • Identify the arterial supply of the hand and palmar arches. • Describe the nerve supply of the hand and its distribution. • Explain fascial spaces of the hand and spread of infection. • Describe mechanics of grip and intrinsic–extrinsic muscle roles. • Explain movements of the thumb and fingers. • Correlate hand anatomy with common clinical conditions.	**06**	**Hand Surgery / General Surgery**
HISTOLOGY PRACTICALS				
Practical	**CODE**	**Learning Objectives**	**Hours**	**Integration**

Cells & Fibers of C.T.	**A-MSK-015**	• Identify major connective tissue cells (fibroblasts, macrophages, plasma cells, mast cells, adipocytes) on routine slides. • Recognize collagen, elastic, and reticular fibers under light microscopy and relate them to staining characteristics. • Distinguish loose from dense connective tissue based on cell density and fiber arrangement. • Correlate cell and fiber types with basic supportive and protective functions. • Record microscopic findings with simple, labeled drawings.	**02**	
Connective Tissue	**A-MSK-016**	• Identify major Connective Tissue Types according to their classification • Recognize and differentiate between Dense C.T. (Regular & Irregular) with examples, Loose Areolar C.T., Embryonic C.T. (mesenchyme), • Draw and label relevant diagrams after observing under the microscope.	**02**	
Hyaline Cartilage	**A-MSK-017**	• Identify hyaline cartilage on prepared slides by its glassy matrix and chondrocytes in lacunae. • Recognize isogenous groups and territorial vs interterritorial matrix. • Distinguish perichondrium and describe its role in growth and repair. • Correlate structural features with functions in support, flexibility, and smooth joint surfaces. • Record observations with clear, labeled microscopic drawings.	**02**	
Elastic + Fibrocartilage	**A-MSK-018**	• Identify elastic cartilage by its elastic fiber network and chondrocytes in lacunae. • Identify fibrocartilage by its thick collagen bundles and rows of chondrocytes. • Distinguish these cartilages from hyaline cartilage based on matrix composition and fiber content. • Correlate structural features with functional roles in flexibility (elastic) and tensile strength (fibrocartilage). • Record observations with clear, labeled microscopic drawings.	**02**	
Compact + Spongy Bone	**A-MSK-019**	• Identify compact bone by osteons, Haversian canals, lamellae, and lacunae with canaliculi. • Identify spongy (cancellous) bone by trabeculae, marrow spaces, and absence of osteons. • Distinguish compact from spongy bone based on organization, density, and vascular arrangement. • Recognize osteocytes, osteoblasts, and osteoclasts in routine sections where visible. • Record microscopic findings using clear, labeled drawings.	**02**	

Cardiac, Skeletal, Smooth Muscles	**A-MSK-020**	• Identify skeletal, cardiac, and smooth muscle on prepared slides using key features (striations, nuclei position, branching, intercalated discs). • Distinguish these muscle types based on fiber arrangement, cell shape, and connective tissue organization. • Correlate structural characteristics with basic functional roles (voluntary movement, rhythmic contraction, visceral motility). • Recognize perimysium, endomysium, and fascicle organization where applicable. • Record observations through simple, accurate labeled drawings.	**02**	

CARDIOVASCULAR MODULE (6 weeks)
ANATOMY CURRICULUM

Topic	CODE	Learning Objectives	Number of Hours	Integrated Lectures
General Anatomy: Angiology	**A-CVS-001**	• Describe the organization of systemic and lymphatic circulation. • Classify blood vessels by structure and function.	**01**	

		• Explain anastomoses, collateral circulation, and end arteries. • Describe structure and roles of lymphatic vessels and lymph nodes. • Use key angiology terminology accurately. • Recognize common clinical correlations of vascular and lymphatic anatomy.		
Systemic Embryology: Development of Body Cavities & Diaphragm	**A-CVS-002**	• Describe formation of the intra-embryonic coelom and body cavities. • Explain development and role of dorsal and ventral mesenteries. • Describe embryological partitioning of the thoracic cavity. • Explain development and components of the diaphragm. • Ventral Body Wall Defects, Diaphragmatic hernias • Relate embryonic folding to final organ positioning. • Identify congenital anomalies related to coelomic and diaphragmatic development.	**01**	
Systemic Embryology: Development of Heart	**A-CVS-003**	• Describe formation of the primitive heart tube. • Explain cardiac looping and chamber alignment. • Describe septation of the heart and valve formation. • Explain development of the cardiac outflow tracts. • Describe establishment of fetal circulation and shunts. • Correlate cardiac developmental errors with congenital anomalies – Laterality anomalies, abnormalities of cardiac looping, Total anomalous pulmonary venous return (TAPVR), teratogenic insult to cardiac development, Holt-Oram Syndrome, Heart-hand syndromes, hypertrophic cardiomyopathy, ventricular inversion, L-transposition of Great Arteries, HRHS, HLHS, Atrial Septal Defects, Ventricular Septal Defects	**03**	
Systemic Embryology: Development of Arterial System	**A-CVS-004**	• Describe embryological origins of the major arterial systems. • Explain transformation of the aortic arches into definitive arteries. • Describe remodeling of the dorsal aortae and their adult derivatives. • Explain the fate of vitelline and umbilical arteries. • Correlate vascular remodeling with adult arterial patterns. • Identify clinically important arterial developmental anomalies. • Describe the Fetal Circulation – its functional importance and importance of termination	**02**	
Systemic Embryology: Development of Venous System	**A-CVS-005**	• Describe embryological origins of the major venous systems. • Explain venous remodeling leading to formation of the SVC and azygos system. • Describe vitelline vein contributions to the portal venous system. • Explain formation of the IVC from its embryological segments. • Correlate venous remodeling with definitive adult venous patterns. • Identify clinically important congenital venous anomalies.	**01**	
General Histology: Vascular Histology	**A-CVS-006**	• Describe microscopic structure of arterial and venous walls. • Differentiate vessel types histologically. • Describe structural types of capillaries. • Explain functional significance of vascular structural specializations. • Correlate vessel histology with hemodynamic principles. • Recognize histopathological features of common vascular diseases.	**02**	**Pathology**

Systemic Histology: Cardiac Histology	**A-CVS-007**	• Describe microscopic and ultrastructural features of cardiac muscle. • Explain structure and significance of intercalated discs. • Describe organization of myocardium and conducting fibers. • Correlate cardiac microstructure with functional properties. • Identify key histopathological changes in cardiac disease.	**01**	**Pathology**
Gross Anatomy of Thorax: Skeleton of Thorax	**A-CVS-008**	• Describe osteological features of ribs, thoracic vertebrae, and sternum. • Explain thoracic cage articulations and their role in respiration. • Describe biomechanics of thoracic cage movements. • Identify anatomical variations of the thoracic skeleton and their implications. • Correlate thoracic skeletal anatomy with common clinical conditions. • Explain anatomical basis of sternal clinical procedures.	**02**	
Gross Anatomy of Thorax: Thoracic Apertures	**A-CVS-009**	• Describe the boundaries and skeletal components of thoracic apertures. • Identify structures traversing the thoracic apertures. • Explain spatial relationships at the superior thoracic aperture. • Correlate anatomical variations with thoracic outlet syndrome. • Describe clinical and surgical relevance of the thoracic outlet.	**02**	**Thoracic Surgery**
Gross Anatomy of Thorax: Thoracic Wall Proper	**A-CVS-010**	• Describe the layered structure of the thoracic wall. • Explain the course and distribution of intercostal nerves and vessels. • Identify functional significance of thoracic wall layers. • Correlate thoracic wall anatomy with common clinical procedures. • Explain venous collateral pathways of the thoracic wall. • Describe surgical and functional relevance of thoracic wall anatomy.	**04**	**Thoracic Surgery**
Gross Anatomy of Thorax: Pericardium & Heart	**A-CVS-011**	• Describe the anatomy of the pericardium and its layers. • Identify external features and surfaces of the heart. • Describe internal anatomy of the heart and its chambers. • Explain coronary circulation and cardiac conduction pathways. • Correlate cardiac anatomy with common clinical conditions. • Describe anatomical bases of cardiac diagnostic and interventional procedures.	**06**	**Thoracic Surgery**
Gross Anatomy of Thorax: Great Vessels	**A-CVS-012**	• Identify the origin, course, branches, and termination of mediastinal great vessels. • Describe anatomical relations of the great vessels within the mediastinum. • Outline formation and drainage of the SVC, brachiocephalic veins, and azygos system. • Recognize key landmarks and common variations of mediastinal great vessels.		
HISTOLOGY PRACTICALS				
Practicals	**CODE**	**Learning Objectives**	**Hours**	**Integration**
Large Elastic &	**A-CVS-013**	• Identify elastic arteries on slides by multiple elastic lamellae within the tunica media.	**02**	

Muscular Artery		• Identify muscular arteries by a prominent internal elastic lamina and smooth-muscle–dominant media. • Distinguish elastic from muscular arteries based on wall architecture and relative layer composition. • Record microscopic features using clear, labeled drawings.		
Arterioles, Venules	**A-CVS-014**	• Identify arterioles on slides by their small lumen, 1–2 layers of smooth muscle, and relatively thick wall. • Identify venules by their wider lumen, thin wall, and sparse smooth muscle. • Distinguish arterioles from venules based on wall thickness, lumen size, and endothelial appearance. • Record key microscopic features through simple, labeled drawings.	**02**	
Capillaries	**A-CVS-015**	• Identify capillaries on slides by their single endothelial cell layer and minimal supporting tissue. • Distinguish continuous, fenestrated, and sinusoidal capillaries based on lumen size and wall characteristics when demonstrable. • Recognize capillaries in relation to surrounding tissues (muscle, glands, connective tissue). • Record observed features with clear, labeled microscopic drawings.	**02**	
Veins	**A-CVS-016**	• Identify veins on prepared slides by their wide, irregular lumen and thin wall relative to arteries. • Recognize the predominance of tunica adventitia and sparse smooth muscle in the tunica media. • Distinguish veins from arteries and venules based on wall thickness, lumen shape, and layer organization. • Record key microscopic features using simple, labeled drawings.	**02**	
Heart L.S.	**A-CVS-017**	• Identify the myocardium, endocardium, and epicardium in longitudinal sections of the heart. • Recognize cardiac muscle fibers in longitudinal orientation, including branching and intercalated discs where visible. • Distinguish connective tissue elements (fibrous skeleton, endomysium) associated with cardiac muscle. • Record observed structural features with clear, labeled microscopic drawings.	**02**	

RESPIRATORY MODULE (5 weeks)
ANATOMY CURRICULUM

Topic	CODE	Learning Objectives	Number of Hours	Integrated Lectures
SYSTEMIC Embryology: Development of Respiratory System	**A-R-001**	• Describe embryological origin of the respiratory system. • Explain branching morphogenesis and stages of lung development. • Describe development of larynx, trachea, bronchi, and lungs. • Explain formation of pleura and pleural cavities. • Correlate developmental milestones with functional respiratory maturation. • Identify common congenital respiratory anomalies. • Describe and explain the common congenital respiratory anomalies – Tracheo-esophageal fistulas (TEFs), RDS / Hyaline Membrane Disease, Ectopic lung lobes, congenital cysts of the lung	**02**	**Pediatric Surgery**
SYSTEMIC Histology: Histology of Respiratory Tree	**A-R-002**	• Describe the microscopic organization of the respiratory tract. • Explain epithelial and structural transitions along the airway. • Describe histological features of bronchi, bronchioles, and alveoli. • Correlate respiratory histological specializations with function. • Identify key histopathological changes in common respiratory diseases.	**02**	**Pathology**
Gross Anatomy of Thorax: Respiratory Tree & Lungs	**A-R-003**	• Describe the gross anatomy of the trachea and bronchial tree. • Identify bronchopulmonary segments and their clinical relevance. • Describe external features of the lungs and pleural reflections. • Identify structures at the lung hilum and their arrangement. • Explain vascular and lymphatic supply of the lungs. • Correlate respiratory anatomy with mechanics of respiration and common clinical conditions.	**04**	**Medicine**
Gross Anatomy of Thorax: Mediastinum	**A-R-004**	• Describe boundaries, subdivisions, and contents of the mediastinum. • Explain anatomical relationships among mediastinal structures. • Correlate mediastinal anatomy with common clinical conditions. • Describe compressive effects of mediastinal pathology. • Explain relevance of mediastinal anatomy in imaging and surgical approaches.	**06**	**Radiology**
Gross Anatomy of Thorax: Joints of Thorax	**A-R-005**	• Describe and classify the major joints of the thoracic cage. • Explain articulations and movements of thoracic cage joints in respiration.	**04**	
Gross Anatomy of Thorax:	**A-R-006**	• Describe biomechanics of breathing and thoracic joint mobility. • Explain coordinated actions of thoracic muscles and diaphragm in ventilation. • Correlate thoracic mechanics with normal ventilation and clinical conditions affecting chest wall movement.	**02**	

Respiratory Movements				
HISTOLOGY PRACTICALS				
Practicals	**CODE**	**Learning Objectives**	**Hours**	**Integration**
Epiglottis	**A-R-007**	• Identify the epiglottis on slides by its core of elastic cartilage. • Recognize the surface epithelia: non-keratinized stratified squamous on the lingual side and respiratory epithelium on the laryngeal side (when demonstrable). • Distinguish underlying connective tissue, glands, and cartilage boundaries. • Record key microscopic features using clear, labeled drawings.	**02**	
Larynx	**A-R-008**	• Identify major laryngeal tissues on slides, including respiratory epithelium, stratified squamous epithelium (at vocal folds), and underlying connective tissue. • Recognize laryngeal cartilages (hyaline and elastic) and distinguish their boundaries in section. • Identify seromucous glands and their distribution within the laryngeal mucosa. • Record microscopic features with clear, labeled drawings.	**02**	
Trachea	**A-R-009**	• Identify tracheal respiratory epithelium with cilia and goblet cells on prepared slides. • Recognize the C-shaped hyaline cartilage rings and intervening connective tissue. • Identify the trachealis smooth muscle and submucosal seromucous glands. • Record key microscopic features using clear, labeled drawings.	**02**	
Lungs Panoramic View	**A-R-010**	• Identify the overall lung architecture on panoramic sections, including bronchi, bronchioles, alveolar ducts, and alveoli. • Distinguish conducting airway walls (cartilage, smooth muscle, glands) from terminal respiratory structures. • Recognize alveolar septa, capillary networks, and basic tissue organization across lung regions. • Record panoramic features with simple, labeled microscopic drawings.	**02**	

BLOOD & IMMUNITY MODULE (6 weeks)
ANATOMY CURRICULUM

Topic	CODE	Learning Objectives	Number of Hours	Integrated Lectures
General Anatomy: Lymphoid System	**A-BI-001**	• Identify major components of the lymphoid system. • Describe gross and microscopic organization of lymphoid organs. • Explain anatomy and distribution of lymphatic vessels. • Outline major lymphatic drainage pathways of the body. • Classify regional lymph node groups and their drainage areas. • Explain functional roles of lymphoid tissues. • Correlate lymphatic anatomy with common clinical conditions. • Describe anatomical basis of metastatic spread via lymphatics. • Recognize surgical and imaging relevance of lymphoid structures.	**3**	**Surgery**
Systemic Embryology: Development of Axial Skeleton	**A-BI-002**	• Describe somite formation and differentiation into sclerotome, dermatome, and myotome. • Explain the role of the notochord in vertebral body and disc formation. • Describe resegmentation of sclerotomes and its significance. • Outline stages of vertebral development and formation of vertebral components. • Explain embryological development of ribs. • Describe formation and segmentation of the sternum. • Correlate developmental disruptions with axial skeletal anomalies (EXCLUDING SKULL) – Vertebral Defects, Rib Defects, Sternal Defects • Discuss clinical significance of axial skeletal embryology.	**3**	
General Histology: Lymphoid Organs	**A-BI-003**	• Identify histological components of primary and secondary lymphoid organs. • Describe microscopic architecture of lymphoid organs. • Explain cortical–medullary organization of the thymus and its role in T-cell maturation. • Describe the bone marrow microenvironment supporting lymphoid development. • Describe structural organization of lymph nodes. • Explain histological features of the spleen and splenic circulation. • Describe structural patterns of MALT. • Correlate lymphoid histology with immune functions. • Recognize pathological changes in lymphoid tissues microscopically. • Discuss the histological basis of diagnostic evaluation of lymphoid disorders.	**3**	**Pathology**
General Histology: Microscopic Anatomy of Immune System	**A-BI-004**	• Identify major immune cell types and their microscopic features. • Describe distribution of immune cells in tissues and organs. • Explain microscopic organization of innate and adaptive immune components. • Describe mechanisms of immune surveillance and antigen sampling. • Explain histological basis of antigen processing and presentation. • Outline microscopic features of acute and chronic inflammation. • Correlate immune histology with common immunological conditions.	**2**	

		• Recognize tissue changes associated with infectious processes. • Discuss diagnostic relevance of immune system histology.		**Pathology**
Gross Anatomy of Lower Limb: Gluteal Region	**A-BI-005**	• Identify boundaries, surface landmarks, and layers of the gluteal region. • Describe gluteal muscles and their nerve supply and actions. • Explain organization and functional role of gluteal fasciae. • Describe major neurovascular structures of the gluteal region. • Identify sciatic foramina and transmitted structures. • Locate the safe intramuscular injection site using surface landmarks. • Correlate gluteal anatomy with hip movements, gait, and posture. • Explain the anatomical basis of sciatic nerve injury. • Describe gluteal bursae and their clinical relevance. • Discuss anatomical factors in deep gluteal and compartment syndromes. • Recognize common clinical conditions of the gluteal region.	**4**	**Neurology**
Gross Anatomy of Lower Limb: Thigh – Anterior, Posterior, Medial	**A-BI-006**	• Describe boundaries, fascial layers, and compartments of the thigh. • Identify thigh muscles by compartment and their actions. • Explain compartmental innervation of the thigh. • Describe arterial supply of the thigh. • Outline venous drainage of the thigh and its clinical relevance. • Identify the femoral triangle and its contents. • Describe the adductor canal and adductor hiatus. • Correlate thigh compartment anatomy with gait and posture. • Explain the anatomical basis of major thigh nerve lesions. • Discuss compartment syndrome of the thigh. • Recognize common clinical conditions of the thigh and their anatomical basis.	**06**	
Gross Anatomy of Lower Limb: Knee Joint & Popliteal Fossa	**A-BI-007**	• Describe articulating surfaces of the knee joint and their functional significance. • Explain the roles of major knee ligaments in joint stability. • Describe menisci, their attachments, vascularity, and functions. • Identify important bursae around the knee and their clinical relevance. • Explain mechanisms of knee stability and locking–unlocking. • Describe the joint capsule, synovial membrane, and compartments of the knee. • Identify boundaries of the popliteal fossa. • Describe contents and spatial relationships within the popliteal fossa. • Explain the anatomical basis of popliteal artery aneurysm. • Describe mechanisms of nerve entrapment around the knee. • Correlate knee anatomy with common clinical conditions. • Discuss clinical significance of the popliteal fossa in procedures and trauma.	**2**	**Orthopedics**
HISTOLOGY PRACTICALS				
Practical	**CODE**	**Learning Objectives**	**Hours**	**Integration**

Cells of Immune System	**A-BI-008**	• Identify major immune cells on slides and smears (lymphocytes, plasma cells, macrophages, neutrophils, eosinophils, basophils). • Recognize distinguishing microscopic features such as nucleus shape, cytoplasmic granules, and cell size. • Distinguish immune cells within lymphoid tissues (nodes, spleen, thymus) when demonstrable. • Record observed cellular features with clear, labeled drawings.	**02**	
Lymph Node	**A-BI-009**	• Identify the major structural regions of a lymph node: capsule, cortex, paracortex, and medulla. • Recognize lymphoid follicles (primary and secondary) and medullary cords/sinuses on prepared slides. • Distinguish the organization of lymphocytes, macrophages, and supporting reticular tissue. • Record key microscopic features using clear, labeled drawings.	**02**	
Spleen	**A-BI-010**	• Identify splenic white pulp (lymphoid follicles, periarteriolar lymphatic sheath) and red pulp on prepared slides. • Recognize the central artery, splenic cords, and sinusoids within their respective regions. • Distinguish overall splenic architecture, including capsule and trabeculae. • Record key microscopic features with clear, labeled drawings.	**02**	
Thymus	**A-BI-011**	• Identify thymic cortex and medulla on prepared slides and distinguish their cellular density. • Recognize Hassall's corpuscles as characteristic structures of the medulla. • Distinguish capsule, septa, and lobular organization of the thymus. • Record observed microscopic features with clear, labeled drawings.	**02**	
Tonsils	**A-BI-012**	• Identify the epithelial covering (stratified squamous or respiratory epithelium) depending on tonsil type. • Recognize lymphoid follicles with germinal centers beneath the epithelium. • Identify tonsillar crypts and distinguish surrounding connective tissue. • Record key microscopic features using clear, labeled drawings.	**02**	

Core Concepts 5 -weeks)
ANATOMY CURRICULUM

Topic	CODE	Learning Objectives	Number of Hours	Integrated Lectures
General Anatomy: Nervous System	A-IN-001	• Describe the structural organization of the nervous system into CNS and PNS. • Explain functional divisions of the nervous system. • Identify morphological features of neurons and their roles in impulse transmission. • Describe types and functions of neuroglial cells in CNS and PNS. • Outline structural components of a peripheral nerve. • Explain formation and branching of spinal nerves and plexuses. • Describe dermatomes and myotomes and their clinical relevance. • Explain basic organization of neural circuits and pathways. • Correlate nervous system anatomy with common clinical conditions. • Discuss anatomical basis of UMN vs. LMN lesions and peripheral neuropathies.	02	**Neurology**
Systemic Embryology: Development of Limbs & Appendicular Skeleton	A-IN-002	• Describe formation of limb buds and timing differences between upper and lower limbs. • Explain establishment of limb axes and roles of AER, ZPA, and ectodermal signals. • Describe mesenchymal condensation, skeletal patterning, and ossification of limbs. • Explain joint formation and development of synovial structures. • Outline development and compartmentalization of limb musculature. • Describe formation of peripheral nerves and dermatomal patterning in limbs. • Explain vascular development and arterial remodeling of limbs. • Describe limb rotations and their effects on definitive anatomy. • Correlate developmental disruptions with congenital limb anomalies - Meromelia, Amelia, Phocomelia, Micromelia, Brachydactyly, Syndactyly, Polydactyly, Cleft Hand and foot, Hand-foot-genital Syndrome, Holt-Oram Syndrome, Osteogenesis imperfecta, Marfan Syndrome, Arthrogryposis, Club Foot, Congenital Absence of Radius, Transverse limb deficiency, congenital hip dislocation etc. • Discuss clinical implications of abnormal limb development.	03	**Pediatrics**
Systemic Embryology Development of Integumentary System	A-IN-003	• Describe epidermal development from surface ectoderm. • Explain dermal development from mesenchymal sources. • Describe neural crest origin and migration of melanocytes. • Outline embryological development of hair follicles. • Explain development of skin glands. • Describe embryological development of nails. • Correlate developmental disruptions with congenital skin anomalies – pigmentary disorders, Dermatoglyphics, abnormalities of hair distribution, mammary gland abnormalities • Discuss embryological basis of acquired skin disorders. • Explain regional variations in skin development and their clinical relevance.	01	**Dermatology**

General Histology Nervous Tissue	**A-IN-004**	• Identify major components of nervous tissue and their microscopic features. • Classify neurons structurally and functionally. • Describe structural organization of a neuron and its functional correlations. • Explain types and functions of neuroglial cells in CNS and PNS. • Describe microscopic structure of synapses and neurotransmission. • Explain myelination in CNS and PNS and its role in conduction. • Identify organization of peripheral nerves and fiber types. • Discuss cellular events in nerve injury and repair. • Correlate histological alterations with neurological disorders. • Recognize histopathological features of demyelinating diseases.	**02**	**Neurology**
Systemic Histology Integumentary System + Mammary Glands	**A-IN-005**	• Describe histological organization of the integumentary system. • Explain microscopic differences between thick and thin skin. • Describe histological structure of skin adnexal glands and hair follicles. • Describe histological architecture of the mammary gland. • Compare mammary gland histology across developmental and functional states.	**02**	
Gross Anatomy of Lower Limb: Leg	**A-IN-006**	• Describe fascial organization and compartmentalization of the leg. • Identify muscles of leg compartments and their actions. • Explain course and functional distribution of major leg nerves. • Describe arterial supply and venous organization of the leg. • Identify superficial and deep venous systems and their clinical relevance. • Explain major leg tendons and their roles in ankle mechanics. • Correlate compartmental anatomy with gait and functional movements. • Discuss anatomical basis and presentation of compartment syndrome. • Explain mechanisms and consequences of common leg nerve injuries. • Describe anatomical basis of shin splints. • Recognize major vascular conditions affecting the leg. • Relate surface landmarks to underlying structures for clinical examination.	**06**	
Gross Anatomy of Lower Limb: Foot	**A-IN-007**	• Identify bones and major joints of the foot and their permitted movements. • Describe arches of the foot and their supporting structures. • Explain organization and function of the plantar fascia. • Identify intrinsic muscles of the foot and their roles. • Describe extrinsic tendons of the foot and their actions. • Explain neurovascular supply of the foot. • Describe biomechanical organization of the foot in gait and balance. • Correlate foot anatomy with common deformities and plantar conditions. • Explain anatomical basis of nerve entrapment syndromes of the foot. • Recognize injuries affecting gait and foot stability. • Relate surface landmarks of the foot to underlying structures.	**06**	**Orthopedics**
HISTOLOGY PRACTICALS				

Practical	CODE	Learning Objectives	Hours	Integration
Cells of Nervous System	A-IN-008	• Identify major neural cell types on slides: neurons, astrocytes, oligodendrocytes, microglia, and ependymal cells. • Recognize distinguishing microscopic features such as neuron cell bodies, Nissl substance, and glial cell morphology. • Distinguish gray matter from white matter based on cell distribution and fiber content. • Record observed cellular features with clear, labeled drawings.	02	
Peripheral Nerve	A-IN-009	• Identify peripheral nerves in cross and longitudinal sections, noting axons, myelin sheaths, and Schwann cells. • Recognize connective tissue layers: endoneurium, perineurium, and epineurium. • Distinguish nerve fascicles from surrounding connective tissue and adjacent structures. • Record key microscopic features with clear, labeled drawings	02	
Spinal & Autonomic Ganglia	A-IN-010	• Identify large pseudounipolar neuron cell bodies with prominent nuclei and Nissl substance. • Recognize the arrangement of satellite cells surrounding each neuronal soma. • Distinguish the ganglion's connective tissue capsule and the organization of nerve fibers passing through it. • Record key microscopic features using clear, labeled drawings. • Identify autonomic ganglion cells on slides by their smaller, multipolar neurons and eccentric nuclei. • Recognize the loosely arranged neurons with fewer satellite cells compared to spinal (sensory) ganglia. • Distinguish autonomic ganglia from surrounding nerve fibers and connective tissue. • Record observed microscopic features with clear, labeled drawings.		
Thick & Thin Skin	A-IN-011	• Identify thick and thin skin based on epidermal thickness, keratinization, and presence or absence of stratum lucidum. • Recognize the specific epidermal layers and the principal cell types within them, including keratinocytes, melanocytes, Langerhans cells, and Merkel cells. • Identify dermal layers (papillary and reticular) and their connective tissue components on histological sections. • Identify and differentiate adnexal structures associated with thin and thick skin, including hair follicles, sebaceous glands, sweat glands, and arrector pili muscles.	02	
Mammary Glands	A-IN-012	• Identify mammary gland tissue under the microscope and distinguish it from other glandular tissues.	02	

		• Recognize the structural organization of the mammary gland, including ducts, lobules, and alveoli. • Identify epithelial and myoepithelial cells lining ducts and secretory units. • Differentiate pre-pubertal, non-lactating, and lactating mammary gland based on their characteristic histological features.		

BIOCHEMISTRY

MODULE 1 - FOUNDATION MODULE (5 weeks)
BIOCHEMISTRY CURRICULUM

TOPIC	CODE	LEARNING OUTCOME	Number of Hours	Integrated Lectures
Structure of a Cell	**B-F-001**	• **Explain the** composition and function of the cell membrane. • Discuss transfer of material across the membrane. • Correlate clinical disorders associated with defective transport across the cell membrane. • Explain the physicochemical properties of a cell. • Osmolality and osmolarity, Gibbs-Donnan equilibrium, viscosity, surface tension.	**04**	Physiology and Anatomy
Cell organelle	**B-F-002**	• **Explain** the structure and functions of mitochondria. • **Identify** their marker enzymes and **analyze** their role in maintaining cellular health and mitochondrial diseases.	**01**	
Membrane receptors	**B-F-003**	• Classify cell surface and intracellular receptors with examples. • Describe the structure and signaling mechanism of intracellular (cytoplasmic/nuclear) receptors, with examples (steroid, thyroid, vitamin D receptors). • Illustrate components and actions of G-protein coupled receptors. • Explain the pharmacological actions of drugs acting on cell surface and intracellular receptors by correlating receptor type, signaling pathway, and clinical effects."	**04**	Pharmacology
Chemistry of proteins	**B-F-004**	• Classify standard amino acids based on charge and polarity of side chains. • Differentiate essential vs non-essential amino acids • Classify amino acids into glucogenic, ketogenic, or both. • Explain acidic and basic properties of amino acids. • Illustrate the titration curve of Alanine.	**03**	

Chemistry of CHO	**B-F-005**	• Classify carbohydrates based on sugar units (monosaccharides, disaccharides, oligosaccharides, polysaccharides). • Describe the features and significance of biologically important monosaccharides. • Explain the chemical properties of monosaccharides. • Discuss the phenomena of isomerism.	**03**	
Chemistry of lipids	**B-F-006**	• Describe the structural classification of lipids and relate it to their biological functions. • Describe the classification, structure, and biological significance of fatty acids. • Define and explain the significance of saponification, iodine number, acid number, and rancidity of fats and oils.	**03**	
PRACTICALS				
	B-F-007	• Introduction to Laboratory safety protocols	**02**	
	B-F-008	• Introduction to laboratory instruments i.e, Water bath, Centrifuge, Spectrophotometer, and pH meter.	**02**	
	B-F-009	• Perform the Biuret test for the detection of proteins	**02**	
	B-F-010	• Perform the Benedict test and interpret the result for reducing sugars	**02**	
	B-F-011	• Perform Hay sulfur test for the detection of bile salts	**02**	

MODULE 2 – MUSCULOSKELETAL (6 weeks)
BIOCHEMISTRY CURRICULUM

TOPIC	CODE	LEARNING OUTCOME	Number of Hours	Integrated Lectures
Proteins: Structure & Organization	**B-MSK-001**	• Classify proteins • Describe various levels of protein structure. • Explain the role of hydrogen bonds, hydrophobic interactions, disulfide bonds, and ionic interactions in protein folding. • Discuss the biochemical basis and consequences of protein misfolding.	**04**	Alzheimer disease

Fibrous protein	**B-MSK-002**	• Describe the synthesis and post-translational modifications of collagen and elastin. • Explain the role of vitamin C in collagen synthesis. • Discuss the biochemical basis of scurvy, osteogenesis imperfecta, Marfan's syndrome, Ehlers-Danlos syndrome, and muscular dystrophies.	**2 + 1**	Anatomy: connective tissue structure Pathology: Wound healing, scarring Orthopedic department
GAGs	**B-MSK-003**	• Describe the structure and function of glycosaminoglycans (GAGs). • Differentiate proteoglycans, glycoproteins, and peptidoglycans. • Relate carbohydrate macromolecules to bone and cartilage matrix.	**02**	Anatomy: cartilage structure Physiology: joint lubrication
Vitamins	**B-MSK-004**	• Classify Vitamins • Discuss sources, synthesis, and significance of Vitamin D. • Discuss sources, synthesis, and significance of Vitamin E. • Discuss sources, synthesis, and significance of Vitamin K. • Discuss sources, synthesis, and significance of Vitamin C. • **Describe** the roles of **vitamins K and C** in maintaining connective tissue integrity and collagen synthesis. • **Correlate** deficiencies of vitamins with **clinical conditions, such as** rickets, osteoporosis, and osteomalacia.	**04**	Physiology: Nerve–muscle junction; Pathology: Demyelinating diseases
Myoglobin	**B-MSK-006**	Describe the Structure and functions of Myoglobin.	**01**	
Muscle metabolism	**B-MSK-007**	• Discuss synthesis and degradation of glycogen • Discuss the role of glycogen metabolism in muscle contraction. • Discuss the role of creatinine in muscle metabolism. • Biochemical significance of Lactic acidosis under anaerobic conditions. • Explain Mitochondrial Myopathies.	**03**	Anatomy Physiology
Enzymology	**B-MSK-008**	• Classify enzymes. • Explain the mechanism of enzyme action. • Discuss various types of enzyme inhibition and their significance. • Enumerate various types of enzyme regulation. • Discuss the role of serum markers in the diagnosis of muscular dystrophies.	**04**	
PRACTICALS				

	B-MSK-009	• Perform the Heat coagulation test to detect proteins and interpret the results based on the principle of protein denaturation.	**02**	
	B-MSK-010	• Demonstrate the basic operation of a spectrophotometer and explain its application in quantitative biochemical analysis.	**02**	
	B-MSK-011	• Demonstrate the basic operation of a spectrophotometer and explain its application in quantitative biochemical analysis.	**02**	
	B-MSK-012	• Perform Quantitative estimation of serum Calcium and interpret results in relation to normal physiological ranges and clinical conditions.	**02**	
	B-MSK-013	• Perform Quantitative estimation of serum Phosphate and interpret results in relation to metabolic and bone disorders.	**02**	

CARDIOVASCULAR (5 weeks)
BIOCHEMISTRY CURRICULUM

TOPIC / THEME	CODE	LEARNING OUTCOME	Number of Hours	Integrated Lectures
Chemistry of lipids	**B-CVS-001**	• Analyze the role of dietary fats in heart health (omega-3 & omega-6) • Explain the biological significance of essential fatty acids. • Define eicosanoids, identify their major classes (prostaglandins, thromboxane, leukotrienes), and their significance. • Correlate disturbances in eicosanoid pathways with clinical conditions such as inflammation, myocardial ischemia, and thrombosis. • Discuss the structure and biochemical significance of serum cholesterol. • Elaborate on the biomedical significance of lipid peroxidation and its relevance in oxidative stress and disease.	**04**	Pathology: Free radical injury
Lipoprotein metabolism	**B-CVS-002**	• Explain the Structure and function of lipoproteins. • Classify apolipoproteins and their roles. • Discuss Reverse cholesterol transport and its health benefits. • Discuss the Biochemical basis of Atherosclerosis (foam cell formation) • Classify Hyperlipoproteinemias	**02**	Medicine department
Cardiac energy metabolism	**B-CVS-003**	• Discuss ATP production in cardiac muscle (preference for fatty acids vs glucose) • Discuss metabolic changes in ischemia/hypoxia → shift to anaerobic glycolysis, lactate accumulation • Classify High-energy phosphate compounds (Creatine kinase & CK-MB relevance in MI)	**02**	

Cardiac markers	**B-CVS-004**	• Analyze the role of enzymes in clinical diagnosis and therapeutics. • Explain the term isoenzymes with examples and significance. • Describe the diagnostic role of cardiac troponins (T and I), CK-MB, and LDH-1, AST in the diagnosis of myocardial injury, including the concept of the "flipped LDH pattern." • Compare the sensitivity and specificity of major cardiac biomarkers for acute myocardial infarction (MI).	**02**	Cardiology department
Nutrition	**B-CVS-005**	• Explain the concept of caloric value of foods. • Describe the factors influencing Basal Metabolic Rate (BMR) and Total Energy Requirement. • Calculate energy requirements based on age, sex, and activity level. • Explain the significance of glycemic index and glycemic load. • Describe the functions and benefits of dietary fiber. • Describe protein quality and protein requirements across the lifespan • Discuss the biochemical and clinical features of marasmus and kwashiorkor. • Discuss the health effects of saturated fats, trans fats, and omega-3 fatty acids. • Describe Protein Energy Malnutrition (PEM) and its biochemical impact. • Explain the biochemical basis and health risks of obesity. • **Outline** nutritional requirements during **pregnancy, lactation, infancy, and aging.**	**03**	
		PRACTICALS		
	B-CVS-006	• Perform quantitative estimation of serum ALT and interpret results in relation to hepatocellular injury.	**02**	
	B-CVS-007	• Perform quantitative estimation of serum AST and interpret results in relation to liver and muscle disorders.	**02**	
	B-CVS-008	• Perform quantitative estimation of CK-MB and interpret results in the biochemical diagnosis of myocardial injury.	**02**	

MODULE 4 – RESPIRATORY (6 weeks)
BIOCHEMISTRY CURRICULUM

TOPIC	CODE	LEARNING OUTCOME	Number of Hours	Integrated Lectures
Water, pH and Buffers	**B-R-001**	•Explain the ionization of water, weak acids, and bases. • Define pH and pI (isoelectric pH) and demonstrate pH determination. • Explain pKa and Ka and illustrate the titration curve of a weak acid. • Apply the Henderson–Hasselbalch equation to calculate buffer pH and composition. • Describe the mechanism of action of body buffers (bicarbonate, phosphate, protein, ammonia).	**03**	Physiology
Amino Acid Buffering	**B-R-002**	• Describe the dissociation and titration of amino acids. • Explain the importance of amino acids in pH maintenance. • Discuss the buffering action of proteins in blood.	**01**	
Hemoglobin	**B-R-003**	• Describe the molecular mechanism of cooperative oxygen binding in hemoglobin. • Explain the effects of 2,3-BPG, CO_2, and pH on hemoglobin function. • Interpret oxygen dissociation curves of myoglobin and hemoglobin. • Discuss the biochemical basis of hemoglobinopathies, i.e., sickle cell anemia, thalassemia, etc	**05**	Pathology: anemia, carbon monoxide poisoning, methemoglobinemia. Physiology: O_2 and CO_2 transport.
Chemistry of lipids	**B-R-004**	• Classify phospholipids. • Describe the structure and biologic significance of phospholipids, glycolipids, sulfolipids and gangliosides • Discuss the biological significance of surfactant and its role in respiratory distress syndrome • Discuss synthesis and degradation of glycosphingolipid	**04**	
Emphysema	**B-R-005**	• Discuss the biochemical basis and pathophysiology of α1-antitrypsin deficiency.	**01**	Medicine dept
		PRACTICALS		
	B-R-006	• Prepare laboratory solutions of required concentration accurately using appropriate calculations and standard laboratory techniques.	**02**	
	B-R-007	• Perform accurate unit conversions and concentration calculations relevant to biochemical laboratory practice.	**02**	
	B-R-008	• Measure the pH of a given solution using a pH meter and interpret results based on acid–base principles.	**02**	

	B-R-009	• Identify and interpret the normal organic and inorganic constituents of urine using standard qualitative biochemical tests.	**02**	
	B-R-010	• Identify and interpret the abnormal inorganic constituents of urine using appropriate qualitative laboratory methods.	**02**	

MODULE 5 – BLOOD AND IMMUNITY (6 weeks)
BIOCHEMISTRY CURRICULUM

TOPIC	CODE	LEARNING OUTCOME	Number of Hours	Integrated Lectures
Blood Chemistry	**B-BI-001**	• Describe the major components of blood. • Explain the primary functions of blood in transport, regulation, and protection. • Differentiate between plasma and serum based on composition and method of extraction. • Relate the clinical applications of plasma and serum in diagnostic testing and transfusion medicine.	**02**	
Plasma protein	**B-BI-002**	• Classify plasma proteins and list the functions of plasma proteins. • Describe the role of plasma proteins in maintaining osmotic pressure and fluid balance. • Discuss the electrophoretic pattern of plasma proteins and interpret changes in diseases. • Correlate alterations in plasma protein levels with clinical conditions.	**03**	Physiology: blood volume and oncotic pressure. Pathology: hypoalbuminemia, edema, inflammation.
Immunoglobulin	**B-B1-003**	• Identify structural components of immunoglobulins. • Differentiate between major classes of immunoglobulins based on structure and function. • Explain the biochemical basis of antigen–antibody interaction. • Correlate the role of immunoglobulins with humoral immunity and clinical relevance (e.g., allergy, immune deficiency).	**02**	Paediatric department for immunization
Heme metabolism	**B-BI-004**	• Outline the steps of heme biosynthesis, • Discuss porphyria's and their biochemical basis. • Discuss the catabolism of heme and its transport to the liver. • Explain the biochemical basis of different types of jaundice.	**04**	Pathology: LFTs Medicine department Anatomy

		• Interpret laboratory patterns of bilirubin, urobilinogen, and related tests in jaundice.		
Minerals	**B-BI-005**	• Discuss the biochemical role of iron and trace elements in hematopoiesis.	**02**	
Vitamins	**B-BI-006**	• Discuss the biochemical role of vitamins in hematopoiesis. • Explain sources, functions, and deficiency manifestations of folic acid. • Explain sources, coenzyme form, functions, and deficiency manifestations of cobalamin. • Explain sources, coenzyme form, functions, and deficiency manifestations of vit B-6.	**04**	
Blood Buffers	**B-BI-007**	• Explain the role of buffers in the regulation of blood pH.	**01**	
PRACTICALS				
	B-BI-008	• Perform steps of Standardized Phlebotomy Procedure	**02**	
	B-BI-009	• Perform steps of Standardized Phlebotomy Procedure	**02**	
	B-BI-010	• Perform steps of Quantitative estimation of serum Albumin and interpret the results.	**02**	
	B-BI-011	• Perform the steps of the quantitative estimation of serum total protein and interpret results	**02**	
	B-BI-012	• Perform Quantitative estimation of serum Bilirubin and interpret the results.	**02**	
	B-BI-013	• Perform Quantitative estimation of serum alkaline phosphate and interpret the results.	**02**	

MODULE 6 – CORE CONCEPTS (5 weeks)
BIOCHEMISTRY CURRICULUM

TOPIC	CODE	LEARNING OUTCOME	Number of Hours	Integrated Lectures
Chemistry of CHO	**B-IM-001**	• Explain the properties and biomedical significance of disaccharides. • Discuss glycosidic bond and their significance. • Discuss the structural and functional characteristics of homopolysaccharides.	**04**	
Chemistry of nucleotide	**B-IM-002**	• Describe the structural components of a nucleotide. • Differentiate between purine and pyrimidine bases, nucleosides, and nucleotides with examples. • Explain the major biological functions of nucleotides, including their role in energy transfer (ATP, GTP), coenzyme structure, and signal transduction (cAMP, cGMP). • Describe the biochemical structure and components of nucleic acids (DNA	**05**	Pharmacology. Nucleotides in therapeutics.

		• Describe the structure and biomedical role of synthetic derivatives of purines and pyrimidines (e.g., in chemotherapy). • Detail the structure, function, and specific types of RNA (e.g., mRNA, tRNA, rRNA).		
Vitamins	**B-IM-003**	• Describe sources, functions, and deficiency disorders for vitamins A, B_1, B_2, B_3, B_5, B_7.	**06**	
Minerals	**B-IM-004**	• Discuss the biochemical function of Sulphur. • Discuss biochemical significance of trace elements (Se, I, Cr, Mn, Cd, F).	**04**	
Nutrition	**B-IM-005**	• Calculate Specific Dynamic Action (SDA) and Respiratory Quotient (RQ). • Calculate caloric requirements in special conditions such as pregnancy, lactation, infancy, and old age.	**02**	Food safety
PRACTICALS				
	B-IM-006	• Perform the Barfoed test for the detection of disaccharides	**02**	
	B-IM-007	• Calculate RQ and BMR and interpret the results	**04**	

PHYSIOLOGY

MODULE 1 – FOUNDATION
PHYSIOLOGY CURRICULUM

TOPIC	CODE	LEARNING OUTCOMES	Number of Hours	Integrated Lectures
Introduction to Physiology	P-F-001	•Define physiology •Classify different branches of physiology •Explain the importance of physiology in medical and clinical sciences •Understand functional organization of human body from cell to systems		
Concept of Body Fluid and Internal Environment	P-F-002	• Describe distribution of total body water • Differentiate between the composition of ECF & ICF with respect to cations & anions • Understand the concept of internal environment		Integrate with Biochemistry
Homeostatic Control System	P-F-003	• Define homeostasis • Describe homeostatic mechanisms of the major functional systems •Describe the characteristics of control system of the body. • Enlist four control mechanisms of body • Understand the mechanism of positive, negative, feed forward & adaptive control feedback with examples • Define & comprehend gain of control system		
Cell membrane	P-F-004	• Describe the structure of cell membrane • Enlist the types of cell membrane proteins (Integral & peripheral) • Enumerate the functions of membrane proteins • Define and enumerate the functions of cell Glycocalyx • Explain the importance of membrane Rafts, Spectrin, Ankyrin		Integrate with Biochemistry

Cytoplasm & Cell organelles	**P-F-005**	• Enlist membrane bound and non - membrane bound organelles • Enlist functions of RER, SER, Golgi apparatus & ribosomes • Differentiate between lysosomes & peroxisomes • Discuss the functions of nucleus • Enlist the major processes of ATP consumption in the body • Enlist the components & functions cell cytoskeleton (molecular motors & axonal transport)		
Cell Locomotion & Functional systems	**P-F-006**	• Explain cell ingestion • Define and enlist types of endocytosis • Explain the mechanism of pinocytosis • Explain the mechanism of exocytosis		
Cellular control mechanisms	**P-F-007**	• Describe the cell cycle • Differentiate between Apoptosis & Necrosis • Explain Cell differentiation • Discuss characteristics of cancer cells		Integrate with Pathology
Transport across the cell membrane	**P-F-008**	• Enumerate modes of transport mechanism across the cell membrane • Enlist different types of diffusion • Discuss aquaporins • Illustrate facilitated diffusion • Enlist various types of ion channels with examples • Define & classify active transport • Describe various types of active transport (primary & secondary) with examples • Discuss functions and significance of Na/K ATPase pump		
Autonomic Nervous System (ANS)	**P-F-009**	• Discuss the components of ANS • Explain the physiological anatomy of sympathetic and parasympathetic nervous system • Describe the types of adrenergic and cholinergic receptors and their functions • Explain the effects of sympathetic and parasympathetic on various organs/ system of body		Integrate with Anatomy

Introduction to Nerve Physiology & Classification of nerve fibers	**P-F-010**	• Describe the physiological anatomy of neurons • Enlist the functions of neuroglial cells • Explain process of myelination in Central Nervous System & Peripheral Nervous System • Classify neurons functionally • Classify nerve fibers according to Erlanger & Gasser Classification • Discuss the properties of nerve fibers • Define stimulus • Describe various types of stimuli and response • Define rheobase, chronaxie & their significance		
Diffusion / Equilibrium Potentials, Nernst potential & Goldman Equation	**P-F-011**	• Explain diffusion potentials of Na & K • Explain Nernst potential • Explain the effects of altering the concentration of Na+, K+, Ca on the equilibrium potential for that ion. • Describe the normal distribution of Na+, K+, Ca and Cl- across the cell membrane • Explain physiological basis of Goldman equation • Clarify the role of Goldman equation in generation of RMP		
Resting Membrane Potential in Neurons	**P-F-012**	• Define resting membrane potential • Describe the physiological basis of generation of RMP. • Explain the effects of hyperkalemia and Hypokalemia on the Resting Membrane Potential (RMP) • Name the membrane stabilizers • Explain the physiological basis of action of Local Anesthetics		Integrate with Anesthesiology

Action Potential	**P-F-013**	• Define Action Potential of Neurons • Enlist the Properties of action potential • Describe monophasic action potential • Describe the ionic basis of an action potential • Explain the phases of action potential • Describe the mechanism of propagation of action potential • Explain the effects of hyperkalemia and hypokalemia on action potential • Explain absolute and relative refractory period • Explain the role of other ions in action potential. • Elaborate the effect of hypocalcemia on neuron excitability. • Explain Physiological basis & properties of graded potential & compound action potential. • Contrast between action potential and graded potential • Describe the ionic basis of excitatory Post Synaptic Potential (EPSP), Inhibitory Post Synaptic Potential (IPSP), End Plate Potential(EPP)		Integrate with Medicine
	P-F-014	• Classify and explain Physiological basis of different types of synapses • Elaborate how signal transmission takes place across chemical synapse • Explain the mechanism of conduction in myelinated and unmyelinated nerve fibers • Elaborate significance of saltatory conduction • Enlist the types of nerve injury • Explain Wallerian degeneration • Describe the process of regeneration of nerve fiber • Describe the causes, features & pathophysiology of Multiple sclerosis, GB syndrome.		

PHYSIOLOGY PRACTICALS – Foundation Module			
	P-F-015	• Identification of different parts and their uses	Introduction to Microscope
	P-F-016	• Identify the Wintrobe and Westergen tubes	Introduction to Wintrobe & Westergen tube & Determination of ESR
	P-F-017	• Complete study of Neubauer's slide & relevant calculations	Introduction to Neubauer's chamber, Red Blood Cell (RBC) pipettes& White Blood Cell (WBC) pipette

	P-F-018	• Identification of different parts	Introduction to centrifuge machine & determination of PCV
	P-F-019	• Demonstrate **protocol for obtaining informed consent**	Protocol of Consent taking for Lab and Clinical Procedure

MODULE 2 - MUSCULOSKELETAL MODULE
PHYSIOLOGY CURRICULUM

Topic	CODE	Learning Objectives	Number of Hours	Integrated Lectures
Introduction to Skeletal Muscle	**P-MSK-001**	• Explain the physiologic anatomy of skeletal muscle • Describe the physiological structure of sarcomere • Differentiate b/w skeletal, smooth, and cardiac muscle		
Molecular Mechanism of skeletal muscle contraction	**P-MSK-002**	• Describe the sarcotubular system & its importance in muscle Contraction • Discuss the Sliding Filament Model/ Walk-Along Theory of muscle contraction • Draw and describe Length duration curve Load and velocity of contraction		
Energetics of Muscle contraction	**P-MSK-003**	• Enumerate and explain energy sources (ATP, creatine phosphate, glycolysis) • Describe the important metabolic systems that supply energy for muscle contraction		
Characteristics of whole muscle contraction	**P-MSK-004**	• Differentiate between isometric and isotonic contraction by giving examples • Compare the fast and slow muscle fibers.		
Mechanics of skeletal muscle contraction	**P-MSK-005**	• Define motor unit • Discuss recruitment and its effect on force of contraction • Explain the mechanism of summation and Tetanization. • Describe staircase effect/Treppe phenomena • Discuss the mechanism of skeletal muscle fatigue. • Explain the remodeling of skeletal muscle to match the function. • Describe the development of macro motor units in poliomyelitis.		Integrate with Forensic Medicine

		• Explain the physiological basis of rigor mortis		
Disorders of Skeletal Muscle	**P-MSK-006**	• Explain the pathophysiological basis of muscular dystrophy		Integrate with Biochemistry
Neuromuscular junction (NMJ)	**P-MSK-007**	• Describe the physiological anatomy of NMJ • Discuss the mechanism/steps of NMJ transmission & generation of End Plate Potential • Explain features, pathophysiology & treatment of myasthenia Gravis		Integrate with Medicine
Drugs acting on Neuromuscular Junction (NMJ)	**P-MSK-008**	• Describe the enhancers & blockers of the NMJ along with their mechanism of action.		Integrate with Medicine
Excitation-Contraction Coupling in skeletal muscle	**P-MSK-009**	• Explain the mechanism of spread of muscle action potential • Discuss the steps/ events of excitation contraction coupling in skeletal muscle • Describe the pathophysiological basis of malignant hyperthermia		
Introduction to Smooth Muscle	**P-MSK-010**	• Differentiate between types of smooth muscles (unitary vs multiunit) • Describe mechanism of contraction in smooth muscle in comparison to skeletal muscle • Explain the regulation of smooth muscle contraction by calcium ions • Explain the nervous and hormonal control of smooth muscle contraction • Explain the phenomena of stress relaxation and reverse stress relaxation in smooth muscles		
Latch mechanism in smooth muscles	**P-MSK-011**	• Explain the latch mechanism • Describe the significance of latch mechanism		
Neuromuscular Junctions of Smooth Muscle	**P-MSK-012**	• Explain the physiological anatomy of neuromuscular junction of smooth muscle • Explain the excitatory and inhibitory transmitters secreted at NMJ of smooth muscles		Integrate with Pharmacology

		• Describe the mechanism of action of drugs acting on NMJ		
Action Potentials in Smooth Muscle	**P-MSK-013**	• Explain the types of membrane & action potentials in smooth muscles		
Smooth muscle contraction without action potential	**P-MSK-014**	• Explain the depolarization of multi-unit smooth muscle without action potentials • Explain the local tissue factors & hormones that can cause smooth muscle contraction without action potential • Discuss the mechanisms of smooth muscle excitation or inhibition by hormones or local tissue factors		
Introduction to Cardiac muscle	**P-MSK-015**	• Discuss the functional significance of arrangement of cardiac muscle fibers • Discuss the properties of cardiac muscles		
Action Potentials in Cardiac Muscle	**P-MSK-016**	• Describe & illustrate the phases of action potential of ventricular muscle along with the ions involved • Describe & illustrate the phases of action potential of SA node • Explain the mechanism of self excitation/ auto-rhythmicity of SA node. • Differentiate between action potential generated in ventricular versus SA nodal fiber • Define and give the duration of the Absolute and relative refractory period in cardiac muscle.		
Excitation-contraction coupling in cardiac muscle	**P-MSK-017**	• Describe the mechanism of Excitation-contraction coupling & relaxation in cardiac muscle		
Cardiac Cycle	**P-MSK-018**	• Explain & illustrate pressure & volume changes of left ventricle during cardiac cycle. • Explain & draw relationship of ECG with cardiac cycle. • Explain & draw the relationship of heart sounds with cardiac cycle.		Integrate with Medicine

		• Enlist, draw, and explain the physiological basis of atrial pressure waves in relation to cardiac cycle. • Explain & draw the aortic pressure curve		
Function Of The Ventricles As Pumps	**P-MSK-019**	• Describe the Outflow of Blood from the Ventricles During Systole • Define cardiac output, stroke volume, end diastolic volume & end systolic volume • Explain & illustrate Ventricular Volume-Pressure graph		
Function Of The Ventricles As Pumps	**P-MSK-020**	• Describe the Frank starling mechanism. • Describe the autonomic regulation of heart pumping • Describe the effect of potassium, calcium ions & temperature on heart function. • Define chronotropic effect- positive and negative. • Define the inotropic effect: positive and negative. • Define dromotropic effect: positive and negative • Describe the location of adrenergic & cholinergic receptors in heart. • Name the receptors present in coronary arterioles. • Explain sympathetic & parasympathetic effects on heart rate & conduction velocity		
Conducting system of heart	**P-MSK-021**	• Draw and explain the conducting system of heart • Describe the transmission of the cardiac impulse from SA node to ventricular muscles along with time duration & conduction velocity • Describe the physiological basis and significance of AV nodal delay. • Explain SA node as the pacemaker of the heart • Explain the ectopic pacemaker		
Fundamentals of ECG	**P-MSK-022**	• Enlist and explain the physiological basis of ECG • Describe durations of waves, intervals, and segments of normal ECG • Describe the standard limb leads, Augmented limb leads & precordial leads. • Define Einthoven's Triangle & Einthoven's law.		

		• Explain the physiological basis of upright T wave in normal ECG.		
Interpretation of ECG & mean Cardiac Axis	**P-MSK-023**	• Define and plot the mean cardiac axis. • Enlist the physiological & pathological causes of right axis deviation of heart. • Enlist the physiological & pathological causes of left axis deviation of heart • Describe the abnormalities of T wave and their causes • Describe the location and significance of J point in ECG • Explain the physiological basis of current of injury. • Enlist the ECG changes in angina pectoris. • Enlist the ECG changes in myocardial infarction.		Integrate with Medicine/Cardiology
Effect of electrolyte on ECG	**P-MSK-024**	• Describe the effect of hypokalemia and hyperkalemia on ECG. • Describe the effect of hypocalcemia and hypercalcemia on ECG.		
Cardiac arrhythmia	**P-MSK-025**	• Define tachycardia and enlist its causes. • Define bradycardia and enlist its causes • Describe the effect of hypokalemia and hyperkalemia on ECG • Describe the effect of hypocalcemia and hypercalcemia on ECG. • Define tachycardia and enlist its causes. • Define bradycardia and enlist its causes. • Classify arrhythmias • Explain the physiological basis of sinus arrythmia. • Explain the physiological basis of reflex bradycardia in Athletes. • Explain the carotid sinus syndrome. • Enlist the causes of atrioventricular block. • Explain the types of atrioventricular blocks. • Explain the ECG changes in 1st, 2nd & 3rd degree heart block. • Explain the cause, physiological basis & ECG changes in Stokes Adam syndrome/ventricular escape. • Enlist the causes of premature contractions.		

		• Explain the causes and ECG changes of premature atrial contractions. • Explain the physiological basis of pulses deficit. • Explain the causes and ECG changes in Premature Ventricular Contraction • Enlist the causes and ECG findings in Long QT syndrome. • Explain the causes, physiological basis, features, ECG changes & management of premature heartbeat. • Explain the causes, physiological basis, features, ECG changes & management of atrial fibrillation. • Explain the causes, physiological basis, features & ECG changes of ventricular fibrillation. • Explain the physiological basis, features & ECG changes of atrial flutter. • Compare Flutter and Fibrillations		
Heart Sounds	**P-MSK-026**	• Enlist the different types of heart sounds and explain the physiological basis of each. • Enlist the causes of 3rd & 4th heart sounds. • Explain the causes of splitting of 2nd heart sound • Explain the causes & physiological basis of murmurs caused by valvular lesions. • Enumerate abnormal heart sounds and describe the physiological basis of each.		Integrate with medicine/medicine

PHYSIOLOGY PRACTICALS – Musculoskeletal Module		
P-MSK-027	• Demonstrate t use of hemocytometer	RBC & Platelet Count
P-MSK-028	• Perform total WBC count	WBC Count
P-MSK-029	• Demonstrate correct technique	Determination of Bleeding Time
P-MSK-030	• Demonstrate correct technique	Determination of Clotting Time
P-MSK-031	• Perform hemoglobin estimation	Estimation of Hemoglobin (Hb)
P-MSK-032	Revision	Revision

MODULE 3 – CVS MODULE
PHYSIOLOGY CURRICULUM

TOPIC	CODE	LEARNING OUTCOMES	Number of Hours	Integrated Lectures
Organization of Circulation	**P-CVS-001**	• Explain the functional parts of circulation (arteries, arterioles, capillaries, veins, venules).		
Blood flow	**P-CVS-002**	• Explain the pressures in systemic & pulmonary circulation • Explain the types of Blood flow and significance of Reynolds number.		
Local & Humoral Control of Blood flow	**P-CVS-003**	• Describe local control of blood flow according to tissue needs. • Discuss humoral control of local blood flow. • Explain long term control of local blood flow • Describe vascular control by ions and other chemical factors. • Name the organs in which auto regulation of blood flow occurs • Explain the metabolic & myogenic mechanisms		
Nervous Regulation of circulation	**P-CVS-004**	• Explain the role of autonomic nervous system for regulating the circulation. • Describe the vasomotor center. • Explain the control of vasomotor center by higher nervous centers. • Explain emotional fainting/vasovagal syncope • Identify vessels constituting micro-capillaries • Enumerate hydrostatic and osmotic factors that underlying starling's hypothesis for capillary function.		
Rapid control of arterial blood pressure	**P-CVS-005**	• Explain the role of nervous system in rapid control of arterial blood pressure. • Explain the regulation of arterial blood pressure during exercise. • Enlist different mechanisms for short term regulation of arterial blood pressure. • Explain the role of baroreceptors in regulation of arterial blood pressure • Explain the role of chemoreceptors in regulation of arterial blood pressure • Discuss the role of Atrial volume reflexes/ Bainbridge reflex in control of blood pressure.		Integrate with Medicine

		• Describe reflex responses to increased blood volume which increase blood pressure and atrial stretch. • Describe the role of CNS ischemic response in regulation of blood pressure. • Explain the Cushing reflex • Explain the role of abdominal compression reflex to increase the arterial blood pressure.		
Role of kidneys in long term Regulation of Arterial Blood Pressure	**P-CVS-006**	• Illustrate the role of renin angiotensin system for long term control of blood pressure. • Illustrate the regulation of blood pressure in response to increase in ECF volume. • Illustrate regulation of blood pressure in response to increase in salt intake.		
Cardiac output	**P-CVS-007**	• Define cardiac output, cardiac index & venous return with their normal values. • Discuss the factors regulating cardiac output. • Discuss factors regulating venous return		Integrate Medicine/cardiology
Skeletal muscle circulation	**P-CVS-008**	• Explain the regulation of skeletal muscle blood flow at rest & during exercise.		
Coronary circulation	**P-CVS-009**	• Explain the physiological anatomy of coronary circulation. • Explain the regulation of coronary blood flow. • Explain the physiological basis of angina, myocardial & subendocardial infarction		Integrate with Medicine
Circulatory shock	**P-CVS-010**	• Define & enlist different types of shock. • Explain the causes, features, and pathophysiology of hypovolemic/hemorrhagic shock. • Explain the causes, features, and pathophysiology of septic shock. • Explain the causes, features, and pathophysiology of neurogenic shock. • Explain the causes, features, and pathophysiology of anaphylactic shock. • Discuss the treatment of different types of shock. • Explain the different stages of shock. • Explain the mechanisms that maintaining cardiac output & arterial blood pressure in non-progressive shock. • Enlist different types of positive feedback mechanisms leading toprogression of shock.		Integrate with Medicine

Cardiac Failure	**P-CVS-011**	• Define cardiac failure • Classify it into systolic and diastolic failure • **Explain pathophysiology of compensated & decompensated heart failure**		Integrate with Medicine

PHYSIOLOGY PRACTICALS – CVS Module		
Examination of Precordium	P-CVS-012	• Locate apex beat and assess its position and character
Examination of Arterial Pulse	P-CVS-013	• Demonstrate correct technique for palpation and assessment
Recording of Normal Blood Pressure	P-CVS-014	• Demonstrate accurate measurement technique
Effect of Posture & Exercise on Normal Blood Pressure	P-CVS-015	• Record BP in different postures and after exercise
Determination of JVP	P-CVS-016	• Demonstrate correct positioning and technique for estimation of JVP
Recording of ECG	P-CVS-017	• Perform correct electrode placement and record a normal ECG

MODULE 4 - RESPIRATORY MODULE
PHYSIOLOGY CURRICULUM

TOPIC	CODE	SPECIFIC LEARNING OUTCOMES	Number of Hours	Integrated Lectures
Breathing	**P-R-001**	• Enlist the muscles of inspiration and expiration in quiet breathing • Enlist the muscles of inspiration and expiration in labored breathing • Explain the components of the work of breathing • Discuss the mechanics of pulmonary ventilation • Explain abnormal patterns of breathing (periodic, kussmaul) • Explain the causes and pathophysiology of sleep apnea		Integrate with Anatomy Integrate with medicine
Lung compliance	**P-R-002**	• Define lung compliance • Enlist the factors that affect lung compliance • Draw the compliance diagram of air filled and saline filled lungs • Enlist the components of surfactant • Describe the role of surfactant in lung compliance • Explain the role of surfactant in premature babies		Integrate with Pediatrics
Lung volume and capacities	**P-R-003**	• Define the different lung volumes and capacities and their clinical significance • Enlist the lung volumes and capacities that cannot be measured by spirometer. • Define dead space & explain its types		
Lung volume and capacities	**P-R-004**	• Discuss fev1/ FVC ratio and its clinical significance • Discuss FEV1/FVC ratio in relation to Bronchial Asthma. • Discuss FEV1/FVC ratio in relation to Chronic Obstructive Pulmonary disease/restrictive lung diseases • Discuss FEV1/FVC ratio in relation to pulmonary embolism • Define alveolar ventilation. • Define minute respiratory volume • Describe the pressures in the pulmonary system.		Integrate with Pulmonology
Pulmonary Circulation	**P-R-005**	• Describe the blood volume of the Lungs • Describe the distribution and regulation of blood flow through the lungs. • Describe the mechanics of blood flow in the three blood flow zones of the lung • Describe the effect of heavy exercise on pulmonary arterial pressure.		

		• Describe the function of pulmonary circulation when left atrial pressure rises as a result of left-sided heart failure. • Explain pulmonary capillary dynamics.		
Pulmonary Edema, and Pleural Fluid	**P-R-006**	• Discuss pathophysiology and common causes of pulmonary edema. • Explain the safety factors that prevent pulmonary edema. • Explain the physiological basis of the presence of fluid normally in the pleural cavity. • Define pleural effusion and give its causes.		
Principles of Gaseous Exchange	**P-R-007**	• Explain the ultrastructure of respiratory membrane • Discuss the factors affecting diffusion of gases across the respiratory membrane • Explain the diffusion capacity of respiratory membrane for oxygen and carbon dioxide • Define alveolar, pleural and transpulmonary pressure. • Explain differences in the partial pressures of atmospheric, humidified, alveolar air and explain physiological basis of change in each pressure		
Transport of oxygen in the blood	**P-R-008**	• Explain the different forms of transport of oxygen in the blood		
Transport of oxygen in the blood	**P-R-009**	• Draw and explain oxy-hemoglobin dissociation Curve • Enlist the factors that cause rightward shift of Oxyhemoglobin dissociation curve. • Enlist the factors that cause leftward shift of Oxyhemoglobin dissociation curve • Explain the Bohr's effect • Define cyanosis & enlist its types and causes		Integrate with Medicine
Transport of CO2 in the blood	**P-R-010**	• Enlist different forms in which C02 is transported in the blood. • Explain the carboxyhemoglobin dissociation curve. • Explain the Haldane effect. • Explain the chloride shift/Hamburger phenomenon. • Define the respiratory exchange ratio (RER)		
VA/Q (Ventilation Perfusion Ratio)	**P-R-011**	• Explain the alveolar oxygen and carbon dioxide pressure when VA/Q = infinity, zero and normal • Explain the concept of physiological shunt when VAQ ratio is less than normal • Explain the concept of physiological dead space when VA/Q ratio is above normal		

Protective Reflexes	**P-R-012**	• Enlist the respiratory & non-respiratory functions of lungs. • Explain the nervous control of bronchiolar musculature • Trace the reflex arc of cough reflex and sneeze reflex		
Aviation and space	**P-R-013**	• Explain the principal means by which acclimatization occurs • Explain the events that occur during acute mountain sickness • Enlist the features of chronic mountain sickness		
Deep sea diving	**P-R-014**	• Explain the pathophysiology, features, prevention and treatment of decompression sickness		
CO poisoning Nervous regulation of respiration	**P-R-015**	• Draw and explain the effect of CO poisoning on oxyhemoglobin dissociation curve • Explain the pathophysiology, features, and treatment of CO poisoning. • Enumerate the components of respiratory centers and explain their functions. • Explain the inspiratory RAMP signal • Explain the Herring Breuer reflex lung inflation reflex and its clinical significance		Integrate with medicine
Chemical control of respiration Exercise and respiration	**P-R-016**	• Explain the location of chemo sensitive area and peripheral chemoreceptors • Explain the effect of hydrogen ions & carbon dioxide on the chemo- sensitive area • Explain the role of oxygen in the control of respiration/peripheral chemoreceptors • Explain the regulation of Respiration during Exercise		
Hypoxia	**P-R-017**	• Enlist the effects of acute hypoxia • Explain the hypoxia inducible factor a master switch for body response to hypoxia • Define and explain different types of hypoxias		Integrate with Medicine
Tuberculosis Pneumonia Dyspnea	**P-R-018**	• Explain the pathophysiology of Tuberculosis. • Describe the pathophysiology of Pneumonia • Enlist different causes of dyspnea • Differentiate between cardiac and respiratory dyspnea • Outline management strategies for dyspnea		Integrate with pathology General Medicine
Pneumothorax	**P-R-019**	• Enlist the causes of Pneumothorax		Integration with Surgery

		• Describe the signs and symptoms of Pneumothorax		
Pleuritis	**P-R-020**	• Enlist the causes of Pleuritis • Describe the signs and symptoms of Pleuritis • Discuss the management of Pleuritis		Integration with Surgery
Bronchitis	**P-R-021**	• Enlist the causes of Bronchitis • Discuss the signs and symptoms of Bronchitis • Discuss the management of Bronchitis		Integration with GeneralMedicine
Pneumonia	**P-R-022**	• Discuss the management of pneumonia • Discuss the sign symptoms of pneumonia • Discuss the management of pneumonia		Integration with GeneralMedicine
Asthma	**P-R-023**	• Classify different types of asthma • Discuss the signs and symptoms of asthma • Discuss the management of asthma		Integration with GeneralMedicine
Tuberculosis	**P-R-024**	• Classify different types of Tuberculosis • Discuss the signs and symptoms of tuberculosis • Discuss the management of Tuberculosis		Integration with GeneralMedicine
Acute respiratory distress syndrome	**P-R-025**	• Classify different types of acute respiratory distress Syndrome • Discuss the signs and symptoms of acute respiratory distress syndrome • Discuss the management of acute respiratory distress syndrome		Integration with GeneralMedicine
Respiratory Failure	**P-R-026**	• Define respiratory failure • Describe various types of respiratory failure • Enlist various causes of respiratory failure • Outline management strategies of respiratory failure		Integration with GeneralMedicine

Spirometry	P-R-027	• Perform spirometry following standard procedure • Identify and interpret basic spirometric parameters (TV, VC, FEV_1, FVC, FEV_1/FVC)
Determination of Peak Expiratory Flowrate	P-R-028	• Demonstrate correct technique
Determination of Oxygen saturation by Pulse Oximeter	P-R-029	• Accurately measure oxygen saturation
Examination of Respiratory System	P-R-030	• Demonstrate systematic procedure
Cardiopulmonary Resuscitation (CPR)	P-R-031	• Demonstrate basic life support

MODULE 5 - BLOOD & IMMUNITY MODULE
PHYSIOLOGY CURRICULUM

TOPIC	CODE	SPECIFIC LEARNING OUTCOMES	Number of Hours	Integrated Lectures
Blood Composition	**P-BI-001**	• Enumerate the functions of blood • Explain the composition of blood • Enumerate plasma proteins • Describe the functions of plasma proteins • Explain the causes of hypoproteinemia • Explain the pathophysiology of edema		
Red Blood Cells	**P-BI-002**	• Define Hematopoiesis • Explain the role of Growth inducers and differentiation inducers in hematopoiesis • Explain different types of bone marrow • Describe the morphology of RBC • Discuss the characteristics of red blood cells • Enumerate the different sites of erythropoiesis at different ages • Discuss steps of erythropoiesis		

		• Enumerate factors that regulate erythropoiesis • Explain Erythropoietin • Discuss Erythropoietin synthesis and release • Explain the significance of vitamin B12 and folic acid in maturation of red blood cell		
Hemoglobin	**P-BI-003**	• Enumerate the types of normal hemoglobin in different ages of life • Explain the role of Iron in Hemoglobin formation. • Define blood indices, give their normal values & enumerate the conditions in which these values are disturbed • Enlist the abnormal types of hemoglobin		
Anemia	**P-BI-004**	• Define, classify and explain anemia on the basis of morphology and cause • Discuss the effects of anemia on the body		
Polycythemia	**P-BI-005**	• Define polycythemia • Explain types of polycythemias • Discuss the effects of polycythemia on the body		
White Blood Cells	**P-BI-006**	• Enumerate the types of white blood cells • Describe the characteristics and functions of Neutrophils • Explain the process of defense against invading agent by neutrophils • Define leukocytosis and leukopenia • Explain the effects of leukemia on body • Explain the process of defense against invading agent by macrophages • Discuss different lines of defense during inflammation • Explain the functions of neutrophils and macrophages in spread of inflammation (walling off effect) • Define the Reticuloendothelial system Enlist the different components of Reticuloendothelial system • Explain the characteristics and functions of basophils • Explain the characteristics and functions of eosinophils and enlist conditions in which these cells are raised.		
Immunity	**P-BI-007**	• Define immunity • Classify immunity • Explain humoral immunity • Explain Innate immunity. • Elaborate cell mediated immunity.		

		• Describe the structure of antigen and immunoglobulin • Describe the role of Helper T-cells in cell mediated immunity • Enlist the types of Immunoglobulins along with their functions • Explain the role of memory cells in enhancing antibody response (secondary response) • Describe the mechanism of action of antibodies Elaborate the complement system.		
Tolerance	**P-BI-008**	• Elaborate Immune tolerance • Explain the process of clone selection during T cell processing • Discuss the failure of tolerance mechanism		
Immunization	**P-BI-009**	• Discuss immunization. • Define passive Immunity • Explain features and physiological basis of delayed reaction allergy. • Explain features and physiological basis of Atopic Allergy • Explain features and physiological basis of Anaphylaxis, urticaria and hay fever		Integrate with Community Medicine
Blood Types & Blood group Incompatibility	**P-BI-010**	• Enumerate different blood group types. • Explain the basis of ABO and Rh blood system • Explain the Landsteiner law • Discuss the pathophysiology, features and treatment of ABO and RH incompatibility. • Enlist the changes that take place in the stored Blood.		
Blood mismatch Transfusion reactions	**P-BI-011**	• Discuss the features and complications of mismatched blood transfusion reaction • Describe the Hazards of blood transfusion. Transfusion reactions • Elaborate the Transplantation of Tissues and Organs		Integrate with Medicine
Transplantation of tissues	**P-BI-012**	• Explain the process of tissue typing • Integrate with pathology Transplantation of tissues • Explain the prevention of Graft Rejection by suppressing immune system		
Hemostasis Platelets	**P-BI-013**	• Describe the mechanisms by which hemostasis is secured • Discuss the characteristics and functions of platelets • Explain the mechanism of formation of platelet plug		

Coagulation factors	**P-BI-014**	• Enlist the clotting factors in blood • Explain the conversion of prothrombin to thrombin & formation of fibrin Fibers • Explain the intrinsic & extrinsic clotting pathway. • Name & explain the mechanism of anticoagulants used in laboratory. • Explain the factors that prevent intravascular coagulation • Explain the role of Calcium ions in intrinsic and extrinsic pathways • Enlist the vitamin-K dependent clotting factors • Explain the prothrombin time, International Normalized Ratio and its clinical significance.		
Coagulation disorders	**P-BI-015**	• Enlist and explain the conditions that cause excessive bleeding • Coagulation disorders • Define thrombocytopenia • Enlist the causes and consequences of Thrombocytopenia		Integrate with Medicine

PHYSIOLOGY PRACTICALS – Blood & Immunity Module		
Differential Leucocyte Count	**P-BI-016**	• Identify and differentiate various leukocytes
Normal RBC, Hct, Hb & platelet report	**P-BI-017**	• Interpret normal hematological indices
Abnormal RBC, Hct, Hb & . platelet report	**P-BI-018** .	• Analyze abnormal hematological parameters .
Normal TLC & DLC report	**P-BI-019**	• Interpret normal total and differential leukocyte counts
Abnormal TLC and DLC report	**P-BI-020**	• Interpret abnormal TLC/DLC patterns (e.g., leukocytosis, leukopenia)
Determination of Blood Group	**P-BI-021**	• Correctly perform ABO and Rh blood grouping

MODULE 6 CORE CONCEPT
PHYSIOLOGY CURRICULUM

TOPIC	CODE	SPECIFIC LEARNING OUTCOMES	Number of Hours	Integrated Lectures

Regulation of Core Body Temperature	**P-IM-001**	• Define core body temperature and explain its physiological set point • Explain the **roles of hypothalamus, skin, and viscera in thermoregulation** • Describe **mechanisms of heat production** (basal metabolism, muscle activity, shivering) • Describe mechanisms of **heat loss** (radiation, conduction, convection, evaporation) • Explain **physiological responses to hyperthermia & hypothermia** • Relate **thermoregulatory failure** to clinical conditions such as fever, heat stroke, or hypothermia		
Aviation and space	**P-IM-002**	• Explain the principal means by which acclimatization occurs • Explain the events that occur during acute mountain sickness • Enlist the features of chronic mountain sickness • Explain the effect of positive & negative G on the body		
Deep sea diving	**P-IM-003**	• Explain the pathophysiology, features, prevention and treatment of nitrogen narcosis & decompression sickness		
Sports Physiology	**P-IM-004**	• Describe muscle metabolic systems in exercise • Discuss the energy systems used in different sports • Explain the effect of athletic training on performance • Differentiate between fast & slow twitch muscle fibers • Describe adaptations in major body systems during exercise • Explain VO2 max and its significance		

PHYSIOLOGY PRACTICALS – Core Concepts Module		
Recording of core body temperature	**P-IM-002**	• Demonstrate **correct technique**
Osmotic Fragility	**P-IM-002**	• Demonstrate **correct procedure**
Triple response	**P-IM-003**	• Demonstrate **elicitation of triple response**
Mock OSPE Block 1	**P-IM-004**	• Introduction to new assessment tool for laboratory skills
Mock OSPE Block 2	**P-IM-005**	• Introduction to new assessment tool for laboratory skills
Mock OSPE Block 3	**P-IM-006**	• Introduction to new assessment tool for laboratory skills

ANNEXURE 4

Timetable

Day	08:00-10:00	10:00-10:30	10:30-11:30	11:30-12:30	12:30-02:30	
Monday	**Practical** Histology C Physiology A Biochemistry B **Tutorial** Biochemistry D	BREAK	Biochemistry Lecture	Anatomy Lecture	Anatomy Demonstration	Anatomy Dissection
Tuesday	**Practical** Histology A Physiology B Biochemistry D **Tutorial** Biochemistry C		Physiology Lecture	Anatomy Lecture	Anatomy Demonstration	Anatomy Dissection
Wednesday	**Practical** Histology D Physiology C Biochemistry A **Tutorial** Biochemistry B		Anatomy Lecture	Biochemistry Lecture	Anatomy Dissection	
Thursday	**Practical** Histology B Physiology D Biochemistry C **Tutorial** Biochemistry A		Biochemistry Lecture	Physiology Lecture	Anatomy Demonstration	Anatomy Dissection
Friday	Physiology Tutorial	10:00 – 11:00 Physiology Lecture		11:00 – 12:00 K – PRISM		

Saturday	08:00 – 09:00 **K – PRISM**	09:00 – 10: 30 **K – CORE**	**BREAK** 10:30 – 11:00	11:00 – 12:00 Physiology Lecture	12:00 – 01:00 Biochemistry Lecture	01:00 – 02:00 Anatomy / SDL

ANNEXURE 5

ASSESSMENT PLANNER – 2026
FIRST YEAR MBBS
Proposed Dates

BLOCK 1	BLOCK 2	BLOCK 3	Professional examination
31st January 2026 to 14th May 2026	16th May 2026 to 14th September 2026	15th September 2026 to 9th December 2026	1st January 2027

ASSESSMENT	SUBJECT	DATE (proposed)	Assessment Tool
Foundation Module	Anatomy Biochemistry Physiology	End module	SEQ/MCQ/VIVA/OSPE
Musculoskeletal Module	Anatomy Biochemistry Physiology	End module	SEQ/MCQ/VIVA/OSPE
Block 1		**Written: 11th May 2026** **OSPE: 12th to 14th May 2026**	SEQ / MCQ / OSPE / OSVE
Cardiovascular Module	Anatomy Biochemistry Physiology	End module	SEQ/MCQ/VIVA/OSPE
Respiratory Module	Anatomy Biochemistry Physiology	End module	SEQ/MCQ/VIVA/OSPE
Block 2		**Written: 9th September 2026** **OSPE: 11th to 14th September 2026**	SEQ / MCQ / OSPE / OSVE

Blood & Immunity Module	Anatomy Biochemistry Physiology	End module	SEQ/MCQ/VIVA/OSPE
Core concepts Module	Anatomy Biochemistry Physiology	End module	SEQ/MCQ/VIVA/OSPE
Block 3		**Written: 5th December 2026** **OSPE: 7th, 8th and 9th December 2026**	SEQ / MCQ / OSPE / OSVE

ANNEXURE 6

Islamic Studies (General)

Total Contact Hours: 25 Lectures

Course Introduction

This course provides a comprehensive understanding of Islamic teachings in relation to human creation, human dignity, professional responsibilities, leadership, social harmony, environmental ethics, and contemporary intellectual challenges. Grounded in the Qur'an and Sunnah, the course explores the Islamic perspective on human creation and sanctity of life, professional ethics, Prophetic medicine (Tibb al-Nabawi), patients' rights, Islamic guidance during pandemics, and modern intellectual debates such as secularism, atheism, Islamophobia, and globalization.

Islamic studies will be included in K-PRISM lecture schedule.

Course Objectives

1. Understand the Qur'anic concept of human creation and dignity.
2. Recognize the sanctity of life from an Islamic perspective.
3. Apply Islamic ethical principles in professional settings
4. Understand Prophetic medicine and Islamic health guidance
5. Analyze Prophetic leadership, consultation, and administration.
6. Critically examine contemporary intellectual challenges.
7. Understand Islamic teachings regarding sustainable development and environmental responsibility.
8. Develop moral qualities such as empathy, resilience, and optimism.

Learning Objectives

Upon successful completion of the course, students will be able to:

1. Discuss the Qur'anic concept of human creation and dignity.
2. Apply Islamic ethical principles in medical and professional contexts.
3. Discuss the significance of Prophetic medicine in contemporary healthcare discussions.
4. Analyze the Prophet's (PBUH) model of leadership, consultation, and administration.
5. Critically evaluate secularism, atheism, Islamophobia, and globalization from an Islamic perspective.
6. Demonstrate understanding of patients' rights and professional responsibilities.
7. Explain Islamic guidance regarding environmental ethics and sustainable development.

Course Contents / Weekly Breakdown (25 Lectures)

PART I: HUMAN BEING AND ISLAMIC WORLDVIEW

- **Lecture 1**: Qur'anic Concept of Human Creation
- **Lecture 2**: Stages of Human Creation in the Qur'an
- **Lecture 3**: Human Dignity and Honor in Islam
- **Lecture 4**: Sanctity and Protection of Human Life
- **Lecture 5**: Resilience in the Light of Qur'an and Sunnah
- **Lecture 6**: Hope and Optimism in Worship

PART II: PROFESSIONAL AND ETHICAL DIMENSIONS

- **Lecture 7**: Professionalism and Islamic Ethical Principles
- **Lecture 8**: Empathy and Human Relations
- **Lecture 9**: Mediation and Conflict Resolution in Islam
- **Lecture 10**: Patients' Rights in Islamic Teachings
- **Lecture 11**: Medical Responsibilities and Ethical Accountability
- **Lecture 12**: Prophetic Medicine (Tibb al-Nabawi): Principles
- **Lecture 13**: Lifestyle of the Prophet (PBUH) and Healthy Living
- **Lecture 14**: Islamic Teachings During Pandemics

PART III: LEADERSHIP AND INSTITUTIONAL MODEL

- **Lecture 15**: Concept of Leadership in Islam
- **Lecture 16**: The Prophet (PBUH) as a Teacher
- **Lecture 17**: The Prophetic Model of Consultation (Shura)
- **Lecture 18**: The Prophet (PBUH) as an Administrator

PART IV: SOCIAL AND GLOBAL PERSPECTIVES

- **Lecture 19**: Pluralistic Society and Islamic Guidance
- **Lecture 20**: Welfare Society in Islam
- **Lecture 21**: Globalization and Islamic Thought
- **Lecture 22**: Sustainable Development from an Islamic Perspective
- **Lecture 23**: Islam and Environmental Ethics

PART V: CONTEMPORARY INTELLECTUAL CHALLENGES

- **Lecture 24**: Secularism and Atheism: Introduction and Critical Review
- **Lecture 25**: Islamophobia and Contemporary Islamic Character Building